

MODELS APLPT - APOLLO PROCESS TIME INDICATOR AND PBLPT - 4/5 DIGIT MODULE FOR USE WITH THE LARGE DIGIT DISPLAY (LDD)

- DISPLAYS INVERSE OF INPUT RATE
- 2 MODELS: 9999 & 999-59
- 0.56" (14.2 mm) HIGH LED DISPLAY (APLPT)
- EASY SELECTION OF DISPLAY & SCALE MULTIPLIER VALUES
- PROGRAMMABLE INPUT CIRCUIT. ACCEPTS OUTPUTS FROM A WIDE VARIETY OF SENSORS
- DECIMAL MODE SELECT (9999 Model Only)
- POWER-UP SELF-TEST
- 0.02% ACCURACY
- INPUT RATE 0.05 CPS TO 10,000 CPS
- 8 PULSE MOVING WINDOW AVERAGE BELOW 3 CPS (Selectable)
- NEMA 4/IP65 SEALED FRONT METAL BEZEL



DESCRIPTION

The Apollo Process Time Indicator (Model APLPT) and Module (Model PBLPT) displays a value representing the time between a beginning and end point of a process, such as a conveyor oven.

The unit's display will update inversely in relation to the input signal frequency. As input frequency increases (representing speed), the APLPT/PBLPT time display decreases, indicating a reduction in the duration of process time. For example, the baking time through an oven is inversely proportional to the conveyor speed.

The APLPT/PBLPT is available in two versions: The Decimal Point version, APLPT4/PBLPT4, that has 4 digits with different modes that provide for decimal points; and the chronometer display version, APLPT5/PBLPT5, which will show as its maximum value, 999-59.

The units have a feature called "moving window average". This allows one time disturbances, or irregularly spaced items to be averaged over eight input pulses, thus keeping display fluctuations to a minimum while still updating the display on every input pulse. This feature can be enabled or disabled by a side panel DIP switch.

The units can accommodate magnetic pickups, logic sensors, and NPN open collector sensors, as well as switch contact closure sensors.

These units have a self-test feature, which checks all the micro-processor and display driver circuitry at power-up (if enabled). This self-test can also be used to test display and scale multiplier select DIP switches to make certain all switches are functioning properly.

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 and to set the scale multiplier value.

The Model APLPT 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 installation. The Model APLPT has a 0.56" high LED display, which is readable to 23 feet (7 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.



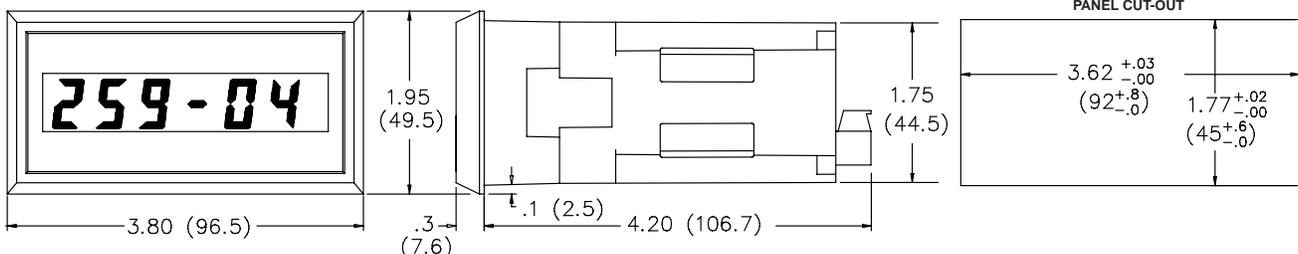
CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.



CAUTION:
Risk of electric shock.

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) formounting clip installation is 2.1" (53.4) H x 5.5" (140) W.



SPECIFICATIONS

- DISPLAY:** 4 or 5-digit, 0.56" (14.2 mm) high LED, display. (APLPT)
- POWER REQUIREMENTS:**

APLPT
AC Operation: Available in two voltage ranges. 115 VAC ($\pm 10\%$) or 230 VAC ($\pm 10\%$), 50/60 Hz, 14 VA.
DC Operation: 11 to 14 VDC @ 0.6A max.

PBLPT
AC Operation: Switch selected via the LDD power supply board, 115/230 ($\pm 10\%$), 50/60 Hz, 10 VA for 4-digit, 15 VA for 6-digit (including LDD).
- SENSOR POWER:** +12 VDC, $\pm 25\%$ @ 100 mA max.
- OPERATING FREQUENCY RANGE:** 0.05 pulse/sec. to 10,000 pulse/sec.
Note: When the value to be displayed exceeds the full scale display capacity, all dashes are displayed. If input rate is too low, the unit will display a zero.
- ACCURACY AND REPEATABILITY:** 0.02%
- DISPLAY MULTIPLIER INCREMENT TOTAL, SELECTION RANGE:**
 From 1 to 16,383.
- SCALE MULTIPLIER VALUES:** 1, 10, 100, 1000.
- DISPLAY UPDATE TIME:** The display will update every 0.65 sec. plus one input pulse when the input pulse rate is 1.54 PPS or higher. When the input pulse rate is below 1.54 PPS, the display will update on every input pulse.
Note: When the input pulse rate is 3 PPS or lower, the unit will utilize, if selected, a technique known as a "moving window average". (This continually averages the last eight input pulses.)
- MAXIMUM INPUT VOLTAGE AND CURRENT:** When the "SIG. IN" (Terminal 5) is driven from external signal voltages, maximum allowable voltage swing is ± 50 V peak. Input voltage can be dropped by an external series resistance that limits input current to ± 5 mA. (These ratings are for S3 "OFF".)
- INPUT IMPEDANCE:** When S1 and S3 "OFF", the resistive input impedance exceeds 1 megohm as long as the "SIG. IN" (Terminal 5) input voltage is between zero and +12 VDC. Beyond these levels, the high and low clamping diode will start to conduct, thus decreasing the input impedance. With S3 "ON" the maximum input voltage to Terminal 5 must be limited to 28 VDC.
- PARALLELING WITH APOLLO TOTALIZER INPUTS (RLC standard count input):** Apollo Process Time Indicators may be parallel connected with counters having the RLC standard count input circuitry. These can operate from a common current sink or source sensor by connecting the appropriate terminals in common. S3 on the APLPT/PBLPT should be turned "OFF" since pull-up or pull-down resistors are already present in the counter. The unit will not add appreciable sensor load with this arrangement.
Note: The APLPT/PBLPT cannot be operated in parallel with standard input counters when 2-wire proximity sensors are used.
- 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.

13. 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

ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2

Electrostatic discharge	EN 61000-4-2	Level 2; 4 Kv contact ¹ Level 3; 8 Kv air
Electromagnetic RF fields	EN 61000-4-3	Level 3; 10 V/m 80 MHz - 1 GHz
Fast transients (burst)	EN 61000-4-4	Level 4; 2 Kv I/O ² Level 3; 2 Kv power
RF conducted interference	EN 61000-4-6	Level 3; 10 V/rms 150 KHz - 80 MHz
Power frequency magnetic fields	EN 61000-4-8	Level 4; 10 A/m
Simulation of cordless telephone	ENV 50204	Level 3; 10 V/m 900 MHz \pm 5 MHz 200 Hz, 50% duty cycle

Emissions to EN 50081-2

RF interference	EN 55011	Enclosure class A Power mains class A
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Notes for APLPT only:

- Metal bezel of unit connected to earth ground (protective earth) at the mounting panel.
- EMI filter placed on the DC power supply, when DC powered: Corcom #1VB3 or Schaffner #FN610-1/07 (RLC #LFIL0000).

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

14. ENVIRONMENTAL CONDITIONS:

Operating Temperature Range: 0 to 50°C

Storage Temperature Range: -40 to 70°C

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

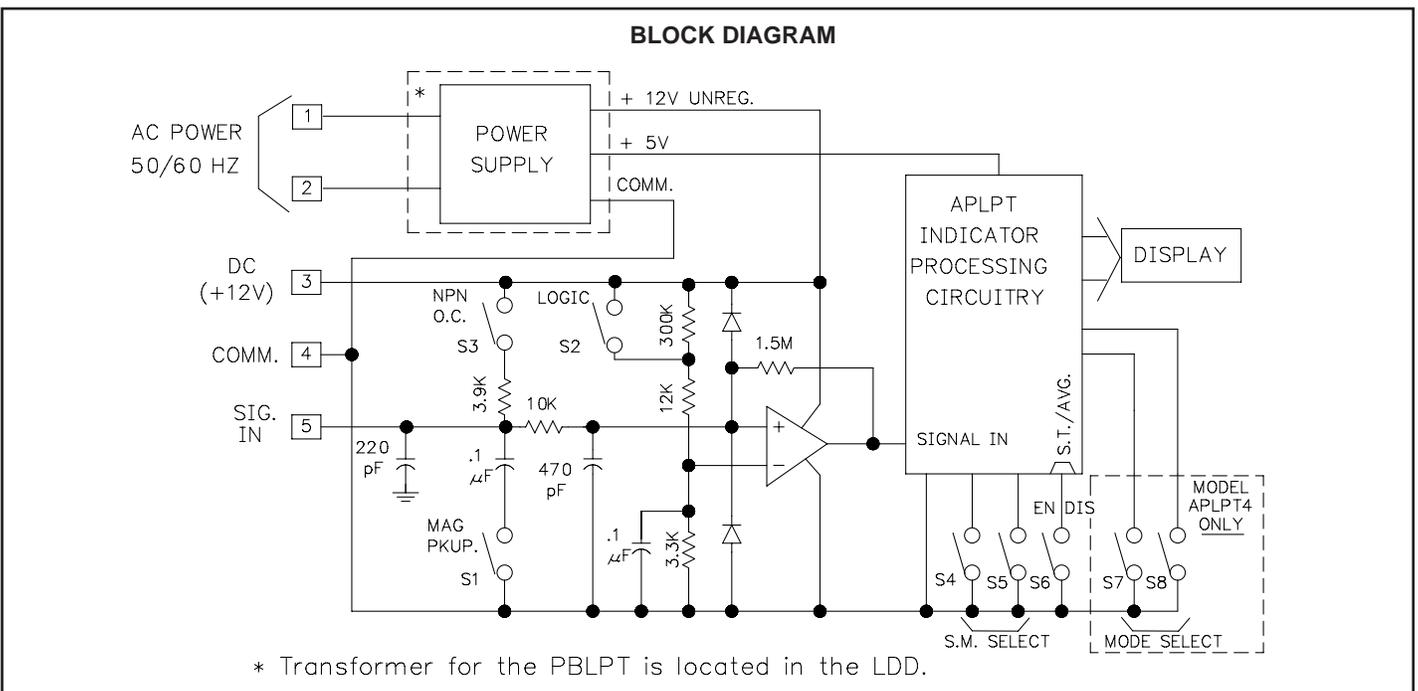
Altitude: Up to 2000 meters

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

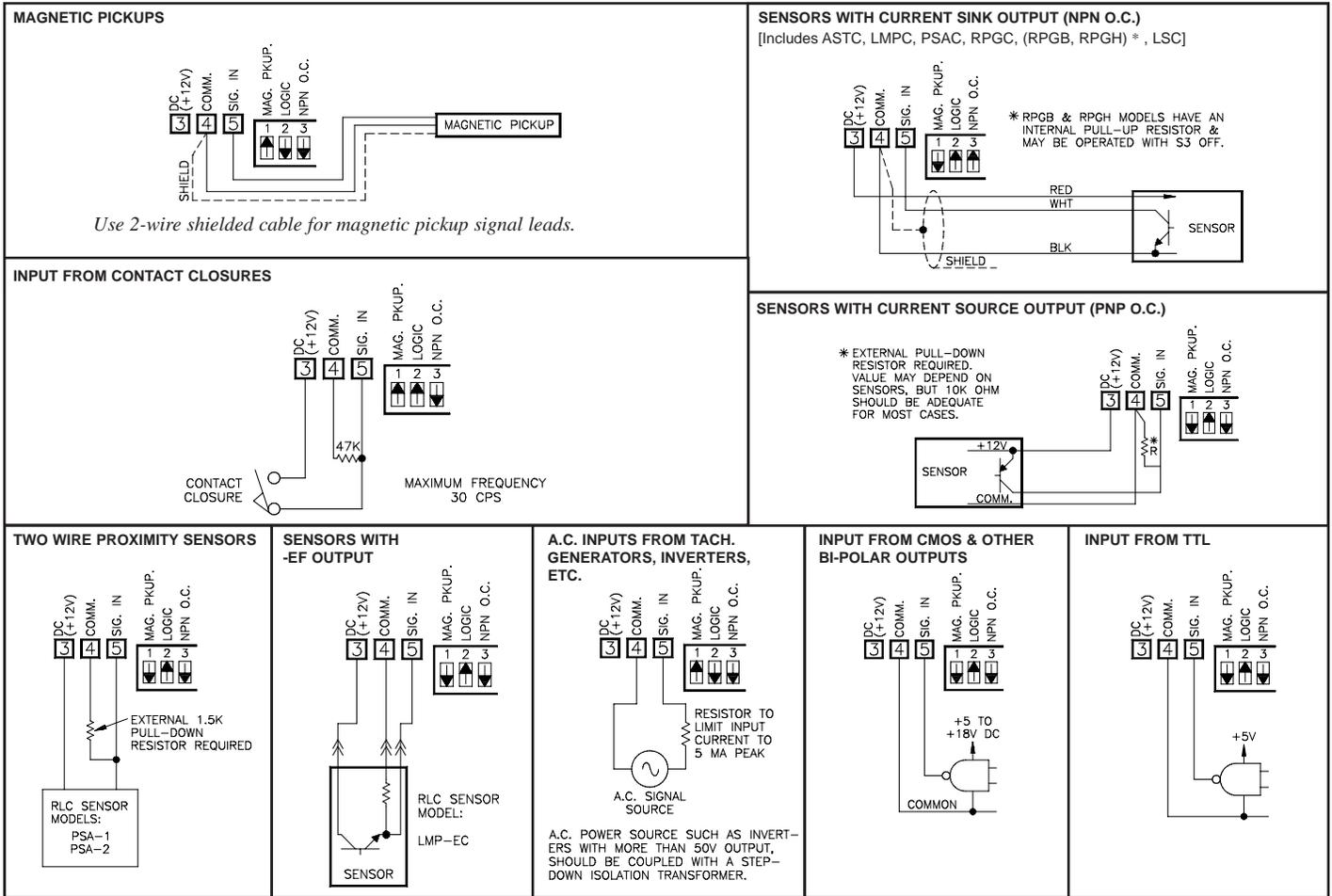
16. WEIGHT:

APLPT: 1.5 lbs. (0.8 Kg)

PBLPT: 0.4 lbs (0.18 Kg)



CONNECTIONS & CONFIGURATION SWITCH SET-UP FOR VARIOUS SENSOR OUTPUTS

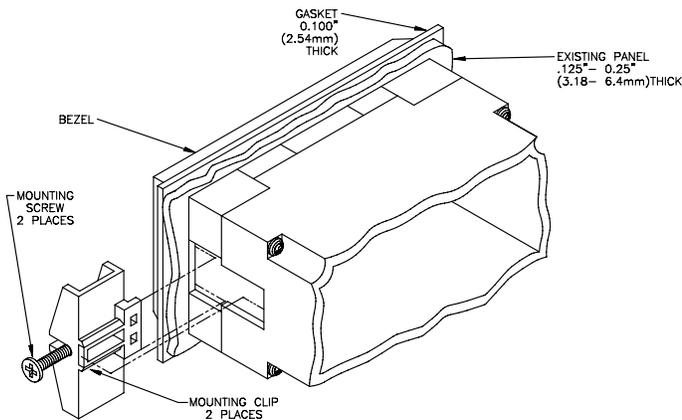


INSTALLATION ENVIRONMENT

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.



INSTALLATION

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

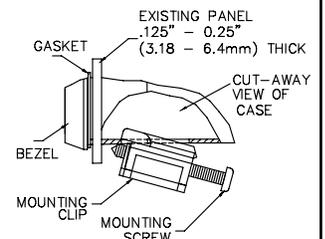
The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The Apollo Indicators are intended to be mounted into an enclosed panel with a gasket to provide a water-tight seal. Two mounting clips and screws are provided for easy installation. Consideration should be given to the 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".)

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.



DISPLAY MULTIPLIER SELECTION PROCEDURE

The APLPT/PBLPT has a Display Multiplier Selection range from 1 to 16,383. For the minimum scaled reading, the X1 DIP switch would be set to "ON". For the maximum scaled reading (16,383 times the measured time between input pulses), all of the rear panel DMIT DIP switches would be turned "ON". Therefore, a specific Display Multiplier Increment Total is achieved by adding up the appropriate individual display multiplier values.

Also available are four scale multiplier (SM) values of X1, X10, X100, and X1000, which are controlled by DIP switches 4 and 5 on the side of the unit. The X10, X100, and X1000 scale multiplier values can be used when the required DMIT exceeds 16,383. *Note: Always use the smallest SM value possible.* Below is a formula to compute the DMIT. *Note: This same basic formula applies to all units.* However, for the APLPT5/PBLPT5 the D.R. must be converted to a base unit of measurement.

DMIT = D.R. x P.P.S.
 DMIT = Display Multiplier Increment Total
 DR = Desired Reading (In hrs., mins., sec., days, etc.)
 PPS = Pulses Per Second (input)

NOTES:

- For the APLPT5/PBLPT5, the display value must be converted to its base units. To do this, multiply the value to the left of the dash by 60 and add it to the value to the right of the dash.
- If the required DMIT value exceeds 16,383, then a scale multiplier value greater than 1 will be needed. But always use the smallest SM possible.

EXAMPLE 1 (for APLPT4):

DESIRED READING = 18 minutes
 PULSES PER SECOND = 450 pulses per second
 DMIT = 18×450 P.P.S.
 = 8100
 DMIT = 8100

The required DMIT does not exceed 16,383, therefore, use a value of 1 for the S.M.

The appropriate display multiplier switches (which together add up to 8100), are then set to "ON". Start by selecting the first increment which is greater than half the desired DMIT, and add subsequent increments that are more than half the difference needed.

DMIT = 8100

DIP switch 13	-	4096	Needed = 4004
DIP switch 12	-	2048	Needed = 1956
DIP switch 11	-	1024	Needed = 932
DIP switch 10	-	512	Needed = 420
DIP switch 9	-	256	Needed = 164
DIP switch 8	-	128	Needed = 36
DIP switch 6	-	32	Needed = 4
DIP switch 3	-	4	

Therefore, DIP switches 3, 6, 8, 9, 10, 11, 12, and 13 would be set to "ON".

Note: If the desired reading is 18.0, the SM can be set for a value of 10. (To get the D.P. required, the unit must be powered down, then switches 7 and 8 set appropriately, then powered back up.)

EXAMPLE 2 (for APLPT5):

DESIRED READING = 2 hours and 23 minutes (2-23)
 PULSES PER SECOND = 230 pulses per second

First convert the D.R. to its base units.

D.R. = 2 (hours) x 60 + 23 DMIT = 143×230 PPS
 = 120 + 23 = 32,890
 = 143 DMIT = $32,890 \div 10^*$
 DMIT = 3,289

* Since the required DMIT does exceed 16,383, a value of 10 is used for the S.M.

DMIT = 3289

DIP switch 12	-	2048	Needed = 1241
DIP switch 11	-	1024	Needed = 217
DIP switch 8	-	128	Needed = 89
DIP switch 7	-	64	Needed = 25
DIP switch 5	-	16	Needed = 9
DIP switch 4	-	8	Needed = 1
DIP switch 1	-	1	

Therefore, DIP switches 1, 4, 5, 7, 8, 11, and 12 would be set to "ON" for a display of 2-23. DIP switch 4 on the side panel must be set to "ON" to obtain the S.M. value of 10.

BREAD BAKING APPLICATION

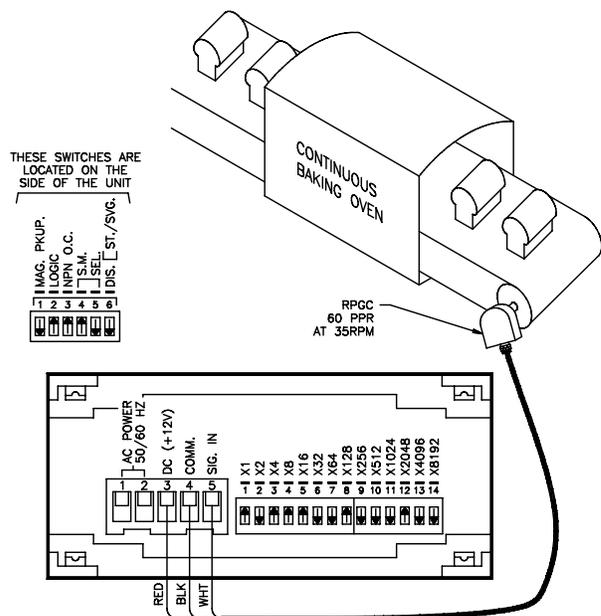
Loaves of bread are being baked in a continuous baking oven. It has been determined that 10 minutes and 30 seconds is normally required for a loaf to progress through the oven (this provides enough time for the loaves to be baked). An RPGC, with 60 PPR, is attached to one of the conveyor belt shafts. When the conveyor belt moves at the 10 min.-30 sec. rate, the shaft turns at 35 RPM. An APLPT5 is used to display the value of 10 min. and 30 sec. Using the formula, the required DIP switch settings are obtained.

PPS = 60 PPR x 35 RPM = 2100 PPM ÷ 60	DMIT = D.R. x P.P.S.
PPS = 35	= 630 x 35
DR = 10 min. & 30 sec. (convert min. to sec.)	DMIT = 22,050
DR = (10 min. x 60) + 30	DMIT = 22,050 ÷ 10*
DR = 630	DMIT = 2,205

* A scale multiplier of 10 is selected because a value greater than 16,383 is required.

DIP switch 12	-	2048	Needed = 157
DIP switch 8	-	128	Needed = 29
DIP switch 5	-	16	Needed = 13
DIP switch 4	-	8	Needed = 5
DIP switch 3	-	4	Needed = 1
DIP switch 1	-	1	

Therefore, DIP switches 1, 3, 4, 5, 8, and 12 must be turned "ON". Also, DIP switch 4 on the side panel must be set "ON" to get a multiplier value of 10.



ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES	
		230 VAC	115 VAC
APLPT	Apollo 4-Digit Process Time Indicator	APLPT410	APLPT400
	Apollo 5-Digit Process Time Indicator	APLPT510	APLPT500

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
PBLPT *	Apollo 4-Digit Process Time Module for use with the 4 digit Large Digit Display	PBLPT400
	Apollo 5-Digit Process Time Module for use with the 6 digit Large Digit Display	PBLPT500

* Requires an LDD for use.

TROUBLESHOOTING

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

LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years 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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