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Bulletin No. DT6-D
Drawing No. LP0131
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DITAK 6 - ADJUSTABLE TIMEBASE 4-DIGIT TACHOMETER

- *ADJUSTABLE TIMEBASE FROM 4 MSEC TO 32 SEC*
- *SELECTABLE DECIMAL POINTS*
- *REPLACEABLE LITHIUM BATTERY PROVIDES UP TO 5 YEARS OF CONTINUOUS OPERATION (Battery included)*
- *RUGGED, SEALED FRONT PANEL CONSTRUCTION (NEMA 4/IP65)*
- *ACCEPTS MAGNETIC OR LOGIC TYPE INPUTS*
- *WIDE TEMPERATURE RANGE [-30° to +75°C]*

DESCRIPTION

The DT6 is a self-powered tachometer which features the ability to select the desired Timebase by simply setting the appropriate DIP switches on the rear of the unit. It also features a 4-digit LCD display with selectable decimal points. The DT6 is powered by an internal 3.0 V lithium battery which is field replaceable.

Like other Micro-Line products, the DT6 combines the use of a custom CMOS LSI counter chip and custom Timebase gate array. These chips are mounted on a gold-plated substrate and electrically connected by ultrasonic wirebonding. Internal electrical interface connections use elastomeric contacts to provide a gas-tight, corrosion resistant connection. Using the latest in Micro-Electronic assembly and manufacturing techniques provides units with reliability and dependability required for industrial service. The DT6 has a metal die-cast front bezel that is sealed and meets NEMA 4 specifications for wash-down and/or dusty environments, when properly installed.

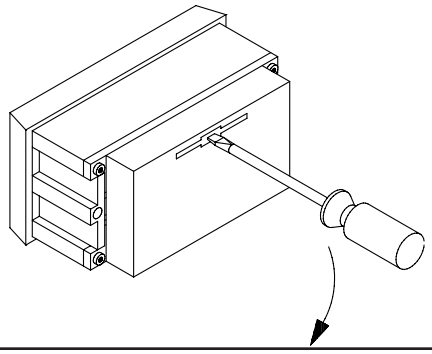
SPECIFICATIONS

1. **DISPLAY:** 4-Digit LCD, 0.35" (9mm) high digits.
2. **POWER SOURCE:** Internal 3.0 V lithium battery to provide up to 5 years of continuous service. For replacement procedure, refer to the illustration. The DT6 also receives power from a logic or magnetic input signal with a min. peak voltage of 4.0 V, which will serve to extend the battery life.
3. **SIGNAL INPUT:** * 0-10 KHz from a magnetic or bi-polar output (with a 50% duty cycle). Min. input sensitivity is 0.7 V. Input signal voltages over 6 V peak require an external series resistor to limit the input current to 10 mA max.
4. **TIMEBASE:** Adjustable in 1/256 sec. (3.906 msec) increments via DIP switches located under the rear cover. Timebase ranges from 3.906 msec to 31.996 sec; 0.05% accuracy.
5. **OPERATING TEMPERATURE RANGE:** -30° to +75°C
6. **WEIGHT:** 5.1 oz (146 g)

* **Caution:** The case of the DT6 is electrically connected to signal common.

BATTERY INSTALLATION

1. Remove rear cover by placing screwdriver in the slot and gently pushing downward (See drawing below).
2. When replacing battery, observe proper polarity as shown in the Application drawing.
3. Allow 32 seconds for the first update to occur after battery replacement.



ELECTRICAL CONNECTIONS

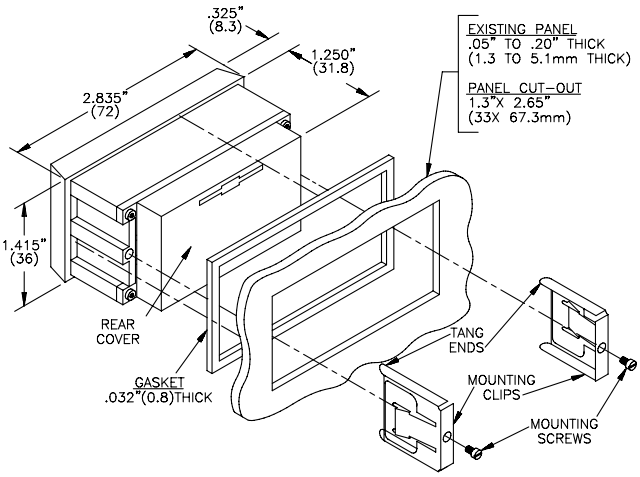
Since the DT6 is self powered, only two electrical connections are required. These connections are made utilizing a 2 position terminal block, located at the rear of the unit. Refer to the procedures below when connecting the DT6 to the signal source.

1. Use 2-wire shielded cable for sensor signal leads.
2. Never run signal cable in conduit, troughs, or cable bundles with power carrying conductors.
3. Connect the shield to the "COMM." terminal at the input of the instrument. Do NOT connect the shield at the pickup end, leave it "open" and insulate the exposed shield to prevent electrical contact with the frame or case. (Shielded cable, supplied on some RLC magnetic pickups, has open shield on pickup end.)
4. The DT6 should be mounted in a panel that is electrically grounded through the machine frame to the magnetic pickup housing.

DIMENSIONS & INSTALLATION

The Model DT6 should be mounted in a panel grounded to the machine frame. After cutting the opening in the panel, slide the panel gasket over the rear of the tachometer body to the back of the bezel. Then slide the tachometer through the panel cut-out. Install mounting clips on each side of the tachometer body with mounting screws. Make sure the side rails of the clips fit into the recesses in the side of the tachometer body so that the "tang ends" wedge between the panel opening and the body as the screws are tightened.

DIMENSIONS: In inches (mm)



Warning: Lithium battery may explode if incinerated.

REAR PANEL DIP SWITCHES

When viewing the DT6 from the rear of the unit, there are two banks of 8 DIP switches located along the top edge of the PC board. The bank to the left is labeled "SWA" and the bank to the right is labeled "SWB". All of the "SWA" switches and 5 of the "SWB" switches are used to select the desired Timebase. The remaining switches of "SWB" are used to select "FREQUENCY DOUBLING" and "DECIMAL POINT".

TIMEBASE SELECTION

The DT6 has a Timebase selection range of approximately 4 msec to 32 sec. For the minimum Timebase setting, SWA 1 is set in the "ON" position. For the maximum Timebase setting, all the Timebase switches are set to the "ON" position. Therefore, a specific Timebase setting is achieved by adding the appropriate individual Timebase increments.

The Timebase increment total is computed according to the following formula:

$$\text{TIMEBASE INCREMENT TOTAL (TBIT)} = \frac{\text{D.R. x D.D.P. x 15,360}}{\text{RPM x PPR}}$$

WHERE:

D.R. = Desired Reading
D.D.P. = Display Decimal Point
RPM = Revolutions Per Minute
PPR = Pulses Per Revolution

D.D.P.:

0 = 1 The Display Decimal Point (D.D.P.) is
0.0 = 10 determined by the desired decimal
0.00 = 100 point placement in the readout.

SWITCH	TIMEBASE INCREMENTS	SWITCH	TIMEBASE INCREMENTS
SWA 1	1	SWB 1	256
SWA 2	2	SWB 2	512
SWA 3	4	SWB 3	1024
SWA 4	8	SWB 4	2048
SWA 5	16	SWB 5	4096
SWA 6	32		
SWA 7	64		
SWA 8	128		

Example: Find the appropriate DIP switch setting for a desired display reading with a fixed shaft speed.

DESIRED READOUT (D.R.) = 250.0
REVOLUTIONS PER MINUTE (RPM) = 1250
PULSES PER REVOLUTION (PPR) = 50

$$\text{TBIT} = \frac{\text{250.0 x 10 x 15,360}}{\text{1250 RPM x 50 PPR}} = \frac{\text{38,400,000}}{\text{62,500}} = 614.4$$

TBIT = 614 (round off to the nearest whole number)

TBIT = 614

DIP SWB 2 ..... - 512 Needed = 102
DIP SWA 7 ..... - 64 Needed = 38
DIP SWA 6 ..... - 32 Needed = 6
DIP SWA 3 ..... - 4 Needed = 2
DIP SWA 2 ..... - 2 Needed = 0

As shown above, DIP switches SWA 2, 3, 6, 7, and SWB 2 are all set to "ON". If it is desired to know what the approximate Timebase is in seconds, multiply:

614 x 0.004 = 2.456 sec.

FREQUENCY DOUBLING

DIP switch SWB-6 is the "Frequency Doubling Disable" switch. When it is in the "ON" position, frequency doubling is disabled. When it is in the "OFF" position, twice the number of input pulses are registered in the unit. This doubling of the input rate allows the Timebase Increment Total to be halved, thus allowing a faster update time for a given display value.

SWB-6 ON "↑" / FRQ. DBL. DIS. (X1) SWB-6 OFF "↓" / FRQ. DBL. (X2)

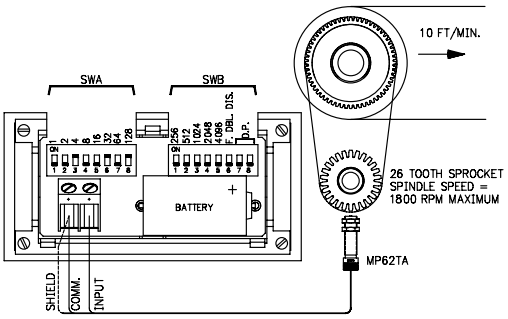
DECIMAL POINT SELECTION

SWB 7	SWB 8	D.P. LOCATION
↑	↑	factory test mode
↑	↓	0
↓	↑	0.0
↓	↓	0.00

The selection of Decimal Point is accomplished by DIP switches SWB 7 and SWB 8. The table at right shows what combinations of switches is needed to obtain the desired decimal point location. The DT6 always has leading zero blanking. *Note: D.P. will change only at the normal display update times.*

TYPICAL APPLICATION

CONVEYOR BELT SPEED INDICATOR



The rate of a conveyor belt used to carry PC Boards through an Infra-Red soldering chamber is variable from 0 to 10 feet per minute. The rate must be adjusted depending on the size of the boards being soldered. The display of the rate indicator must read in hundredths of a foot per minute.

The belt is driven by a chain and sprocket. A 26-tooth sprocket is mounted onto the shaft of a variable speed motor. A speed of 1800 RPM will produce a belt speed of 10 ft/min. A magnetic sensor is used to monitor the speed of this sprocket.

The DT6 can be used to display the belt speed in this application. The signal input of the sensor is connected to the DT6 "INPUT" terminal. Common and the shield of the sensor are connected to the DT6 "COMM." terminal. The Timebase setting can be determined by using the formula.

DESIRED READING, = 10.00
MAX RPM OF SHAFT, = 1800
PULSES PER REVOLUTION, = 26
DISPLAY DECIMAL POINT, = 100

$$\text{TBIT} = \frac{\text{D.R. x D.D.P. x 15,360}}{\text{RPM x PPR}}$$

$$\text{TBIT} = \frac{\text{10.00 x 100 x 15,360}}{\text{1800 x 26}} = \frac{\text{15,360,000}}{\text{46,800}}$$

$$= 328.2 = 328$$

TBIT = 328

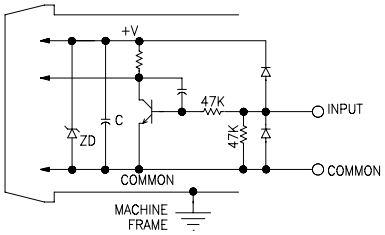
DIP SWB 1 ..... - 256 Needed = 72
DIP SWA 7 ..... - 64 Needed = 8
DIP SWA 4 ..... - 8 Needed = 0

With the above DIP switch settings, the Timebase would be approximately 1.3 sec (328 x 0.004 = 1.312). To reduce the update time, the "Frequency Doubling Disable" switch can be set to the "OFF" position. Then only half the Timebase will be necessary.

$$\text{TBIT} = \frac{328}{2} = 164$$

DIP SWA 8 ..... - 128 Needed = 36
DIP SWA 6 ..... - 32 Needed = 4
DIP SWA 3 ..... - 4 Needed = 0
DIP SWB 6 ..... - OFF Frequency Doubling
DIP SWB 7,8 ..... - OFF 0.00 Decimal Point Position

SIMPLIFIED SCHEMATIC OF DT6 INPUT CIRCUIT



ORDERING INFORMATION

*Battery Included

MODEL NO.	DESCRIPTION	PART NUMBER
*DT6	Adjustable Timebase Tachometer	DT600000
BNL	3V Lithium Battery	BNL00000

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