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DITAK 9 - ADJUSTABLE TIMEBASE 5-DIGIT RATE INDICATOR

- *DESIGNED FOR MEDIUM/HIGH SPEED APPLICATIONS*
- *LCD, POSITIVE REFLECTIVE OR NEGATIVE TRANSMISSIVE WITH YELLOW/GREEN OR RED BACKLIGHTING*
- *0.46 INCH (11.68 mm) HIGH DIGITS*
- *ADJUSTABLE TIMEBASE FROM 1 TO 7 SECONDS*
- *RATE MULTIPLIER FROM 0.0001 TO 1.9999*
- *SELECTABLE DECIMAL POINTS*
- *LITHIUM BATTERY PROVIDES OVER 7 YEARS OF CONTINUOUS OPERATION (Battery included)*
- *NEMA 4X/IP65 SEALED FRONT PANEL BEZEL*
- *ACCEPTS MAGNETIC OR LOGIC TYPE SIGNAL INPUTS*

DESCRIPTION

The DITAK 9 is a self-powered rate indicator designed to operate in medium/high speed applications. It is ideal for use with magnetic pick-ups or other bi-polar sensors operating at a minimum of 30 Hz*. The unit features selectable timebase, rate multiplier, and decimal points via two front panel pushbuttons. It has a 5-digit LCD Display with 0.46" high digits that are available in positive image reflective (black digits, reflective background) or negative image transmissive red or yellow/green (illuminated digits, dark background). Backlight version units require power from an external 9 to 28 VDC supply.
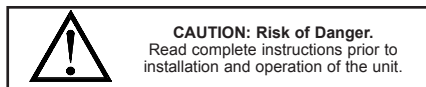
The unit is constructed of a lightweight, high impact plastic case with a clear viewing window. The sealed front panel meets NEMA 4X/IP65 specifications for wash-down and/or dusty environments, when properly installed. A Ditak 9 unit can be mounted in the same panel cut-out as the earlier Ditak 7 units.

The optional Micro Line/Sensor Power Supply (MLPS1000) is designed to attach to the rear of an installed backlight version Ditak 9. The optional supply can be powered from an 85 to 250 VAC source, and can provide power for the backlighting of a unit and a sensor. The maximum current draw for the sensor is 45 mA.

* - For slow speed applications with low pulse rates, it is recommended to use the CUB5 Counter/Rate Indicator.

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.

SPECIFICATIONS

1. **DISPLAY:** 5-Digit LCD, 0.46" (11.68 mm) high digits.
2. **POWER SOURCE:** Internal 3.0 V lithium battery provides over 7 years of continuous service (battery life is dependent upon usage).
3. **BACKLIGHT POWER REQUIREMENTS:** 9 to 28 VDC @ 35 mA. Above 26 VDC, derate operating temperature to 50°C.
   Must use the MLPS or a Class 2 or SELV rated power supply.
4. **SIGNAL INPUT:** 0 to 10 KHz from a magnetic or bi-polar output (with a 50% duty cycle). Min. input sensitivity is 0.9 V. Max. input = 28 V.
5. **TIMEBASE:** Adjustable in 1 sec increments via front panel. Timebase ranges from 1 second to 7 seconds; 0.05% accuracy.
6. **CONSTRUCTION:** High impact plastic case with clear viewing window (Panel gasket and mounting clip included). Installation Category I, Pollution Degree 2.
7. **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
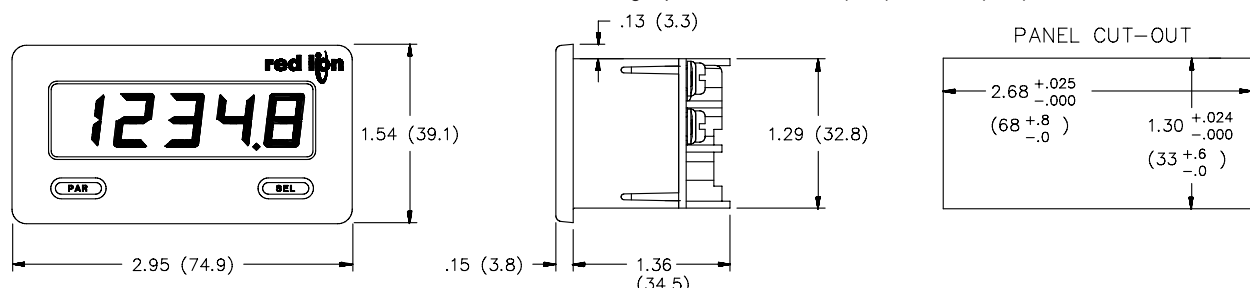   Type 4X Enclosure rating (Face only), UL50

ELECTROMAGNETIC COMPATIBILITY

Emissions and Immunity to EN 61326

Electrostatic discharge	EN 61000-4-2	Criterion A
		4 kV contact discharge
		8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion A
		10 V/m
Fast transients (burst)	EN 61000-4-4	Criterion A
		2 kV power
		2 kV signal
Surge	EN 61000-4-5	Criterion A
		2 kV power
		1 kV signal
RF conducted interference	EN 61000-4-6	Criterion A
		10 V/rms

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.15" (54.6) H x 3.00" (76.2) W.

PANEL CUT-OUT

2.68 +.025 −.000 (68 +.8 −.0)
1.30 +.024 −.000 (33 +.6 −.0)

.13 (3.3)
1.29 (32.8)
1.54 (39.1)
2.95 (74.9)
.15 (3.8)
1.36 (34.5)

SPECIFICATIONS (Cont'd)

Power Frequency magnetic fields EN 61000-4-8 Criterion A
30 A/m
Voltage dip/interruptions EN 61000-4-11 Criterion A
0.5 cycle
Emissions EN 55022 Class B

Notes:
1. Criterion A: Normal operation within specified limits.
Refer to the EMC Installation Guidelines section of this bulletin for additional information.
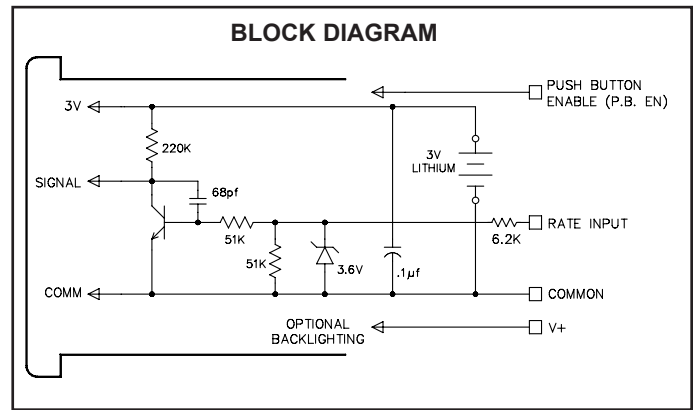
8. **ENVIRONMENTAL CONDITIONS:**
   Operating Temperature: 0 to 75°C (Above 50°C derate backlight operating voltage to 26 VDC max.)
   Storage Temperature: -30 to 80°C
   Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 75°C.
   Altitude: Up to 2000 meters
9. **WEIGHT:** 3.3 oz (93.5 g)

BLOCK DIAGRAM

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. In extremely high EMI environments, additional measures may be needed. 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 EMC guidelines for successful installation in an industrial environment.

1. 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.
   a. Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
   c. Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
2. 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.
3. Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. 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.
5. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.

WIRING CONNECTIONS

The electrical connections are made via rear screw-clamp terminals located on the back of the unit. 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. When wiring the unit, use the label to identify the wire position with the proper function. Strip the wire, leaving approximately 1/4" bare wire exposed (stranded wires should be tinned with solder). Insert the wire into the screw-clamp terminal and tighten the screw until the wire is clamped tightly. Each terminal can accept up to two #14 AWG wires.

The backlighting for a backlight version unit is powered between the V+ Terminal and the Common Terminal.
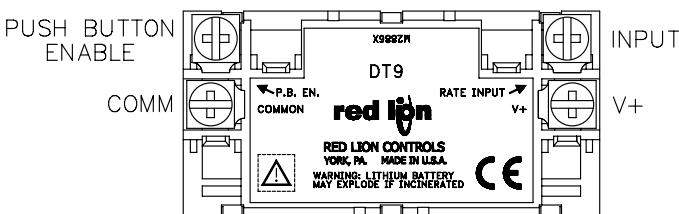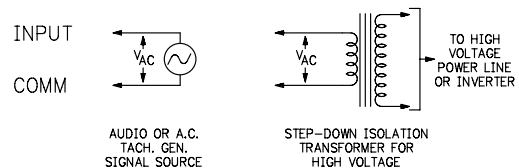

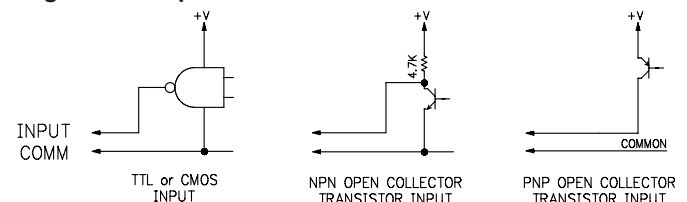**Variable Frequency AC Inputs, Signal Source Powered**
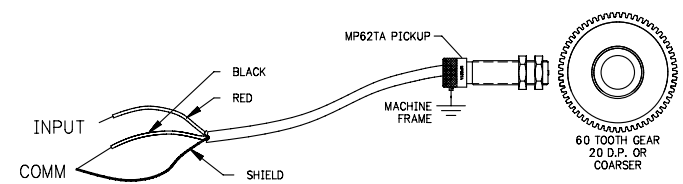
Variable Frequency AC Inputs, Signal Source Powered

Minimum V_{AC} for operation is 0.9 V peak.

Logic Pulse Inputs From Other Circuits & Sensors

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.
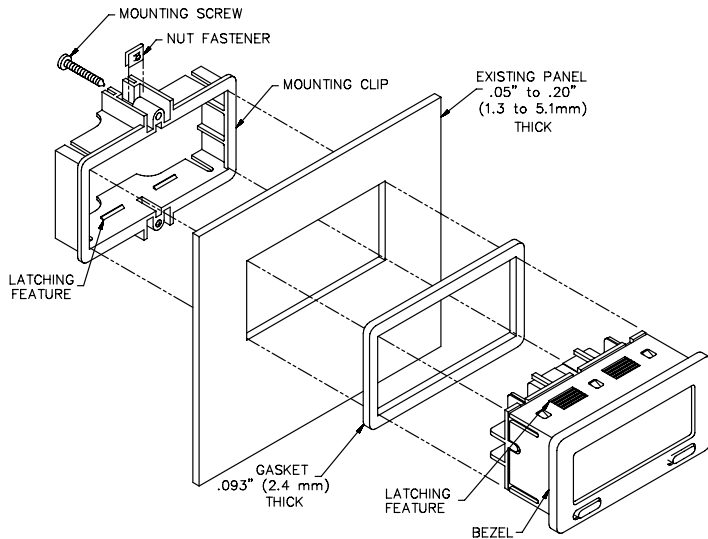

INSTALLATION

The Ditak 9 meets NEMA 4X/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel. A sponge rubber gasket, mounting clip, two screws, and nut fasteners are provided to install and seal the unit in the panel cut-out.

The following procedure assures proper installation:

1. Cut panel opening to specified dimensions. Remove burrs and clean panel opening.
2. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Slide nut fastener into slot on mounting clip and then insert mounting screw through nut on both sides of mounting clip. Tip of mounting screw should NOT project through hole on clip.
4. Install Ditak unit through panel cut-out.
5. Slide mounting clip over rear of unit until clip is against back of panel. The mounting clip and Ditak housing have a latching feature to hold the unit in place until tightened.
   Note: Hold the Ditak front bezel in place when sliding the mounting clip into position.
6. Alternately tighten each mounting screw to ensure uniform gasket pressure. Visually inspect the gasket for proper seal. The gasket should be compressed approximately 75 to 80% of its original thickness.
7. If the gasket is not adequately compressed and the mounting screws cannot be tightened any further, loosen mounting screws and insure that the clip is latched as close as possible to the panel.
8. Repeat step #6 for tightening the mounting screws.

PROGRAMMING MENU
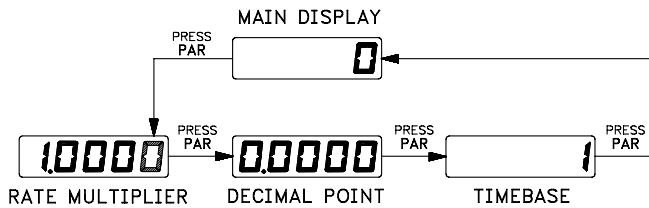
Note: The display changes on "PAR" or "SEL" push button release.

PROGRAMMING

From the factory, the Ditak 9 is programmed with a fixed 1 second timebase to read directly in HZ or RPM with a 60 tooth gear To enter the programming mode, place a jumper between the Push Button Enable (P. B. En.) Terminal and the Common Terminal. Once the jumper is connected the programming buttons are now activated. The Programming Mode consists of three selections; Rate Multiplier, Decimal Point, and Timebase. There is a fourth display which is the main display or run mode. Once programming is complete, the unit must be returned to the main display before exiting the programming mode to obtain normal operation.

RATE MULTIPLIER

The Ditak 9 has a Rate Multiplier (RM) selection range from 0.0001 to 1.9999. See Programming Calculations to determine the calculated value. After entering the programming mode, the least significant digit will be flashing. To increment this digit, press the **SEL** button. After the value 9, the digit will start over at 0. To move to the next digit press **PAR** and then that digit can be changed by pressing **SEL**. When reaching the most significant digit, pressing **PAR** will advance the meter to the Decimal Point selection.

DECIMAL POINT SELECTION

The selection of the decimal point position for the display (DDP) is accomplished by repeatedly pressing **SEL**. This selection will always default to 0.0000 when advancing to it from the Rate Multiplier selection. By pressing **PAR**, the shown decimal point selection is entered and the Time base selection is shown.

TIMEBASE SELECTION

The Ditak 9 has a Time Base selection range from 1 second to 7 seconds. See Programming Calculations to determine the calculated Rounded Time Base (RTB) value. The value is changed by pressing **SEL**. The value is entered by pressing **PAR** and the Main Display/Run Mode is shown.
Note: The position of the decimal point has no effect on this selection.

MAIN DISPLAY/RUN MODE

This display follows the Timebase Selection. The unit must be in this mode to exit the Programming Mode and have the unit display properly. The push button enable jumper can be removed after the Ditak 9 is returned to the main display.

PROGRAMMING CALCULATIONS (Select one of the following)

USING KNOWN RPM

An amusement park director wants his parking tram operators to keep their speed under a certain limit. He has a magnetic sensor looking at a shaft on the tram with 30 pulses per revolution. When the shaft is turning at 50 RPM he wants the meter to show 15.5. The Ditak 9 is programmed as follows:

DR = Desired Reading
DDP = Display Decimal Point
RPM = Revolutions Per Minute
PPR = Pulses Per Revolution
DDP: Use the following corresponding numbers in the formula for the Display Decimal Point:
 0 = 1
 0.0 = 10
 0.00 = 100
 0.000 = 1000

RPM = 50
PPR = 30
DR = 15.5
DDP = 10

$$\text{HERTZ (HZ)} = \frac{\text{RPM x PPR}}{60} = \frac{50 \times 30}{60} = 25$$

$$\text{CALCULATED TIME BASE} = \frac{\text{DR x DDP}}{\text{HZ}} = \frac{15.5 \times 10}{25} = 6.2$$

ROUNDED TIME BASE (RTB) = 6

$$\text{REMAINDER MULTIPLIER (RM)} = \frac{\text{DR x DDP}}{\text{RTB x HZ}} = \frac{15.5 \times 10}{6 \times 25} = 1.0333$$

RM = 1.0333
Decimal = 0.0
RTB = 6

ROUNDED TIME BASE (RTB) = Round Calculated Time Base to nearest whole number between 1-7.

If RM is greater than 1.9999, then remove a decimal location or add more pulses per revolution.

USING KNOWN PULSES PER UNIT

A newspaper company wants to know the line speed of their press to tenths of feet per minute. They have an encoder that gives 125 pulses per foot. The Ditak 9 is programmed as follows:

TF = Time Factor
DDP = Display Decimal Point
PPU = Pulses Per (Single) Unit
TF: = Use one of the following numbers in the formula for the Time Factor:
 Per second = 1
 Per minute = 60
 Per hour = 3600
DDP: Use the following corresponding numbers in the formula for the Display Decimal Point:
 0 = 1
 0.0 = 10
 0.00 = 100
 0.000 = 1000
Required minimum pulses per (single) unit:
 Per second = 0.07 ⎫
 Per minute = 4.4 ⎬ (multiply this value by DDP)
 Per hour = 259.0 ⎭

PPU = 125 (pulses per foot)
DDP = 10 (for tenths of a foot)
TF = 60 (for per minute)

$$\text{CALCULATED TIME BASE} = \frac{\text{TF x DDP}}{\text{PPU}} = \frac{60 \times 10}{125} = 4.8$$

ROUNDED TIME BASE (RTB) = 5

$$\text{REMAINDER MULTIPLIER (RM)} = \frac{\text{TF x DDP}}{\text{RTB x PPU}} = \frac{60 \times 10}{5 \times 125} = 0.9600$$

RM = 0.9600
Decimal = 0.0
RTB = 5

ROUNDED TIME BASE (RTB)= Round Calculated Time Base to nearest whole number between 1-7.

If RM is greater than 1.9999, then remove a decimal location or add more pulses per unit.

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
DT9	Adjustable Timebase Tachometer	DT900000
	Adjustable Timebase Tachometer with Yellow/Green Backlighting	DT900010
	Adjustable Timebase Tachometer with Red Backlighting	DT900020
MLPS	MLPS Micro Line Sensor/Power Supply	MLPS1000
For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.		

TROUBLESHOOTING

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