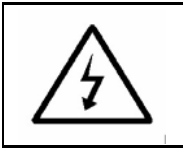# RPM CONTROLLER MONITOR

Model : PDT-2250

Your purchase of this RPM CONTROLLER/MONITOR marks a step forward for you into the field of precision measurement. Although this CONTROLLER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

Caution Symbol

Caution :

* Risk of electric shock !

Caution :
* Do not use fingers or any tool
  to touch the Wire Terminals.
* Do not apply the relay contact load
  current > 0.5 Amp.
* The instrument contains no user
  serviceable parts and should not
  be opened by the user.
* Repair or after service should be
  done by a qualified technician only.
* Power supply should apply the
  correct ACV power voltage
* Cleaning - Only use the dry cloth to
  clean the plastic case !

* **Equipment protected throughout
  by Double Insulation or Reinforced
  Insulation.**

Environmental Condition

* Comply with EN61010.
  Transient overvoltage at Mains Supply 2500V.
* Pollution Degree 2.
* Altitude up to 2000 meters.
* Indoor use.
* Relative humidity 80% max.

TABLE OF CONTENTS

1. FEATURES

* Professional Tachometer (RPM, m/min., ft/min.)
  monitor and controller.
* Build in control relay and the alarm relay.
* Alarm Relay will make action when the reading value
  reach to high/low alarm value.
* Control Relay will make action when the reading value
  reach to control value.
* Hysteresis value setting for control and alarm function.
* Can set input pulse no. of each round.
* Can set the roller's diameter for the surface speed
  (m/min., ft/min.) function.
* Can cooperate the optional proximity sensor or photo
  sensor.
* Large red LED display, high brightness and easy to read.
* RS232 computer interface.
* Microprocessor circuit ensures high accuracy and
  provides special functions and features.
* Standard 96 X 48 mm DIN case.
* Optional data acquisition software.
* Optional GSM controller.

2. SPECIFICATIONS

2-1 General Specifications

Display	4 digits red LED, digit size : 14 mm.	
Unit	RPM	RPM
	Surface speed	m/min (meter per min.)
		ft/min (feet per min.)
Circuit	Custom chip of microprocessor LSI circuit.	

Sampling Time	Approx. 1 second. *Input : one pulse per round, ≧60 RPM*	
Relay Output	Number	2 relays
	Function	*Relay 1 :* Control relay.
		Relay 2 : High/Low alarm relay.
	Max load	0.5 ACA/250 ACV 0.5 DCA/24 DCV *** Do not apply the relay contact load current > 0.5 A, other wise the relay may be damaged permanently without warranty.**
Setting Value	Control value setting. Alarm high limit value setting. Alarm low limit value setting. Pulse no. of each round. Roller diameter value setting. Hysteresis value setting. *Setting for RPM, m/min., ft/min.*	
Input Signal Time base	Pulse Quartz crystal	
External Power Supply	DC 12 V, 50 mA max.	
Data Output	RS 232 PC serial interface.	
Operating Temperature	0 to 50 ℃.	
Operating Humidity	Less than 80% R.H.	
Power Supply	90 to 260 ACV, 50/60 Hz.	
Power Consumption	Approx. 4.7 VA/AC 110V. Approx. 5.3 VA/AC 220V.	
Weight	384 g/ 0.84 LB.	
Dimension	DIN size : 96 x 48 mm. Depth : 110 mm.	

Accessories Included	Instruction manual......................1 PC Case holder with screw.................2 PCs
Optional Accessories	* Proximity sensor, PX-01. * Photo sensor, PI-06.
	* Data Acquisition software, SW-U801-WIN. * RS232 cable, UPCB-02. * USB cable, USB-01.
	* GSM controller, GSM-889. * Interface cable (cable between meter to GSM-889), GMCB-89.

2-2 Electrical Specifications (23±5 ℃)

Range	*Photo Tachometer :* 10 to 99,999 RPM		
	Surface Speed (m/min.) : 0.05 to 9,999 m/min.		
	Surface Speed (ft/min.) : 0.2 to 32,805 ft/min.		
Accuracy	± (0.1 % + 1 digit).		
Resolution	RPM	0.1 RPM	< 1,000 RPM
		1 RPM	1,000 to 9,999 RPM
		10 RPM	10,000 to 99,999 RPM
	m/min.	0.01 m/min.	< 100 m/min.
		0.1 m/min.	100 to 999 m/min.
		1 m/min.	1,000 to 9,999 m/min.
	ft/min.	0.1 ft/min.	< 1000 ft/min.
		1 ft/min.	1,000 to 9,999 ft/min.
		10 ft/min.	10,000 to 32,805 ft/min.

* *Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only.*
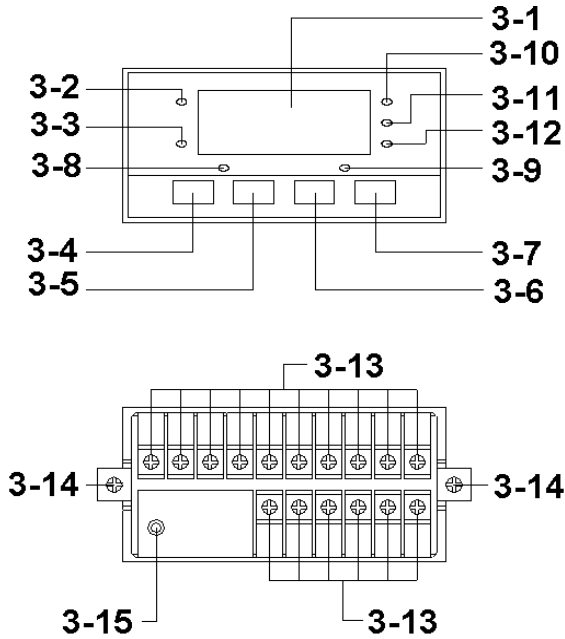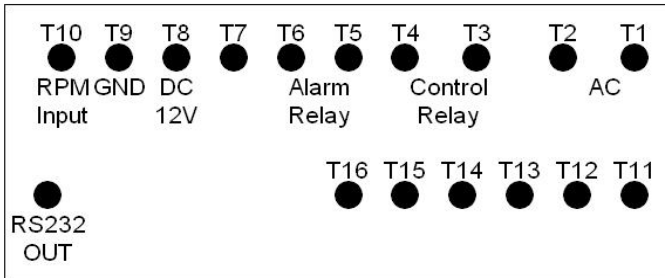
3. FRONT PANEL DESCRIPTION

Fig. 1

3-1 Display
3-2 PV (process value) indicator
3-3 SV (set value) indicator
3-4 Set Button
3-5 ▼ Button
3-6 ▲ Button
3-7 Function Button
3-8 Control relay indicator
3-9 Alarm relay indicator
3-10 RPM indicator
3-11 ft/min indicator
3-12 m/min indicator
3-13 Wire terminals
3-14 Case holder
3-15 RS232 terminal

4. MEASURING PROCEDURE

Terminal layout   Fig. 2

4-1 Terminal connection
1) Input the ACV power (90 to 260 ACV) to T1, T2.

  Do not input the over voltage to the AC input terminals.

2) Connect the " Control Relay " output from T3, T4.
   Connect the " Alarm Relay " output from T5, T6.
3) Connect the following optional sensor (or similar sensor).

   * Proximity sensor, PX-01.
   * Photo sensor, PI-06.

   to the input terminal T8, T9, T10.
        T8 is DC 12 V power supply terminal.
        T9 is the ground (-) terminal.
        T10 is the pulse input terminal.

4-2 RPM measurement

1) Power on the meter, the " Display " (3-1, Fig. 1).
2) Press the " Function Button " (3-7, Fig. 1) once until
   the " RPM indicator " (3-10, Fig. 1) and the " PV
   indicator " (3-2, Fig. 1) is lit.
   The " Display " (3-1 , Fig. 1) will show the RPM value.

3) | The RPM value equal : |

   Total input signal (pulse) per min.
   ÷ *(divide)*
   setting pulse no. per round

   For example :
   If the total signal (pulse) input per minute
   is 5, 124, the setting pulse no. per round is 1,
   the RPM value will be 5,124/1=5,124.

   The procedures that to set the
   * **" Pulse no. per round "**
   refer to the page 10 " 4-5 2nd layer setting procedures ".

4-3 Surface speed (m/min., ft/min.) measurement

1) Power on the meter, the " Display " (3-1, Fig. 1).
2) * Press the " Function Button " (3-7, Fig. 1) once until
      the " m/min indicator " (3-12, Fig. 1) is lit. The "
      Display " (3-1 , Fig. 1) will show the m/min. value.
    * Press the " Function Button " (3-7, Fig. 1) once until
      the " ft/min indicator " (3-11, Fig. 1) is lit. The "
      Display " (3-1 , Fig. 1) will show the ft/min. value.
    * Under the surface speed measurement, the
      " PV indicator " (3-2, Fig. 1) will light too.

3) | The m/min. value equal : |

Total input signal (pulse) per min.
   ÷ *(divide)*
setting pulse no. per round
   x (multiple)
setting roller diameter (cm)
   x (multiple)
3.14
   ÷ *(divide)*
100 ◄——————— 1 meter = 100 cm

For example :
If the total input signal (pulse) per minute
is 501, the setting pulse no. per round is 1,
the roller diameter is 10 cm
the m/min. value will be 501/1x10x3.14/100=157.3

| The ft/min. value equal : |

Total input signal (pulse) per min.
   ÷ *(divide)*
setting pulse no. per round
   x (multiple)
setting roller diameter (cm)
   x (multiple)
3.14
   ÷ *(divide)*
30.48 ◄——————— 1 ft = 30.48 cm

7

For example :
If the total input signal (pulse) per minute
is 501, the setting pulse no. per round is 1,
the roller diameter is 10 cm
the ft/min. value will be 501/1x10x3.14/30.48=516.1

* The procedures that to set the
  " Pulse no. per round "
  " roller diameter (cm) "
  refer to the page 10, 11, " 4-5 2nd layer setting
  procedures ".

4-4 1st layer setting procedures

CtSP	Control value setting
LoLt	Low limit value setting
HILt	High limit value setting

Control Value Setting

1) Press the " Set Button " (3-4, Fig. 1) once, the
   " Display " will show " CtSP ", now the meter is ready
   for the " Control value " setting.
2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring " Control
   value ".

   Remark :
   * When adjust the value, the " SV indicator " (3-3, Fig. 1)
     will light.
   * The function of " Control value " setting, refer to
     page 12, Fig. 3.

Low Limit Value Setting

1) Press the " Set Button " (3-4, Fig. 1) twice, the
   " Display " will show " LoLt ", now the meter is ready
   " Low Limit value " setting.
2) Use the " " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring " Low
   limit value ".

   Remark :
   * When adjust the value, the " SV indicator " (3-3, Fig. 1)
   will light.
   * The function of " Low limit value " setting, refer to
   page 13, Fig. 4.

High Limit Value Setting

1) After set the " Low Limit " value, press the " Set
   Button " (3-4, Fig. 1) twice, the " Display " will show
   " HILt ", now the meter is ready for the humidity
   " High Limit " value setting.
2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring " High
   limit value ".

   Remark :
   * When adjust the value, the " SV indicator " (3-3, Fig. 1)
   will light.
   * The function of " High limit value " setting, refer to
   page 13, Fig. 4.

Consideration of 1st layer setting

1) Under the normal " Display ", if the " Function Button " (3-7, Fig. 1) select to " RPM function ", the " RPM indicator " (3-10, Fig. 1) light, the " 1st layer setting " will ready for " RPM " function .

2) Under the normal " Display ", if the " Function Button " (3-7, Fig. 1) select to " m/min. function ", the " m/min indicator " (3-12, Fig. 1) light, the " 1st layer setting " procedures will ready for " m/min. " function.

3) Under the normal " Display ", if the " Function Button " (3-7, Fig. 1) select to " ft/min. function ", the " ft/min indicator " (3-11, Fig. 1) light, the " 1st layer setting " procedures will ready for " ft/min. " function.

4-5 2nd layer setting procedures

PULS	**Pulse no. per round setting**
dIA	**Roller diameter value setting**
CtHy	**Control Hysteresis value setting**
ALHy	**Alarm Hysteresis value setting**

Pulse no. per round setting

1) Press the " Set Button " (3-4, Fig. 1) continuously at least two seconds, the " Display " will show " PULS ", now the meter is ready for the " Pulse no. per round " setting.

2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲ Button " (3-6, Fig. 1) to adjust the desiring " Pulse no. per round ".

Roller diameter value setting

1) After set the " Pulse no. per round ", press the
   " Set Button " (3-4, Fig. 1) twice, the " Display "
   will show   dIA ", now the meter is ready for the
   the " Roller diameter value " setting.
2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring
   " Roller diameter value " in the unit of cm.
   * When adjust the value, the " SV indicator " (3-3, Fig. 1)
     will light.
   * The function of " Roller diameter value setting ", refer to page 7.

Control Hysteresis value setting

1) After set the " Roller diameter value ", press the
   " Set Button " (3-4, Fig. 1) twice, the " Display "
   will show   CtHy ", now the meter is ready for the
   " Control Hysteresis value " setting.
2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring
   " Control Hysteresis value ".

   Remark :
   * When adjust the " Control Hysteresis value " , the " SV indicator "
     (3-3, Fig. 1) will light.
   * The function of " Control Hysteresis value " setting, refer to
     page 12, Fig. 3.
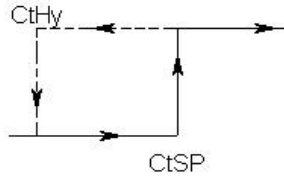
Fig. 3

    * For example :

      Control value : 500
      Control Hysteresis value : 5

      The control relay will On when measuring
      value up to 500. The control relay will Off
      again when measuring value down to 495.

Alarm Hysteresis value setting

1) After select the " Control Hysteresis value " , press the
   " Set Button " (3-4, Fig. 1) twice, the " Display "
   will show " ALHy ", now the meter is ready for the
   the " Alarm Hysteresis value " setting.
2) Use the " ▼ Button " (3-5, Fig. 1) and the " ▲
   Button " (3-6, Fig. 1) to adjust the desiring
   " Alarm Hysteresis value " .
    *When adjust the " Alarm Hysteresis value " , the " SV indicator "
     (3-3, Fig. 1) will light.*

    Remark :
    * When adjust the " Alarm Hysteresis value " , the " SV indicator "
     (3-3, Fig. 1) will light.
    * The function of " Alarm Hysteresis value " setting, refer to
     page 13, Fig. 4.

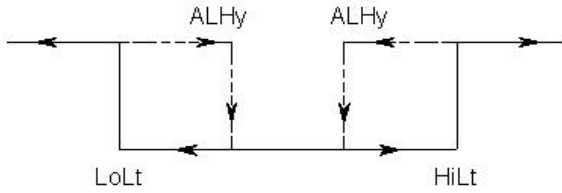ALHy   ALHy

LoLt   HiLt

Fig. 4

* For example :

High limit value   : 100
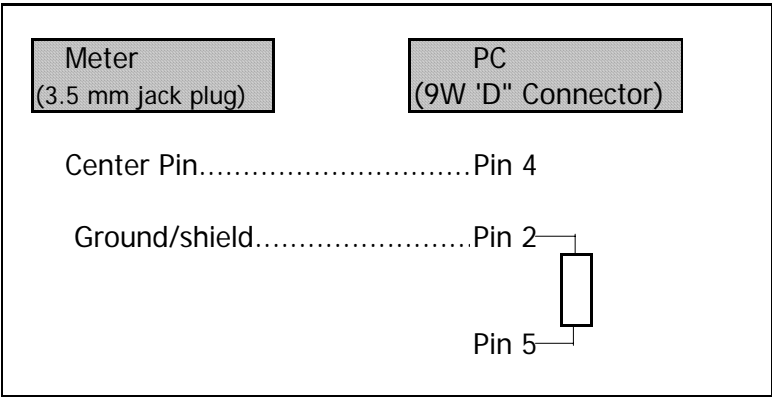Low limit value   : 20
Alarm Hysteresis value : 5

  a. The alarm relay will On when measuring
     value up to 100. The alarm relay will Off
     again when measuring value down to 95.
  b. The alarm relay will On when measuring
     value down to 20. The alarm relay will
     Off when measuring value up to 25.

5. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-15, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)
Center Pin................................Pin 4	
Ground/shield........................Pin 2	
	Pin 5

The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D15	Start Word		
D14	4		
D13	When send the upper display data = 1 When send the lower display data = 2		
D12 & D11	Annunciator for Display		
	RPM = 27	ft/min = 11	m/min = 60
D10	Polarity 0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D8 to D1	Display reading, D8 = MSD, D1 = LSD. For example : If the display reading is 1234, then D8 to D1 is : 00001234		
D0	End Word		

RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

6. SYSTEM RESET

Power on the meter, use the two fingers to press " Set Button " (3-4, Fig. 1) and " Function Button " (3-7, Fig. 1) continuously more than 5 seconds until the Display show the text " rSt ", release the buttons. After " rSt " text flashing 2 times will return to the normal screen. The meter system will be reset, all the calibration data will be cleared, the meter's internal function will return the default value.

7. OPTIONAL PROXIMITY SENSOR
Model : PX-01

Application	* Sensor for PDT-2250 Panel RPM Controller, Monitor
	* Sensor for DT-2240D Panel Tachometer
	* Position Detector.
Output method	PNP, NO(normal open)
Sensing direction	Vertical.
Sensing distance	4 mm.
Operating voltage	10-30 VDC.
Standard Sensing object	Iron 18 x 18 x 1 mm.
Current consumption	8 mA, no load.
Response frequency	600 Hz.
Output current	250 mA max.
Leakage current	1.1 mA.
Residual voltage	0.9 VDC.
Operating Temperature	-20 to 70 ℃
Operating Humidity	35 to 95% RH.
Wire Dimension	4.7 mm Dia. x 2 m x 3 cores.
Application	* Sensor for PDT-2250 DT-224OD.
	* Position Detector.

8. THE ADDRESS OF AFTER SERVICE CENTER

0706-PDT2250