MANUAL
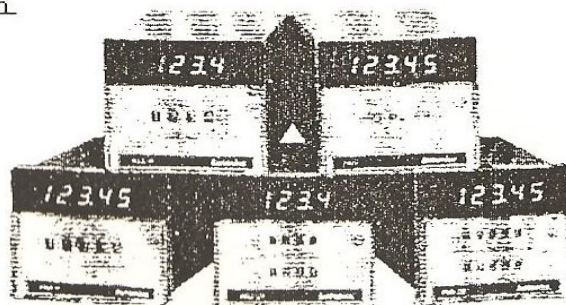
F-SERIES DIGITAL LINE SPEED METER
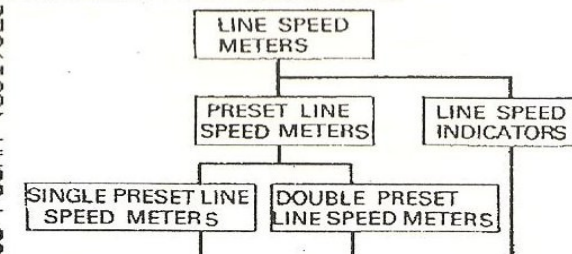
Thank you very much for selecting the Autonics Line Speed Meter. Please read this manual carefully before you use this instrument.

ORDERING INFORMATIONS

	MODEL	MODEL	MODEL
4 DIGITS	F4D–P	F4D–2P	F4D
5 DIGITS	F5D–P	F5D–2P	F5D

4 D – 2P

- P : SINGLE PRESET
- 2P : DOUBLE PRESET
- LINE SPEED METER
- 4 DIGITS : 8888
- 5 DIGITS : 88888
- F : SERIES

## DIMENSIONS AND MOUNTING INFORMATIONS
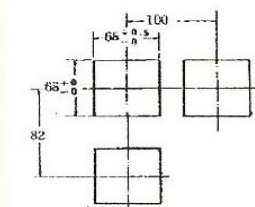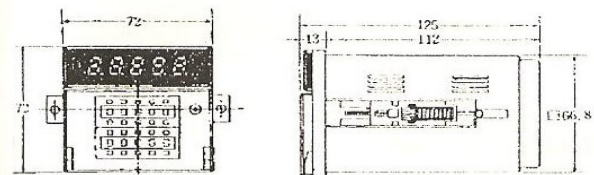

All dimensions in millimeters

USE

- Measuring and monitoring the line speed of conveyers or rollers.
- Controling line speed.
- Measuring the line speed from 1 to 99999 by 1 pulse per turn.
- Maintaining accuracy at high speeds in high speed.
- Measuring even 0.02rpm by rotary encoder with 60 pulses.
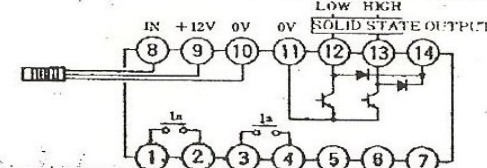
CONNECTIONS

- ### LINE SPEED INDICATORS

- ### SINGLE PRESET LINE SPEED METERS

CONTACT OUTPUT
250V AC 2A RESISTIVE LOAD
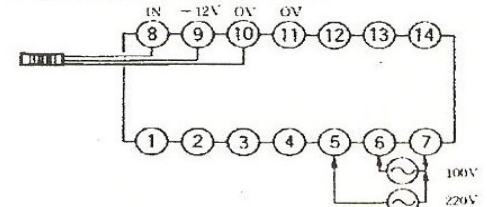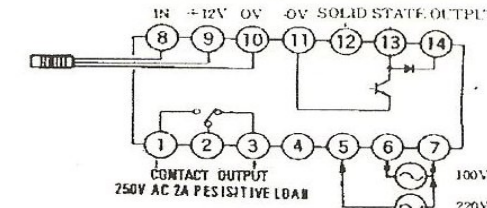
- ### DOUBLE PRESET LINE SPEED METERS

SPECIFICATIONS

|	F4D–2P F5D–2P	F4D–P F5D–P	F4D F5D
Function	Double preset line speed meters	Single preset line speed meters	Line speed Indicators
Power service	AC100/220V ±10% 50 or 60Hz		
Display method	Fixed/Floating Decimal Point 7-Segment LED		
Input level	LOW : 0V ~ +2V HIGH : +5V ~ +30V		
Input impedence	10K OHMS		
Measuring time	0.13~1.04 sec		0.52 Sec
Control output	2A AC 250V 2A Resistive load	1A/B AC 250V 2A Resistive load	—
	Solid state output : open collector		
Power consumption	4VA	4VA	3VA
Power for sensor	DC 12V, 30mA MAX		
Sensor	Proximity switch. Photo sensor. Rotary encoder. Gear sensor.		
Insulation resistance	– Over 100 mΩ at 500V DC – Insulation Tester – Between power circuit and control output circuit – Between power circuit and sensor power circuit		
Max voltage	– 2000V AC @ 50 or 60Hz for 1 minute – Between power circuit and control output circuit – Between power circuit and sensor power circuit		
Power source noise	– Pulse wave input of R phase, S phase+2000V, 1μsec. – By noise simulator between both power source terminals.		
Life	Preset Tachometers	Mechanical : >20,000,000 times Electrical : >100,000 times (AC250V 2A Resistive load)	
	Indicators	Semi–Permanent	

■ FORWARDING SELECTIONS

MODE			FUNCTIONS
SW1–1		Circumference /Diameter mode	Circumference
SW1-2,3		Decimal point mode	Floating decimal point
SW1-4		Input mode	Over 30rpm
SW1-5		Low speed mode	Normal position
SW1-6,7		Sampling time mode	0.52 Sec
SW1-8		Output mode	Normal position
Rotary Switches		Circumference / Diameter	00001

(Exp $10^1 \sim 10^0$)

Exp 10^0 10^1 10^2 10^3 10^4

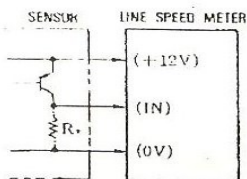## ■ SIGNAL LEVEL OF SOLID STATE INPUT
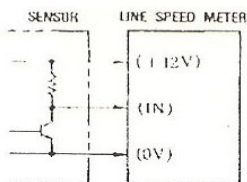
「H」→Transistor off
(NPN Transistor)
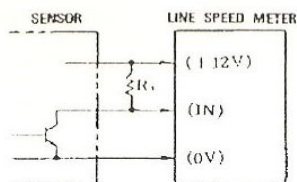
「H」→Transistor off
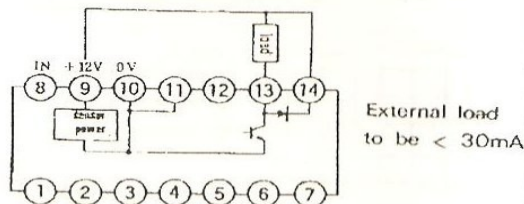(NPN Transistor)
R1=1Ω～2KΩ

「H」→Transistor on
(PNP Transistor)
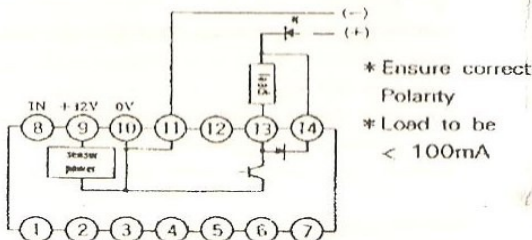R2 may not be connected

■ ERROR MESSAGES

■ LOAD CONNECTIONS

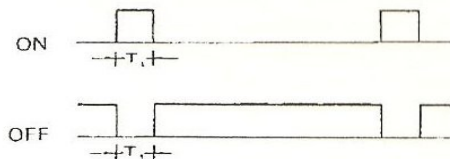● OPERATING LOAD BY SENSOR POWER

External load to be < 30mA

● OPERATING LOAD BY EXTERNAL POWER

* Ensure correct Polarity
* Load to be < 100mA

■ INPUT SIGNAL

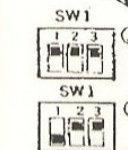Input speed is determined by pulse width T1 minimum 300 micro seconds

ON

OFF

■ SET UP PROCEDURE

1) Loosen phillips screw located on the face of the instrument
2) Pull the instrument out from the back of the case
3) After making the selection insert back in the case and tighten screw.

■ EXAMPLE

Roller
Cam for detecting signal
Sensor

SW1 Ⓐ
SW1 Ⓑ
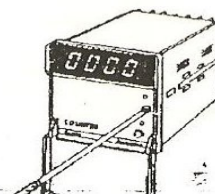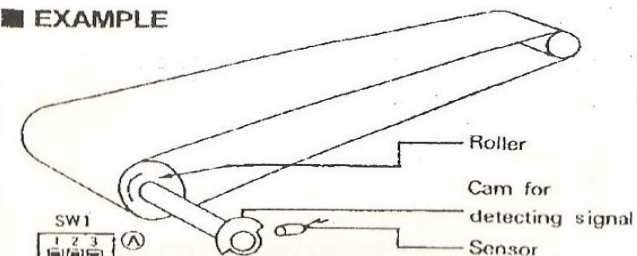
● Select circumference mode Ⓐ set switches as per diagram below

EXP 5 SELECTED AT 0.62800	EXP	10^0	10^1	10^2

0.   6   2   8   0   0
EXP 10^0 10^1 10^2 10^3 10^4

$0.62800 \times 12\text{rpm} = 7.536$ m/min

Conveyed distance = Displayed value
= turn number "n" roller × 0.6280m
= 12 rpm × 0.62800m = 7,5360m/min

● Select diameter mode Ⓑ set switches as per diagram below

EXP 5 SELECTED AT 0.20000	EXP	10^0	10^1	10^2

0   2   0   0   0   0
EXP 10^0 10^1 10^2 10^3 10^4

$0.20000 \times 12\text{rpm} \times 3.14 = 7.536$ m/min

Conveyed distance = Displayed value
= Turn number "n" of roller × 2m × 3.14
= 12 rpm × 0.2m × 3.14
= 7.536m/min

■ SELECTING SWITCHES INFORMATIONS
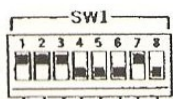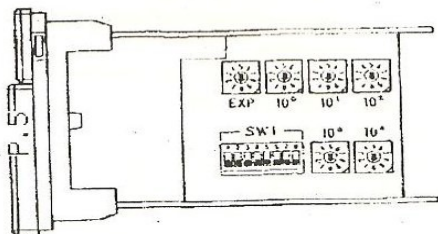
- SELECTING OUTPUT
- SELECTING SAMPLING TIME
- SELECTING LOW SPEED MODE
- SELECTING INPUT SPEED
- SELECTING DECIMAL POINT
- SELECTING CIRCUMFERENCE OR DIAMETER

■ CIRCUMFERENCE OR DIAMETER MODE

SW1	1	Selecting circumference
	1	Selecting diameter

■ FIXED DECIMAL POINT MODE(5 DIGITS)

		RANGE
SW1	2 3	0~00000m/min
	2 3	0.0~0000.0m/min
	2 3	0.00~000.00m/min

■ FLOATING DECIMAL POINT MODE(5 DIGITS)

		RANGE
SW1	2 3	0.0000~ 00000m/min

■ INPUT SPEED MODE

		RPM
SW1	4	< 30 RPM
	4	> 30 RPM

■ LOW SPEED MODE

SW1	5	Measures as low as 0.02 rpm by input sensor of rotary encoder with 60 pulses
	5	Normal Position

■ SAMPLING TIME MODE

SW1	6 7	0.13 sec
	6 7	0.26 sec
	6 7	0.52 sec
	6 7	1.04 sec

* When in high speed revolution, it may be difficult to read the display.
  To get desired display set sampling time by sw1—6,7.

* In preset line speed meters, sampling time is proportional to the response speed of the output. Sampling time can be changed by sw 1—6,7.
  Line speed meters have a fixed sampling time of 0.52 sec.

■ OUTPUT MODE OF
DOUBLE PRESET FROM THE DIAGRAM.
FOR SINGLE PRESET LINE SPEED METER.
DELETE LOW LINE SPEED METERS
FROM THE DIAGRAM.
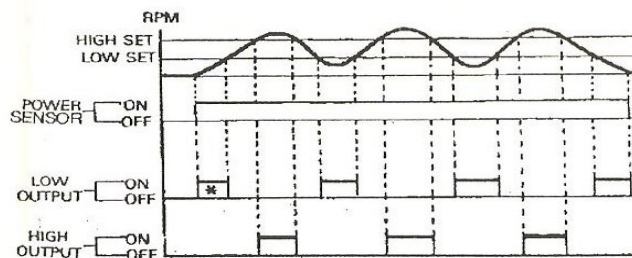
SW1	7	Overrides low speed setting during motor startup
	7	Normal Position

■ ROTARY SWITCHES APPLICATIONS

Selecting switch SW1-1 for circumference mode.

EXP 5 SELECTED AT 0.62800	0.62800m×12 RPM=7,536m/min
EXP 4 SELECTED AT 0.6280	0.6280m×12 RPM=7,536m/min
EXP 5 SELECTED AT 0.628	0.628m×12 RPM=7,536m/min

■ CALCULATION FOR INCH/MIN OR YARD/MIN

- In case of the circumference of 0.5m and the floating point decimal.

1 rpm		Rotary switches					
Display	Units	EXP	10^4	10^3	10^2	10^1	10^0
0.5000	m/min	1	0	0	0	0	5
19.685	inch/min	3	1	9	6	8	5
0.54681	yd/min	5	5	4	6	8	1

5 rpm		Rotary switches					
Display	Units	EXP	10^4	10^3	10^2	10^1	10^0
2.5000	m/min	1	0	0	0	0	5
98.425	inch/min	3	1	9	6	8	5
2.7340	yd/min	5	5	4	6	8	1

For example, to change from m/min
to yd/min
1yd = 0.914399m
0.5m ÷ 0.914399 yd/m = 0.5468072 yd.
Display should be 0.5468072 yd/m yer 1 turn.
0.5468072 by rotary switches should be 0.54681.
Installation precautions ensure the correct supply voltage is used.
Fluctuating voltage may cause eratic operation of the instrument.
Keep signal input away from high induction loads i.e. motors, solenoids, etc.

■ HOW TO USE

(Checking up line speed meters)
In case of finding disorder, please settle line speed meter as following settlements.

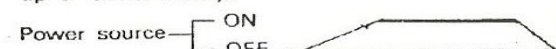- In spite of suppling power source, display and/or operating are working out of order.
  - A : In case of suppling power source, by the external surroundings suppling power source is not made at one try.
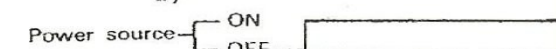
Power source ⎡ ON ⎣ OFF

a) Settlement : Please supply power source at one try.
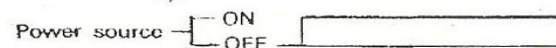
Power source ⎡ ON ⎣ OFF

B : In case of suppling power source, voltage is going up or down slowly.

Power source ⎡ ON ⎣ OFF

b) Settlement : Please supply power source at one try

Power source ⎡ ON ⎣ OFF

C : The supplied power source is less than standard voltage.

c) Settlement : Please arrange power source upto the standard voltage.

- In case that display is going up without input signal or display indicate often the value over than actural value in operating.
  - A : In the sarroundings of line speed meter and/or the line of input signal, motor with large inductive load and/or solenoide are installed.
  - a) settlement : Please keep the long distance between tachometer or the line of imput signal and imductive load, high voltage line and power line as well as install serge absorber both ends of the inductive load.
- In case that the functin of line speed is working out of order as extrauagant display, non display and fixed display in spite of accepting input signal.
  - Settlement : Please change the power source off by no. and then please keep the long distance between line speed meter or the line of input signal and inductive load, hige voltage line and power line as well as install serge absorber both ends of the inbuctive load. Please change the line of input signal into shield wire as below picture.

shield wire

Sensor or contact Point — +12V / IN / OV
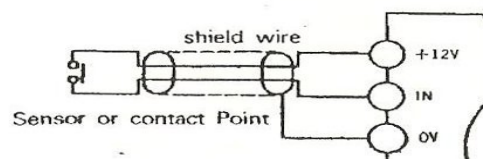
(About noise)

- Impulse voltage between power supply terminals are tested under 2KV, pulse width of 1μ Sec.
  External noise voltage is tested under 1KV, pulse width of 1μ Sec by noise simullator.
  In case noise voltage at impulse is over than above testing value, please connect alternating MP condensor or oil condensor of 0.1 to 1μF between source terminals.
  In case of testing pressure test, impulse voltage test and insulation resistance test with mounting on.
  1 Please separate line speed meter from external circuit.
  2 Please short all of the terminal of line speed meter.

(About input singal line)

- Please shorten the distance between sensor and tachometer if possible.
- Please avoid servicing the input wire in the same duct of and power wires
- In case that the wire of input is longer, please use the shield wire.

(About input signal line)

- Please avoid using line speed meter in the place surroundings gas with corrosion and inflammability, dust and vibration.
- Body is made of ABS plastic and cover is made of acryl, Therefore please avoid using line speed meter in the place surroundings organic materials, methylated alcohol benzol and the strong alkaline-amonia.