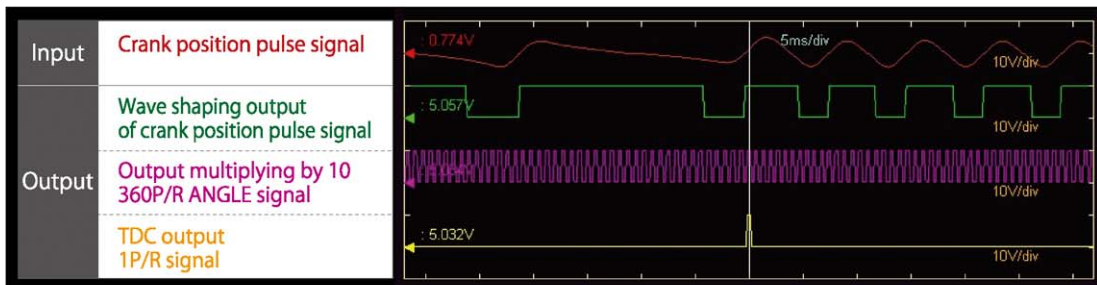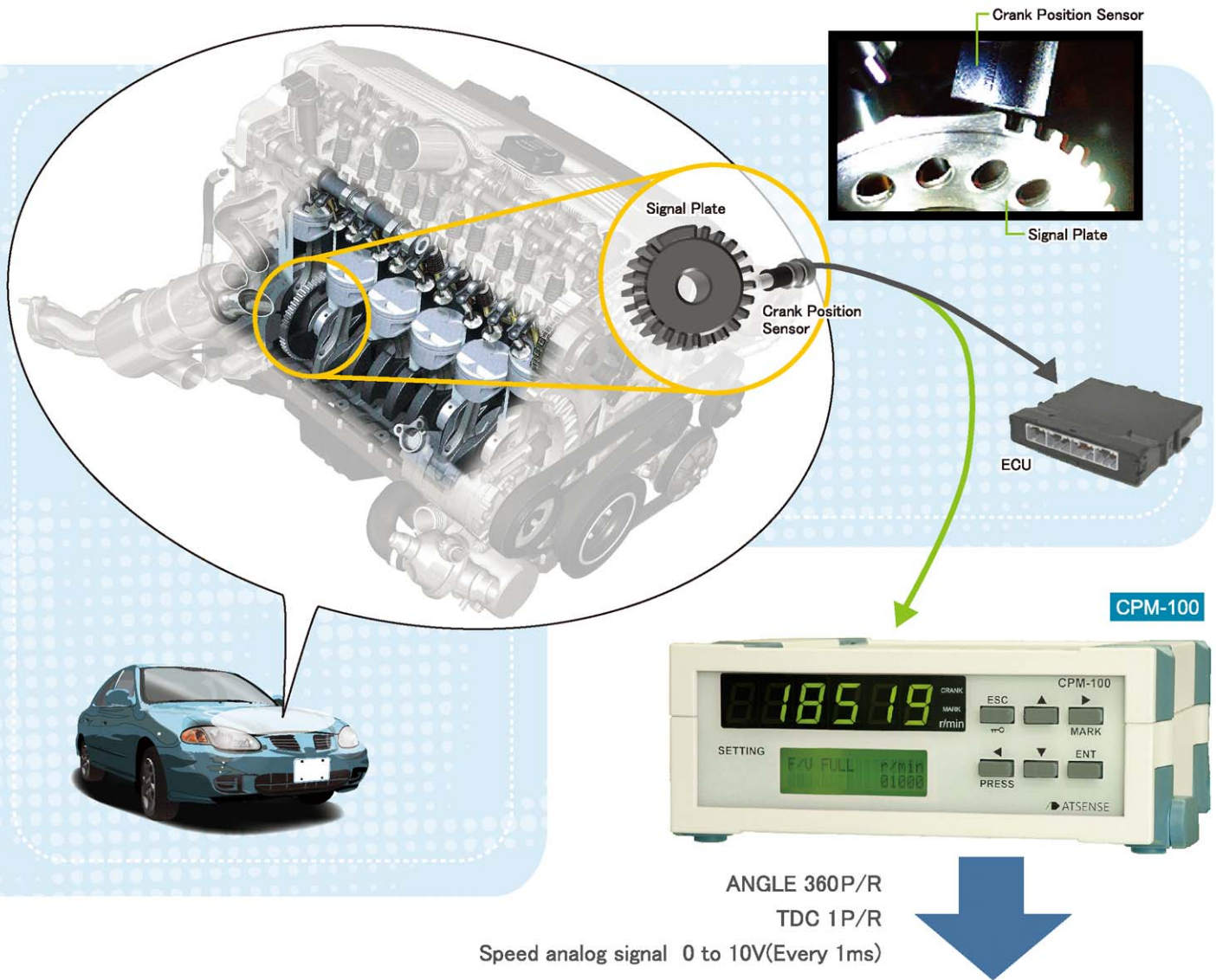# CPM-100
CRANKSHAFT POSITION PULSE MULTIPLIER

Features

Multiplying output of 360 pulses/revolution

1pulse/revolution (TDC signal)

F/V output of rotation speed ratio

Input power: 9 to 32VDC, attached AC adaptor

Application

Angle signal generation for sampling timing of combustion, vibration, stress, noise analysis, ECU control analysis and etc.

ATSENSE

Real-time multiplying to 360 pulses per revolution

Crank Position Sensor

Signal Plate

Signal Plate

Crank Position Sensor

ECU

Signal Plate

Crank Position Sensor

CPM-100

CPM-100

CRANK
MARK
r/min

ESC

MARK

SETTING

E/U FULL r/min
01000

PRESS

ENT

ATSENSE

ANGLE 360 P/R

TDC 1 P/R

Speed analog signal   0 to 10V(Every 1ms)

Input	Crank position pulse signal	0.774V 5ms/div 10V/div
Output	Wave shaping output of crank position pulse signal	5.057V 10V/div
	Output multiplying by 10 360P/R ANGLE signal	10V/div
	TDC output 1P/R signal	5.032V 10V/div

※Real-time output of 360P/R Angle signals despite a missing tooth.

What is multiplication of CPM-100?

A general multiplier outputs the same pulse number as the multiplying ratio at a constant frequency every time crank position pulse is entered. However, under this method, errors in output pulse number are accumulated, because the phases of input and output are not synchronized with each other. Since CPM-100 corrects output pulse cycles depending on rotation speed fluctuation, pulse number errors are not accumulated.

1. Real-time multiplying output
Real-time pulse output by predicting the next input signal

2. Possible to input a wide range from 10 to 20,000Hz
Possible to correspond to 10rpm to 20,000rpm in case of 60 pulses per revolution

3. Offset TDC signal output time at an arbitrary angle
Possible to use as TDC signal by outputting one signal per revolution
Offset setting of TDC output timing at an arbitrary angle by the increments of 0.5°

4. High speed F/V conversion output
1ms response F/V conversion output based on pulse infomation after multiplying
Moving average function enables equalized rotation measuring of rotating body with low pulse resolution

Up till now
Measuring by processing the engine crank and installing rotary encoder or slit disc.

When using CPM-100

- Difficulty for sensor installation and processing
- Too much time required for sensor installation and processing
- Impossible to install sensor
- Low durability of sensor
- High cost of sensor
- Processing required for each single piece of engine
- Impossible to measure an actual vehicle

- **No need to install rotary encoder or slit disc to an engine**
- **Drastic time reduction for experiment preparations by using the signals of actual vehicle**
- **Possible to measure a variety of vehicles**
- **No influences caused by installing rotary encoder or slit disc**

<Samples of inputs>   Multiplication of the signals detected by crank position sensor

Easy angle signal generation without processing an engine by using signal plate and crank position sensor of an actual vehicle .

<Corresponding plates>
- One spot with missing teeth/ No missing teeth
  Original number of teeth: 4, 6, 8, 15, 20, 24, 36, 40, 60
  Number of missing teeth: 0, 1, 2, 3, 4
- One spot with additional tooth
  Original number of teeth: 4, 6, 8, 12
  Position of additional tooth: 1/3, 1/2 and 2/3 of basic number of teeth
- Two spot with missing teeth
  Original number of teeth: 36
  Number of missing teeth: 3
- Three spot with missing teeth
  Original number of teeth: 36
  Number of missing teeth: 4, 6

＊The plates with 2 spot with missing teeth and 3 spot with missing teeth are limited.
＊Please consult us regarding other specifications.

One spot with missing teeth
Original number of teeth: 36
Number of missing teeth: 2

One spot with additional tooth
Original number of teeth: 12
Position of additional tooth: 1/3

<Other usages>   Multiplication of 1 pulse per revolution

Angle signal generation by attaching Reflection Tape to crank pulley and then detecting with photoelectric sensor or multiplying a pulse signal per revolution of Engine Tachometer.

Crank pulley with
Reflection Tape attached
Pulse number 1

■Specification

Display

Display item:Display method	Rotational speed display:7-segment green LED, 6 digits x 1 line, character hight approx. 14.2mm
	Settings display:Character LCD, 16 characters x 2 lines, Character hight approx. 5.6mm, green backlight

Crank Signal Input

Connector	BNC receptacle and Screwless terminal block
Input frequency range	10 to 20,000Hz
Sampling rate	40MHz
Input signal	Sine wave(Trigger level 0V), Square wave(Trigger level +2.5V)
Trigger slope	Rising or Falling
Low-pass filter	OFF or 20kHz
Pull-up	OFF or ON(Screwless terminal block only)
Power supply for sensor	+12V(40mA)
Input resistance	100kΩ
Input voltage range	±50V
Absolute Maximum Ratings	±100V
Wave shaping output voltage	0-5V

Multiplied Pulse Output

Number of outputs	2 outputs(BNC receptacles)
Output items	Angle output(360P/R), TDC output(1P/R)
Output voltage	0-5V
Output logic	Positive logic or Negative logic

F/V output

Number of outputs	1output(BNC receptacles)
Output voltage	0 to 10V
Refresh time	Every 1ms
Moving average	1 to 499

General specification

Power supply	9 to 32DCV, 10W(max.)
Memory backup	EEPROM
Isolation	DC power supply / CRANK signal input / MARK signal input / F/V output connector / All pulse outputs
External dimensions	184mm(W)x196mm(D)x70mm(H) excluding external accessaries.
Weight	Approx. 810g
Ambient operating temperature	0 to 40℃
Ambient operating humidity	0 to 85%(with no condensation)
Accessories	AC adapter, DC plug cable

■Physical Dimensions

CPM-100 CRANKSHAFT POSITION PULSE MULTIPLIER

Related Products

ET-100   ENGINE TACHOMETER

Funtions convienent for egine revolution measuring

Corresponding to Clamp on Secondary Ignition Coil Pulse Detector (Our products, Option) and compatible with various sensors

With Analog output, Pulse output, USB output

The specifications and appearances specified in the catalog are subject to changes due to product improvements without notice.