# RPM CONTROLLER

## MODEL : CNR 230

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# RPM CONTROLLER

## 1. General description

ICD's RPM Controller is a microcontroller based instrument accepts Pulse output from Proximity / magnetic pick up and shows the corresponding RPM in display window and its direction through LED Indication. It has the operational security of extensive measuring system and self-monitoring. All data of the measuring system is safely stored (without batteries) in the EEPROM.

The instrument houses LED type display window and 1x 4 matrix keypad in the front facia, while the rear view has Auxiliary supply, Input and control output terminals. The direction of the RPM may be forward or reverse indicated by relevant LEDs.The instrument is also provided with 4-20mA output corresponding to 0-99999 RPM

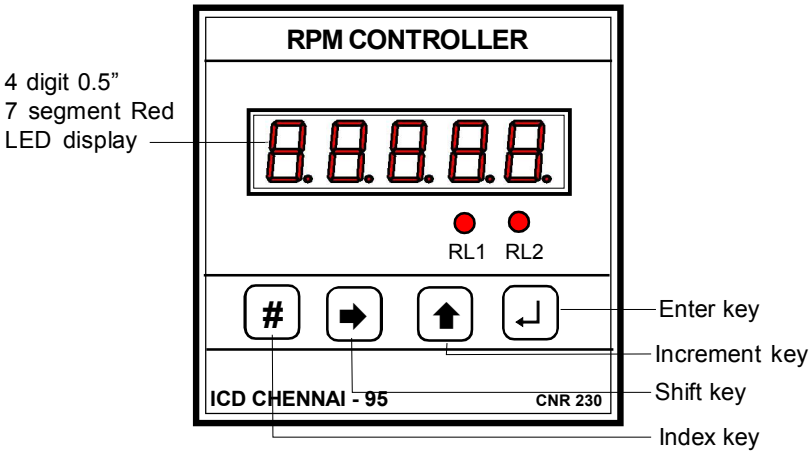
The RPM indicator is housed in a ABS plastic case enclosure of size 96(H) x 96(W) x 120(D) mm dimension and is suitable for flush panel mounting.

## 2. Front Panel & Terminal Details

### 2.1 Front Panel Details

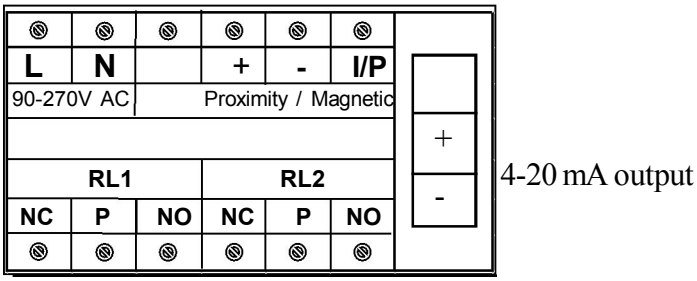
The front panel of Instrument has display window, 1x4 matrix keypad for programming & LED indications.

1. Display window houses 5 digit 0.5” 7 segment red LED type.
2. The 1 x 4 matrix keypad is designed for programming setting parameters.
3. 2 Nos of 3mm LEDs are provided to indicate RL1 & RL2 relay status




### 2.2 Terminal Details

Rear Panel consists of terminals for Auxiliary Supply, Input & Relay Outputs.



## 2.3. 1*4 Matrix Keypad Description

These key switches are provided in bottom side of front facia . The four key switches are designated as

# ———— INDEX

➡ ———— SHIFT

⬆ ———— INCREMENT

↵ ————ENTER

**1.Index key (#)**

The index (#) key operates in Program mode and in run mode . By pressing this key displays the configuration Item display pages.

**2. Shift key**

The shift ( ▶ ) key is used to select the digit one by one on pressing it. The selected digit is shown by flashing that digit.

**3 .Increment key**

The Increment ( ▲ ) key is used to Increment the selected digit. The Increment key Increments the digit from 0 to 9 and then wraps down once again.

**4. Enter key (↵)**

Once the required values are set in the configuration items, press the Enter (↵) key to store it in memory. If the change is accepted the display Indicates ‘E’ otherwise an error message is displayed as ‘Err’.

## 3. Programming Instruction

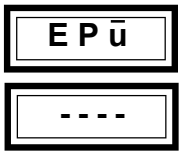
The RPM controller is to be programmed properly to work in a particular installation. The various items that are to be programmed are given below.

1. New pass word
2. Range set ,Low & High Set point
3. Projections
4. Relay control operation

The controller is provided with pass word facility to prevent alteration of configuration items by unauthorised persons.

The configuration items can be changed by following the procedure given below,

With power applied to the meter, hold in **4** and **5** keys together for 3 seconds. The display indicates enter pass word.




Enter Pass word

The valid pass word is set in the configuration item. New pass word has to be entered by using shift ( ▸ ), Incr ( ▲ ), and Enter (↵) keys. (Refer changing the configuration items) After valid pass word is entered the instrument enters into program mode by showing it in display.


**Special Note:**

If the user enters the 'enter pass word' for the first time or if the user fails to remember the pass word entered in 'New pass word' , the default pass word of 0386 can be entered.

In program mode, the configuration items can be selected by using Index (#) key. The heading displays are used to differentiate various configuration items. The heading displays for various configuration items are given below,

**E - - - -** Enter password as in New password menu or “0386” to enter Program mode

Press Enter key

**P r O G** Program Mode

Press # key

**n̄ E u P u** New Password (0000 - 9999)

**0 0 0 0** — **rAnGE** **1 0 0 0**

Press # key

**L - S E t** Low setpoint, which is assigned for Relay & LED (RL1) (Range : 00000 - 99999 rpm)

**0 0 1 0 0**

Press # key

**H - S E t** High setpoint, which is assigned for Relay & LED (RL2) (Range : 00000 - 99999 rpm)

**0 0 5 0 0**

Press # key

**P r O J** Number of Projections ( 001 - 999)

**0 0 1**

Press # key

**C n̄ O d E** Control Mode, *(Control action of both the relay Forward or reverse, 1 relay forward and other Reverse any of these four combination can be slected using shift, increment & Enter Key)*

**1 F 2 F**

**Illustration**

Select Program mode by pressing Shift & Increment keys together and press index key to select the Range setting display page

1 r0 0

The Range which is already existing. To alter this press ▶ key so that first digit from left to right start flashing. Using ▲ key select the desired numeral and then press ▶ key, which flashes the next digit by moving the cursor to the next digit. Again using ▲ key select the desired numeral and repeat the same procedure for remaining digits and then finally press¿ key to update the selected numerals.

## 4. Functional Description

Once the unit is powered, it displays **ICd08** for 3 sec and displays the RPM value with respect to the input. The instrument is programmed to the range of 99999 rpm internally. In program mode, the set value,No of Projections and relay control type are set as per the requirement.

Low setpoint is associated with RL1 (Relay & LED) & High setpoint is associated with RL2 (Relay & LED).

**RPM = (Input Frequency * 60) / No of Projections**

## 5. Control Action

**1F2F : (both are forward)** Both the relays and associated LEDs get ON when respective setpoint is reached and stay in the same state, till rpm value reduces below the setvalue.

**1r2r : (both are reverse)** Both the relays and associated LEDs get OFF when respective setpoint is reached and stay in the same state, till rpm value reduces below the setvalue (ie. below setvalue RL1 & RL2 are ON).

**1F2r : (1 Forward 2 Reverse)** RL1 gets ON when setpoint is reached, whereas RL2 gets OFF, when setpoint is reached.

**1r2F : (1 reverse 2 forward)** RL1 gets OFF when setpoint is reached, whereas RL2 gets ON, when setpoint is reached.

## 6. Technical Specification

| | | |
|---|---|---|
| Type | : | ICD Microcontroller based RPM CONTROLLER (CNR 230) |
| Display | : | 5 DIGIT 0.5' 7 Segment red LED type |
| Input | : | Proximity / Magnetic pick up |
| Range | : | 0 - 99999 RPM |
| Resolution | : | 0.01 RPM upto 150 RPM<br>0.1 RPM 150 to 1500 RPM<br>1 RPM morethan 1500 RPM |
| Accuracy | : | ± 0.1% ± 1 LSD |
| **Control Action** | | |
| No.of setpoint | : | 2 |
| Control setting: | | Through 1x4 matrix keypad |
| Output1 | : | One c/o potential free contact for each setpoint |
| Output2 | : | 4 - 20mA corresponds to 0-99999 RPM |
| Setting parameters | : | New password, Low & High Setpoint, No of Projections and Control Modes. |
| Contact rating | : | 3 Amps at 230 Vac |
| Status Indication | : | Provided by Red LED |
| Calibration | : | Digital through key pad |
| Auxiliary Supply | : | 90 - 270 VAC |
| Box dimensions | : | 96 (H) x 96 (W) x 120 (D) mm |
| Enclosure | : | ABS Plastic case |
| Mounting | : | Panel |

## 7. Commissioning of RPM CONTROLLER

Before fixing the unit into the panel

* Thoroughly read the operating manual, if queries arised contact ICD's sales representative.

* Visualize the unit for any physical damage, which may be caused during transit.

* If severely damaged, unpack the instrument and contact ICD's factory or its representative.

* After physical inspection, complete the external wiring and switch ON the unit for preliminary check (if necessary).

* The display page shows the process value.

* Program the required Setting parameters.

* After complete satisfaction, fix the instrument into the panel and complete the external wiring.

Excess voltage can damage the instrument ,
lesser voltage can cause improper functioning.