Icon Electronics

D3-RPMx / D4-RPMx / P44-RPMx / P49-RPMx

xx-RPM0	(indicator only)
xx-RPM1	(1 relay output)
xx-RPM2	(2 relay output)
xx-RPMx-T	(0-20mA / 4-20mA retransmit)

RPM / Counter / Frequency / PPh Monitor

0 - 9999 pulses
0 - 9999 RPM
0 - 5000 Hz
2 - 9999 PPh

Operating instructions and Guarantee Certificate

www.iconelectronics.co.za

Description:

A 10V – 24V DC (Max: 30mA) supply is incorporated for use with **NPN** proximity / photo switches. Pulses received are displayed according to the selected function. (Counter, Revolutions per Minute, Frequency & Pulses per hour).

The pre-scale (divide by 1- 1000), post-scale (multiply by 1-1000) and adjustable Decimal point parameters allow the device to be programmed to allow pulses received to represent fractional values. Particularly useful when interfacing with flow meters.

While operating in counter mode, the display may be set to indicate RPM, Freq or PPh for 1 minute before it resumes the programmed display value. (Press the center button to change the value being displayed)

Pulses received can be acknowledged when the pulse pins are either shorted or released.

The settings may be locked or reduced to stop unauthorized personnel from making changes.

Dual relay devices:

Relay 2 may be programmed as a COUNTER (of pulses received) OR it can increment whenever COUNTER 1 has reached it's setpoint. (counter of counter 1 setpoints reached).

Dual relay devices may also be configured as a COUNTER on relay 1, while simultaneously monitoring the rate of the pulses received on relay 2. (RPM, Freq or PPh)

The latch / reset pin functionality may be enabled and displayed independantly for each relay.

Please see notes. The relays may be configured to energise or de-energise when the setpoint(s) are reached.

Retransmit devices:

The process value assosiated with relay 1 may be re-transmit as a 0-20mA or 4-20mA signal. This signal may represent any of the operating modes including COUNTER modes. If relay 1 is configured for counting, the loop output will increase as the number of pulses counted increases. See retransmit notes on back page for further details.

Operation:

Counter mode:

Pulses may be displayed as lapsed (up-counting) or remaining (down counting). In remaining mode, the display will indicate negative values up to -999 if the number of pulses received is greater than the setpoint.

The "reset timer" allows the device to automatically reset between 0.1 and 99.9 seconds after the set point is reached, eliminating the need to generate reset pulses manually.

(By using this timer function, the output pulse length can be varied from 0.1 to 99.9 sec)

Individual pulses can represent values as small as 0.001 by adjusting the position of the decimal pointer.

The "save" function may be used to save the state of the counter during power failures. (allowing the device to continue from where it left off when the power is restored)

RPM / Frequency or PPh Mode:

The relay(s) operate in a window comparator mode where the upper and lower set-points are compared to the current value.

Should the measured value exceed or drop below the upper or lower setpoints, the relay is de-energised (optionally enegised) until the value recovers by the Hysteresis amount.

If the latch facility is enabled and the latch pin is shorted to ground, the relay will not recover until the latch is removed, even if the value has recovered sufficiently. When the latch pin is released, the start-up delay is reset to allow time for the system to stabalize before monitoring resumes.

The programmable start-up delay allows fault conditions for a pre set time after power-up. To allow the RPM value to rise to the correct level before monitoring starts.

The reaction delay (trigger delay) allows fault conditions for the pre-set time before the relay(s) react .

If the fault is removed before this timer runs out, the relay remains energised.This feature is used to avoid nucance trips.

The display will indicate Hi or Lo during fault conditions (this may be disabled). If the is above 9999, "Er.Hi" is displayed.

Mixed mode:

Relay 1 may be configured for counting while relay 2 can monitor RPM, Freq or PPh. In this configuration the display may be set to Lapsed pulses, Remaining pulses OR the type of signal relay 2 is configured for (RPM, Freq or PPh).

Available models:

xx-RPM0

These devices do NOT incorporate any relays and are used for display purposes only. In counter mode a the setpoint is used indicate remaining pulses and to determine when the reset timer resets the device.

There is no setpoint parameter in any of the other modes.

xx-RPM1

These devices incorporate 1 relay which may be configured for any mode. COUNTER, RPM, Freq, PPh.

xx-RPM2

These devices incorporate 2 relays. If relay 1 is configured for COUNTING, relay 2 may be configured as a COUNTER, RPM, Freq, PPh monitor. If relay 1 is configured for a mode other than COUNTER, then both relay 1 and 2 are automatically configured foir the same function.ie. The device cannot simultaneously montor RPM and Freq. or RPM and PPh.

Differences between Single and Dual display devices:

The P49 and D4 devices offer 1 large display while the P44 and D3 devices offer 2 smaller displays.

Dual display devices will simultaneously display process values on the upper display, while displaying the set-point associated with relay 1 on the lower display.

When adjusting the parameter values, the dual display devices indicate the parameter on the upper display while the value is displayed on the lower display. There is no need to first select the parameter before adjusting the value.(please see "menu operation" for further details on adjusting parameter values).

Notes:

·When using Relay 1 in COUNTER mode and relay 2 in a pulse rate mode (RPM, Freq or PPh), do not enable both the reset pin (for relay 1) and latch pin (for relay 2), since this is electrically the same pin, the counter value will be reset whenever the latch is enabled. In this mode we recommend disabling the reset functionality for relay 1 (instead use the reset delay to reset the counter value) and using the latch facility on relay 2.

·Make all adjustments and reset device before connecting relay.

·If the input voltage is below the minimum operating voltage, the relay(s) may not energize, even though the device's display is on.

Specifications:

Input range:	0-9999 pulses, 0-9999 RPM,	
	0-5000Hz, 0-9999 pulses per hour	
Maximum display value:	9999	
Pre-scale:	1-1000 pulses	
Post-scale:	1-1000	
Decimal pointer	9999, 9.999, 99.99, 999,9	
Accuracy:	Counter mode :	100%
	All other modes (Freq, RPM,PPh):	±0.05%
Display Resolution:	Counter:	0.001 to 9999
	Freq, RPM, PPh:	1
Input voltage:	±15% of rated voltage	
Led indication:	Relay status	
Reset time:	0.5 sec (power supply reset)	
	0.05 sec (reset pulse)	
Response time:	Counter: <0.02s	
	Freq, RPM, PPh: <1.1s	
Input frequency	"FASt": 0-8000 Hz "SLO": 0-5 Hz	
Pulse source type	mechanical switch or NPN proximity	

Menu operation (single display):

All adjustments are made via the three front mounted buttons.
Press the "MENU" button repeatedly until the desired setting is reached, press "SELECT" to display the current value of the selected parameter, or sub menu (if applicable).
The "+" and "-" buttons are used to change the value.
"ENTER" will return the device to the menu.
The "BACK" button will exit the menu.

Menu operation (dual display):

Press the menu "↻" button repeatedly until the desired setting is reached.
The "▲" and "▼" buttons are used to change the value.
"↻" will display the next menu item.
To exit the menu hold "↻" button for 3 seconds.

Menu options:

Exit the menu before making the following adjustments.

Lock / unlock parameters:
(default: unlocked)

Press "BACK" ("▼"), **then** "ENTER" ("↻") and hold the 2 buttons until the desired option is displayed. The display cycles between "Loc" (no changes allowed) & "u.Loc" (parameters may be adjusted)

Full / reduced menu (default: Full)

Press "SELECT"("▲"), **then** "ENTER"("↻") and hold the 2 buttons until the desired option is displayed. The display cycles between "rEdu" (limited menu) & "Full" (all parameters are accessible)

Access Code: (default: no code)

Once the above options have been set as required, Press "BACK" and "SELECT" ("▼" and "▲") simultaneously until "CODE" is displayed. Now use the "+" & "-" ("▲" and "▼") to enter a code.
Once a code is entered, access to the options above is not permitted.
To clear the code, re-enter the same code again.
If the code is forgotten. Press and hold "+" & "-" ("▲" and "▼") until "CODE" is displayed while re-applying power to the device.

Adjustable parameters:
Please note: Depending on the model of the device purchased and the current mode of operation, some of the parameters listed below may not be available

·**Clear counter 1 value "CLr.1" (COUNTER MODE)**
 Press "▲" and "▼" or "+" and "-" buttons simultaneously to reset counter 1 value to 0.

·**Clear counter 2 value "CLr.2" (COUNTER MODE)**
 Press "▲" and "▼" or "+" and "-" buttons simultaneously to reset counter 2 value to 0.

·**Relay 1 function "Func"**
 Select between **COUNTER** "Cnt", **RPM** "rPn", **Freq** "FrEq" or **PPh** "PPh"

·**Set point for relay 1 counter "SEt.1" (COUNTER MODE)**
 When the pulses received value (after being manipulated by the pre- and post-scalers) reaches this value, the relay will change state until reset via the reset pin or the reset delay timer.

·**Upper limit for relay 1 "Hi 1" (PULSE RATE MODES) (default: disabled)**
 The relay de-energises when the value rises above this value. It will re-energise when the value drops below this value by the programmed hysteresis amount.
 (if the latch pins are NOT shorted)

·**Lower limit for relay 1 "Lo 1" (PULSE RATE MODES) (default: disabled)**
 The relay de-energises when the value drops below this value. It will re-energise when the value rises above this value by the hysteresis amount.
 (if the latch pins are NOT shorted)

·**Hysteresis for relay 1 ("HySt") (PULSE RATE MODES) (default:1)**
 Once the relay has de-energised, the value must change in the opposite direction by this amount before it will re-energise.

·**Pre Scale relay 1 "PrE.S" (ALL MODES) (default:1)**
 This number of pulses must be received before the main counter value is updated by 1.

·**Post Scale relay 1 "PoS.S" (ALL MODES) (default:1)**
 Whenever the main counter value is due to be updated (ie the pre-scale number of pulses have been creceived), the main counter value is incremented by this number counts.

·**Decimal pointer position "dECi" (ALL MODES) (default:9999)**
 Adjust the poisition of the decimal pointer to indicate the required number of decimal points.

·**Relay 1 configuration "r.CnF" (ALL MODES) (default:"CLOS")**
 Select whether the relay must energise "CLOS" or de-energise "OPEn" then the set-point is reached.

- **Relay 1 output "Out.P" (COUNTER MODE) (default:"Cont")**

  Select between 0.5sec pulse "PULS", or continuous "Cont" change over when the required number of pulses are counted. (note. The counted value is NOT reset after the 0.5 second pulse expires. Used the reset delay timer to reset the counter)

- **Relay 1 reset delay timer "r.dEL" (COUNTER MODE) (default:disabled)**

  The counted value (and the relay) is reset this amount of time after the set point is reached. This has the same effect as pulsing the reset pins to reset the counted value.

- **Relay 1 reset enable "r.En" (COUNTER MODE) (default:"EnAb")**

  Select whether the reset pin punctionality is enabled for relay 1 "EnAb" or disabled "diSA"

- **Relay 1 latch enable "L.En.1" (PULSE RATE MODES) (default:"EnAb")**

  Select whether the latch facility is enabled for relay 1 "EnAb" or disabled "diSA"

- **Relay 2 function "Fun.2" control mode (only available if relay 1 is set to counter mode)**

  Select between COUNTER "Cnt", COUNTER of COUNTER 1 setpoints reached "Cnt1", RPM "rPn" ,Freq "Freq" or PPh "PPh".

  In COUNTER mode the value is incremented by the post-scale amount after the pre-scale amount of pulses have been receved from the pulse pins.

  In Counter of COUNTER 1 setpoints reached mode, The value is incremented by the post-scale amount after the pre-scale amount times COUNTER 1 has reached the COUNTER 1 setpoint. eg: Counter 1 can be set to 24 (24 bottles = 1 case of cooldrink) Counter 2 can then indicate the number of cases of cooldrink bottled.

- **Set point for relay 2 counter "SEt.2" (COUNTER MODE) (default 1)**
- **Upper limit for relay 2 "Hi 2" (PULSE RATE MODES) (default: disabled)**
- **Lower limit for relay 2 "Lo 2" (PULSE RATE MODES) (default: disabled)**
- **Hysteresis for relay 2 "HyS.2" (PULSE RATE MODES) (default:1)**
- **Pre Scale relay 2 "Pr.S.2" (COUNTER 2 MODE) (default:1)**
- **Post Scale relay 2 "Po.S.2" (COUNTER 2 MODE) (default:1)**
- **Decimal pointer position COUNTER 2 "dEC.2" (COUNTER 2 MODE) (default:9999)**
- **Relay 2 configuration "r.Cn.2" (ALL MODES) (default:"CLOS")**
- **Relay 2 output "Out.2" (COUNTER MODE) (default:"Cont")**
- **Relay 2 reset delay timer "r.dE.2" (COUNTER MODE) (default:disabled)**
- **Relay 2 reset enable "r.En.2" (COUNTER MODE) (default:"EnAb")**
- **Relay 2 latch enable "L.En.2" (PULSE RATE MODES) (default:"EnAb")**
- **Start-up delay "St d" (PULSE RATE MODES) (default 0.0 sec)**

  After power-up, monitoring will commence after this amount of time has lapsed.

- **Reaction Delay "rE d" (PULSE RATE MODES) (default 0 sec)**

  Once monitoring has started, fault conditions will be tolerated for this period of time before the relay is de-energised.

- **Relay fault Indication "indi" (PULSE RATE MODES) (default: on)**

  Use this setting to disable the relay fault messages

  ("r1.Hi", "r1.Lo", "r2.Hi", "r2.Lo", "-r1-", "-r2-") from being displayed.

- **Save to eeprom at power down "SAuE" (ALL MODES) (default: "on")**

  Enable this feature to continue counting from the values saved at power down. This feature also saves the current pre-scale values in all modes of operation.

- **Input pulse source "i.Put" (ALL MODES) (default "FASt")**

  Select "SLO" to limit the input frequency to a maximum of 30Hz. This reduces "switch bounce" when using mechnical contacts to generate pulses.

- **Input pulse type "P.tYP" (ALL MODES) (default "CLOS")**

  Select whether to acknowlede a pulse input when the contacts are either opened "OPEn" or closed "CLOS"

- **Value of Display (IF relay 1 is in COUNTER MODE) (default :"C1.LA")**

  When set to COUNTER modes, the device can be set to display values other than the pulses counted. Counting will be done in the background irrespective of the value being displayed. Depending on the configuration of the 2 relays, the available options are: Lapsed pulses COUNTER 1, Remining pulses COUNTER 1, RPM, Freq, PPh, Lapsed pulses COUNTER 2, Remaining pulses COUNTER 2.

- **ReTransmit signal type ("rt.tY) (RETRANSMIT MODELS ONLY) (default 4-20mA)**

  Select between 0-20mA and 4-20mA output.

- **Re - transmit output Offset "rt.OS" (default 0)**

  When the value assosiated with relay 1 equals this value, 4mA is transmitted.

- **Re - transmit output Span "rt.SP" (default 1000)**

  When the value assosiated with relay 1 equals this value PLUS the offset (rt.OS) value ("rt.SP"+"rt.OS"), 20mA is transmitted. (see notes)

- **Reset ("rESt) (ALL MODES)**

  Press "▲" and "▼" or "+" and "-" buttons simultaneously to reset the device to the factory defaults.

- **ReTransmit notes ("-T" devices only):**

  The value associated with relay 1 is re-transmitted based on the re-transmit ofset and span parameters. The output may be set to correspond to the entire range of expected values, or any part thereof.

  eg. **relay 1 is set as a COUNTER : Retransmit pulses counted from 0-150:**

  Ouput: At 0 pulses counted = 4 mA; Ouput: At 150 pulses counted = 20 mA

  parameter settings: re-tx offset=0, span=150

eg. **relay 1 is set as a RPM monitor: Retransmit 1000-3000 RPM:**
Ouput: At 1000 RPM = 4 mA; Ouput: At 3000RPM= 20 mA
parameter settings: re-tx offset=1000, span=2000 (3000RPM-1000RPM)

D3 / P44 Programming example: Set decimal pointer to 0.00 position:
Press "↻" repeatedly until "deci" is displayed.
Use "▲" and "▼" to change the value to "99.99".
Press "↻" for 3 seconds to exit the menu.

D4 & P49 Programming example: Set decimal pointer to 0.00 position:
Press "MENU" repeatedly unitl "deci" is displayed.
Press "SELECT" to view the current value.
Use the "+" and "-" buttons to change the value to 99.99
Press "ENTER" to return to the menu.
Press "BACK" to exit the menu.

12 Month guarantee:
Our product is guaranteed for a 12 (twelve) month period from date of purchase. This guarantee is valid for defects arising from failure during specified conditions. This guarantee does not cover damage due to abuse, tampering or improper installation. Our company does not accept liability for any consequential damage or loss arising from product malfunction. Should this product prove to be defective, kindly return for inspection or repair.

Relay specifications:
Contact rating: 10A 250 VAC 2500VA
Mechanical life: 30 million operations
Electrical life: 250 000 operations (at maximum load)

For Further information, please visit us at:
www.iconelectronics.co.za