

# Common Functions of Digital Instruments

This data sheet describes common functions available in the programming of University Paton Instruments Microprocessor based instruments.

## TERMINOLOGY

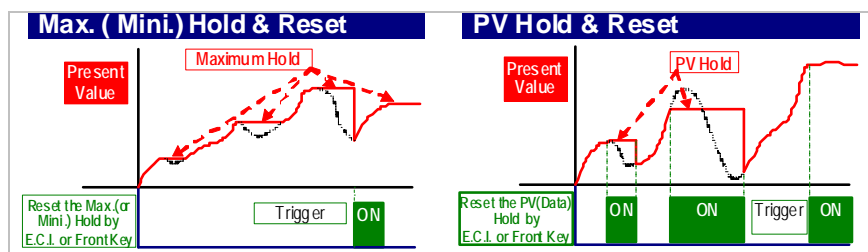
**PV** is the current value being measured, the 'Present Value' **[Pv]**

**ECI** is a digital input (dry contact), 'External Control Input', it is used for functions such as hold, reset, tare, pause etc. An alternative is often a programmable front key being pressed.

**GATE** is to 'pause' an operation.

## MINIMUM OR MAXIMUM VALUE HOLD **[Max.H] / [Mini.H]**

This function allows a meter to read only the maximum or minimum value measured. This can be reset by an ECI and will then continue to display the maximum or minimum until a further reset is initiated.

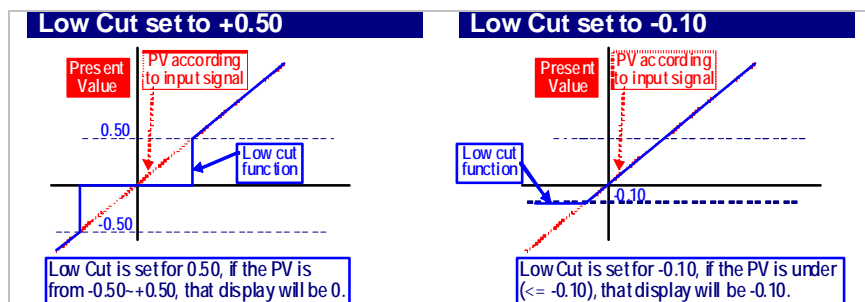


## PRESENT VALUE HOLD **[Pv.Hld]**

When an ECI initiates this function the current PV will be frozen. A subsequent ECI will unfreeze the display allowing it to read and display as normal.

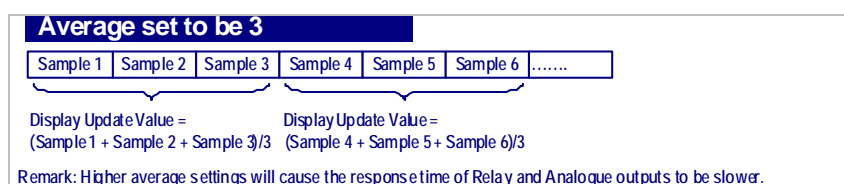
## PRESET MINIMUM VALUE DISPLAY **[Lo.Cut]**

The meter display will display Zero for any measurement below the LO CUT value programmed. There are applications where meters will show small values when equipment is off, a vessel empty etc, this setting guarantees a zero reading.



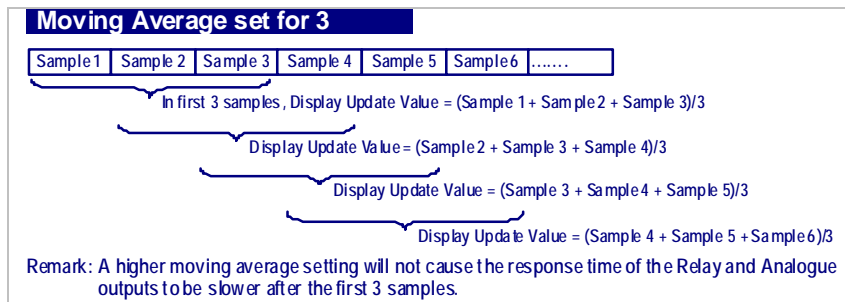
## SAMPLE AVERAGING **[AvG]**

The normal sample rate can be changed with this function. For example if the normal sampling rate of the meter is 15cycles per second and an AvG is set as 3, then the display update will slow to 5 cycles per second. This is useful if an unstable display is seen.



## MOVING AVERAGE [M.AVG]

This function averages the samples by the value set. With a setting of 3 the display will update after averaging the first three samples and then continue at the normal cycling rate (eg 15cycles/sec)



## DIGITAL FILTER [D.FILT]

Occasionally signal noise can affect meter performance. This function can help eliminate the noise.

## FIELD CALIBRATION FINE ADJUSTMENT [Pv.Zro] & [Pv.SPn]

If a field measurement differs slightly from the displayed value and you wish to adjust the displayed value then zero and span can directly entered. The meter will auto calibrate to your values.

## PROGRAMMABLE CT & VT RATIOS

For AC Meters CT and VT ratios are programmable

## TIME PERIOD SETTABLE kWh ACCUMULATION [SCT]

For the DKWH meter the measurement of kWh may be performed over a set time period.

## ALARM RELAYS NORMAL OR LATCHING MODE

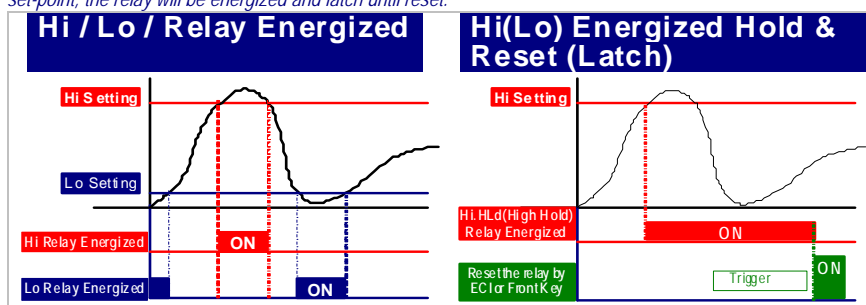
Alarm relays may be assigned to be normal or latching. If latching is selected then an ECI or front key must be assigned to reset the latch. The relay is assignable as follows

Hi / Lo / Hi.HLd / Lo.HLd / do

Hi: Relay will energize when PV > Set-Point

Lo: Relay will energize when PV < Set-Point

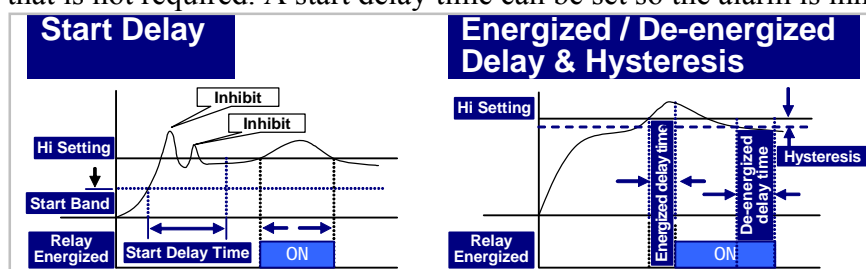
Hi.HLd (Lo.HLd): When the PV is Higher (or lower) than set-point, the relay will be energized and latch until reset.



DO (do) is Digital output. This is a RS485 Modbus function where the relay can be directly controlled via the DCS or PLC.

## START DELAY

Some applications measure signals that are high at startup (eg motors) and may activate an alarm condition that is not required. A start delay time can be set so the alarm is inhibited for the period chosen.

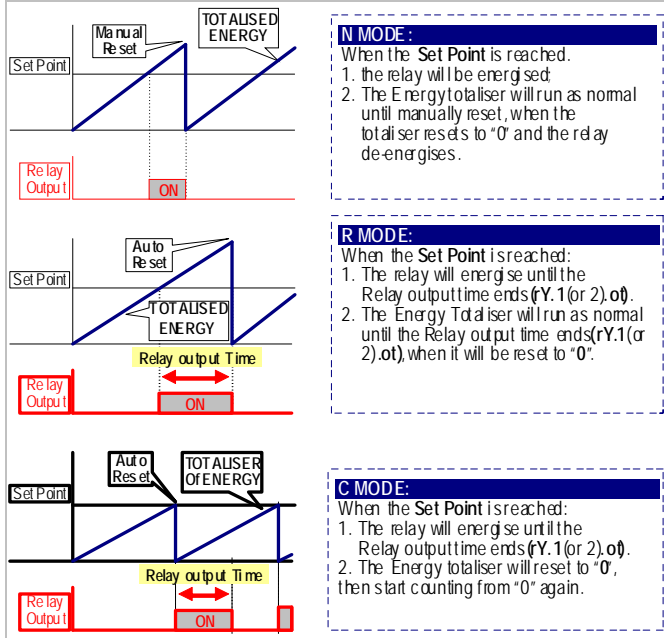


## ALARM DELAY & HYSTERESIS

Hysteresis is the setting that determines the band between an alarm turning on and turning off. Without it an alarm setting close to the PV would have the alarm constantly energizing and de-energising (hunting). Settings are also available for time delays before an alarm is initiated or afterwards. This function stops fleeting alarms or maintains alarms for recognizable periods.

## kWh and TOTALISER RELAY

There are three programmable modes for setting up this function, described below.



## EXTERNAL CONTROL INPUTS

The maximum number of ECI's is determined by the model. There are normally two and they can be dry contact or open collector. It is important to remember that if a front key is assigned as a function then an ECI is disabled. Normally your choices would be 2 x ECI, 2 x Front key or one ECI and one Front key.

Assignable functions are Relative PV(Tare) / PV Hold / Reset Max or Mini. Hold / DI / Reset for Latched Relay. Relative PV is a differential value ( $\Delta PV$ ) or 'tare' in weighing applications. [\[Relative PV\]](#)

The PV Hold / Reset Max or Mini. Hold / Reset for Latched Relay functions are described earlier and are assignable. The Digital Input function allows transmission of the input to a DCS or PLC via RS485 Modbus(RTU) [\[DI\]](#)

With kWh and batch Totalisation the ECI can be assigned to Stop, Reset or Pause the counting. Pause is referred to as 'GATE'.

## DEBOUNCE TIME [\[dEbnC\]](#)

The normal response time for a relay is 8mS. This can be too short in some applications. A debounce time factor can be programmed to increase this time by the number chosen, eg a setting of 3 gives 24mS.