

# Icon Electronics



D3  
53mm  
DIN rail mount



P44  
48mmx48mm  
panel mount



P49  
48mmx96mm  
panel mount

## AC CURRENT MONITOR with 4-20mA or 0-10V re-transmit

**D3-CMA 0/1/2 - 5 or -1-T**

**P44-CMA 0/1/2- 5 or -1-T**

**P49-CMA 0/1/2- 5 or -1-T**

EXAMPLE: D3-CMA1-5-T = 1 RELAY 5A CT

## Operating instructions and Guarantee Certificate

[www.iconelectronics.co.za](http://www.iconelectronics.co.za)

### ReTransmit devices (-T)

The 4 -20mA re-transmitted signal is optically isolated from the input signal. By default the re-transmission parameters are set so that the output follows the full scale input.

### Description:

This device provides OVER and / or UNDER current protection. The display may be scaled to any value from 5 to 5000 and the decimal pointer set to any position. This allows the device to be configured for any primary CT current with up to 3 decimal places. Each relay is controlled via separate upper, lower and hysteresis set-points. The relays may therefore be configured for both over and / or under, or one for over and the other for under current protection. Programmable 'start-up' and 'reaction' delays are included.

### 0 RELAY

The display may be scaled to any value from 5 to 5000 and the decimal pointer set to any position. This allows the device to be configured for any primary CT current with up to 3 decimal places.

### 1 RELAY

The relay remains energised while the current remains below the upper and above the lower set points. OVER and UNDER current conditions are indicated by displaying "Hi" and "Lo" respectively. If the start-up or reaction delay is keeping the relay energised during a fault condition, "-r1-" is displayed as a warning. A latch facility is also included. The menu may be reduced or locked to avoid accidental changes from being made.

### 2 RELAY

The relays remain energised while the current remains below the upper and above the lower set points. The device indicates OVER and UNDER current conditions by displaying "r1.Hi", "r2.Hi", "r1.Lo", "r2.Lo". If the start-up or reaction delay is keeping a relay energised during a fault condition, "-r1-" or "-r2-" is displayed as a warning. A latch facility is also included. The menu may be reduced to stop accidental changes to more advanced settings. The settings may also be locked. When this is done, the settings may be viewed, but not changed.

### Adjustable Parameters:

*Please note: Depending on the model of the device purchased, some of the parameters listed below may not be available*

- **Scale ("SCAL")** (default: 100 (1A device), 500 (5A device))

This value will be displayed when the input is at its maximum. (Usually set to the primary current of the CT).

- **Decimal Pointer ("dECi")** (default: 5.00)

Set the position of the decimal pointer (xxxx, xxx.x, xx.xx, x.xxx)

- **Upper limit for relay 1 ("Hi 1")** (default: Disabled)

If the input current exceeds this value, relay 1 is de-energised and "Hi 1" is displayed. To disable this feature, set it to maximum. "diSA" is displayed. The maximum value of this setting depends on the scale setting.

- **Lower limit for relay 1 (“Lo 1”)** (default: Disabled)

If the input current drops below this value, relay 1 is de-energised. “Lo 1” is displayed. To disable this feature, set it to minimum (-1). “diSA” is displayed.

- **Hysteresis for relay 1 (“HyS.1”)** (default: 0.25)

If the input current has exceeded the “Hi 1” setting, or dropped below the “Lo 1” setting, the current must drop, or rise above the applicable limit by this amount before relay 1 re-energises. This setting is limited to the difference between the “Hi 1” and “Lo 1” settings.

- **Relay 1 function “rE.F.1 “** (default: Energise)

Relay state when the setpoint is reached “dE.En”=de-energise, “EnEr”= energise.

- **Upper limit for relay 2 (“Hi 2”)** (default: Disabled)

- **Lower limit for relay 2 (“Lo 2”)** (default: Disabled)

- **Hysteresis for relay 2 (“HyS.2”)** (default: 0.25)

- **Relay 2 function “rE.F.2 “** (default: Energise)

- **Start-up delay (“St d”)** (default: 1 Second)

The relays are energised upon start-up. The device does NOT monitor the input current until the start-up delay has lapsed. This feature is used to allow for over/under-current conditions following a power-up. If a fault occurs during this time, the display indicates “-r1-” and or “-r2-”.

- **Start-up delay trigger level (“St.tl”)** (default: disabled)

If Disabled “diSA”, the start up delay is activated at power-up. If a value is programmed into this parameter, the startup delay only starts timing out when this amount of current is reached. Eg. When monitoring an AC motor, the start-up delay only starts timing out when the motor is started, even if this device is already powered up. This value’s maximum value is limited to 20% of the lowest value programmed into the “Hi” or “LO” parameters. Once reached, the current must DROP below 80% of this value in order to reset the device to power-up status, where the relay is held energized until the power up timer is re-activated (by increasing the current past this trigger level), and monitoring starts. When monitoring “LO” currents, and the load is removed or turned off, the reaction delay must be used to keep the relay from de-energizing while the current drops from the running value to the trigger level reset value (80% of this parameter’s value).

- **Reaction delay (“rE d”)** (Default: 0 seconds)

Similar to the start-up delay. The device will tolerate over or under current conditions for this period of time once monitoring has commenced.

- **Status Indication (“indi”)** (Default: on)

This setting enables / disables the “Hi 1”, “Lo 1”, “Hi 2”, “Lo 2”, “-r1-” and “-r2-” messages during fault conditions.

- **Display (“diSP”)** (R1 Hi)

This setting shows the fault on the bottom display for “Hi 1”, “Lo 1”

- **Re Transmit signal type (“rt.tY”) (default 4-20mA)**

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

- **Re Transmit Direction (“rt.di”) (default 4-20mA)**

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

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

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

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

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

- **Calibration (“CAL”)** (Default: 100%)

This function may be used re-calibrate the device. The reading may be adjusted from 90% to 110%. Use this setting to correct possible CT errors. (to increase overall system accuracy).

- **Reset (“rESt)**

By selecting this option, all values are reset to default.

**Latch facility:**

If the latch pins are shorted, the relay will not re-energise after fault conditions (until the short is removed or the device is reset), even if the input current is within the pre-set limits.

**Programming Example DUAL DISPLAY DEVICE:**

*Configure the device to operate with a 250A CT. Display must indicate 0-250.0A*

Press "0" repeatedly until the display indicates "SCAL". Use the "▲" & "▼" buttons to change the value to "2500". (ignore decimal pointer)

Press "0" to display "dECi".

Use the "▲" & "▼" buttons to change the position of the decimal pointer to the second last position from the right of the display.

Press and hold "0" for 3 seconds to exit the menu.

**Programming Example SINGLE DISPLAY DEVICE:**

*Configure the device to display 100.0 when the input is at maximum (100A CT). Set the maximum current for relay 1 to 60A.*

Press "MENU" to display "SCAL".

Press "SELECT". Use the "+" and "-" buttons to change the value to 1000.

Press "MENU" to display "dECi".

Press "SELECT".

Press "+" until the display indicates "100.0".

Press "MENU" to display "Hi 1".

Press "SELECT". Use the "+" and "-" buttons to change the value to "60.0".

Press "ENTER" to return to the menu. "Lo 1" is displayed.

Press "BACK".

To remove the decimal pointer, change the scale to 100 ("SCAL"), and remove the decimal pointer. ("dECi")

**Please Note:**

- If the input rises above 110% of the maximum input rating for more than 5 seconds, the relay is de-energised. "O.Cur" is displayed.
- The latch pins MUST BE ISOLATED FROM THE INPUT.
- Certain settings are reset to default when the device is re-configured or the Scale is changed. Before commissioning, re-check all settings to ensure they are correct. (use full menu)
- Even though the device seems to operate correctly, the relay will not energise if the supply is below the minimum operating voltage.
- This device is most accurate when operated at 25°C, and the input is at 60% of the rated input value. (3A with a 5A device, or 0.7A with a 1A device).  
I.e. Select a CT with a primary current rating of approximately 1.6 times the value of the current to be monitored.
- 5A DEVICE: The peak instantaneous current must be limited to 8A. If a full wave signal is applied, the device will accurately up to  $8/\sqrt{2}=5.65A$  RMS. If a half wave signal is applied, the device will only read accurately up to  $8/2=4A$  RMS.
- 1A DEVICE: The peak instantaneous current must be limited to 1.6A. If a full wave signal is applied, the device will accurately up to  $1.6/\sqrt{2}=1.13A$  RMS. If a half wave signal is applied, the device will only read accurately up to  $1.6/2=0.8A$  RMS.
- DUAL DISPLAY DEVICES: During fault conditions, the lower display will alternate between the violated parameter and its value.
- When Span is adjusted the "Hi" and "Lo" set point automatically go back to default

**Specifications:**

Accuracy:	1% of full scale (sinusoidal inputs. see notes) Typically 0.5% at 25 °C.		
Scale:	5 to 5000		
Peak instantaneous current:	5A device:	8A	Full wave: $8/\sqrt{2}=5.65A$ RMS. Half wave: $8/2=4A$ RMS
	1A device:	1.6A	Full wave: $1.6A/\sqrt{2}=1.13A$ RMS. Half wave: $1.6A/2=0.8A$ RMS)
Input voltage:	±15% of rated voltage		
Led indication:	Relay status		
Response time:	<1.1 sec		
Start-up delay	1 to 100 sec (0.5 sec intervals)		
Reaction delay	0 to 100 sec (0.5 sec intervals)		

**re-transmit Notes:**

- The output 4-20mA is dependant on the value being displayed, and is set up in a similar manner to the display. The offset parameter determines when 4mA is output, and the span is the amount required for the output to increase by an additional 12mA ie. 20mA is output when the value displayed = re-transmit OFFSET+SPAN
- To set the re-transmission signal to follow the input signal (the output 4-20mA follows the 4-20mA received), set the re-tx offset and span settings to the same value as the display offset and span settings.
- To set the re-transmission signal to invert the input signal (the output = 4mA when the input = 20mA), set the re-tx offset = (display offset+span) and re-tx span = (display span x -1).
- Whenever the input signal is above or below the "CAL.O" or "CAL.S" values by more than 3%. The display indicates "Er.Hi" or "ER.Lo".
- Certain settings are reset to default when the device is re-configured. Re-check all settings to ensure they are correct before commissioning. (use the advanced menu)

**Menu operation (single display device):**

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 device):**

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.

**Please Note ( for 1 and 2 relay devices ONLY):**

- As a power saving feature, the display dims if settings are not being made.
- Even though the device seems to operate correctly, the relay(s) will not energise if the input voltage is below the operating voltage.

**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)

