MODEL 1200 - USER MANUAL

The IQ model 1200 is a dual process trip amplifier (sometimes called a dual alarmer) which provides two adjustable relay outputs from an analogue process signal (eg. 4~20mA). They offer an inexpensive method of providing alarm and/or trip functions.

Changes have been made to the design over the years, including the addition of extra features, however new units may be used as direct replacement for older units and are totally pin compatible.

A model 1210 was produced for a short period for special applications. This unit featured programmable fail safe operation for 4-20mA systems but the relay operation was limited to de-energise on rise. The latest version of the model 1200 now has this feature and the model 1210 has been discontinued.

BASIC MODE OF OPERATION

Each relay output is associated with a set point knob on the front of the unit. The set point knob may be calibrated directly in measured units (eg. 0-5volts) or, more usually, as a percentage of the input signal (eg. 0-100% representing 4-20mA).

When the input signal exceeds either set point the related relay will change state. When the input signal falls below the set point the relay will change back. Whether the relay energises or de-energises on rise will depend on the setting of DIP switches either on the front of the unit (newer models) or inside, accessed by un-clipping the base (older models).

The hysteresis between relay energising and de-energising is typically 1.5% of span.

Because the set point potentiometers are standard commercial types and the scales on the knobs are small the absolute accuracy of the set point cannot be guaranteed better than 5% of full scale. The repeat accuracy is however better than 1% of full scale.

POWER SUPPLY

The majority of units are supplied for 230V 50Hz or 110V 50/60Hz operation and are fitted with miniature transformers. A 24V DC supply is generated internally and this is made available on pin 6 to power 4-20mA loops or other equipment. The maximum rating for this output is 30mA and later model units have a current limiter set at around 25mA to prevent this from being exceeded. Some earlier models were not current limited and it is possible to damage these units by drawing excess current from this pin.

A small number of units have been supplied with 24V DC power supplies, usually for voltage inputs. In the case of a 24V DC unit, pin 10 (power supply negative) is internally connected to pin 7 (input negative). This is not usually a problem for voltage inputs where the 0V rail is normally the common, however is not recommended for current inputs (eg. 4-20mA) where +24V is usually the common as it is almost certain to lead to ground loop problems.

Units supplied with a 24V DC power supply have pin 6 (+24V out) connected to pin 2 (+24V supply), either directly or through a current limiter.

RELAY OUTPUTS

The model 1200 is fitted with two independent SPDT relays with a contact rating of 10A at 250VAC. Voltages up to 400V AC may be switched provided the total VA rating does not exceed 2500VA.

The manufacturer's specification on the relays is 10^5 operations at full load and 10^7 operations at no load, so for maximum life we recommend using an external relay or contactor if the current is greater than 5 amps.

SELECTING RELAY OPERATION

Because both relays have SPDT contacts many electricians assume that their required function can be achieved merely by the choice of the NO or NC contacts. This approach, although reasonable in a perfect world, makes no allowance for the possibility of unit failure.

The best choice of operating conditions is that both relays should be energised during normal operation and should de-energise in a fault condition. This ensures that should the unit or one of its relays fail, or should the unit lose power, a fault condition will be indicated. Usually fault conditions are on rising signals (eg. Over-temperature, high vibration) however sometimes low levels can indicate faults (eg. Under-temperature, low pH). For that reason the relays of the model 1200 are independently programmable.

Relay Convention

Relay 1 is connected to pins 1, 3, 4 and is controlled by the upper set point knob.
Relay 2 is connected to pins 11, 9, 8 and is controlled by the lower set point knob.

Switch Programming

Old Models (Switch inside on PCB - unclip base). Side label IQ1200.0

Relay 1 - Switch 1 0 (down) = energise on rise 1(up) = de-energise on rise
Relay 2 - Switch 2 0 (down) =-energise on rise 1(up) = de-energise on rise

Later Models (Switch on front) without failsafe. Side label IQ1200.1

Relay 1 - Switch 1 0 (left) = energise on rise 1(right) = de-energise on rise
Relay 2 - Switch 2 0 (left) = energise on rise 1(right) = de-energise on rise

Models with Failsafe. Side Label IQ1200.2

Relay 1- Switches 1 & 3

Switch 1	Switch 3	Function
0	0	energise on rise - no failsafe
0	1	de-energise on rise - no failsafe
1	0	de-energise on rise - failsafe
1	1	energise on rise - failsafe

Relay 2 - Switches 2 & 4

Switch 2	Switch 4	Function
0	0	energise on rise - no failsafe
0	1	de-energise on rise - no failsafe
1	0	de-energise on rise - failsafe
1	1	energise on rise - failsafe

AN EXPLANATION OF "FAILSAFE" MODE.

The failsafe option only works for process signals with live zero eg. 4-20mA and 1-5V.

With failsafe off, the relay will be in one state above the set point and a different state below it.

Let us consider an application where a set point must give an alarm when the signal is greater than 50%. With a 4-20mA loop, currents over 12mA (50%) will give an alarm and currents less than 12mA will not. 0% is represented by 4mA.

If the current loop were to break there would be 0mA in the loop which would not give an alarm as it is still below 50%.

By selecting the failsafe option the alarm condition would be generated if the current falls below 4mA as well as above 12mA, thereby providing a warning of loop failure.

Failsafe action may be selected for either or both relays. Usually it would only be used on one.

During installation and testing of 4-20mA loops, failsafe operation may cause confusing results. We recommend that failsafe options be disabled until system integrity has been confirmed.

HOW TO CONNECT THE INPUTS

There are three pins available on the input side, which sometimes causes confusion as normally only two are used. Because of the limited space on the connection label fitted to the unit it is impossible to show all possible options.

Pin 5 This is the positive signal input. For voltage inputs this normally feeds into a high impedance potential divider. Current inputs have a low value (usually 250ohm) resistor connected internally between pin 5 and pin 7 through which the signal current passes. This pin is always used.

Pin 6 This is usually a 24V DC output which is used to drive 4-20mA current loops. It is not normally used for voltage inputs.

Pin 7 This is the common pin which is connected to the 0V rail of the electronics. This pin is used for voltage inputs and externally sourced current inputs.

Note that pin 7 is always at the lowest potential. Pin 5 is positive with respect to pin 7 but negative with respect to pin 6. Pin 6 is positive with respect to both pins 5 & 7.

Generally speaking the pins to use are as follows:-

Voltage inputs and externally sourced current inputs. Pin 5 + Pin 7 -

Internally sourced current inputs Pin 6 + Pin 5 -
eg. Two- wire transmitters powered from this unit.

INPUT INFORMATION

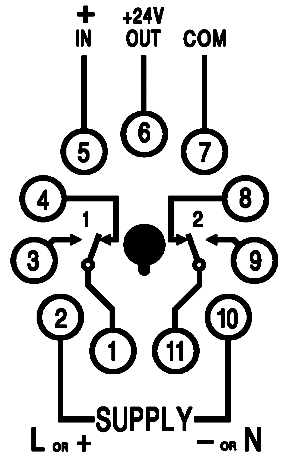
Voltage inputs are high impedance, typically better than 50kohms/volt. Units may be connected in parallel to obtain more set points.

Current inputs are 250 ohm as standard. This allows a high impedance 1-5V voltmeter to be connected across terminals 5 & 7 when indication is required.

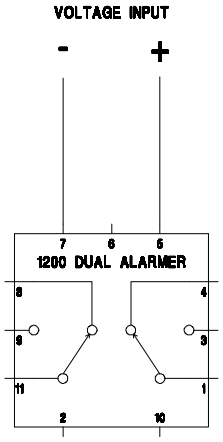
Units may be connected in series to obtain more set points. When using the internal 24V power supply, only one unit should power the loop (from pin 6). The other units must be wired for external supply operation. (See drawings on page 7)

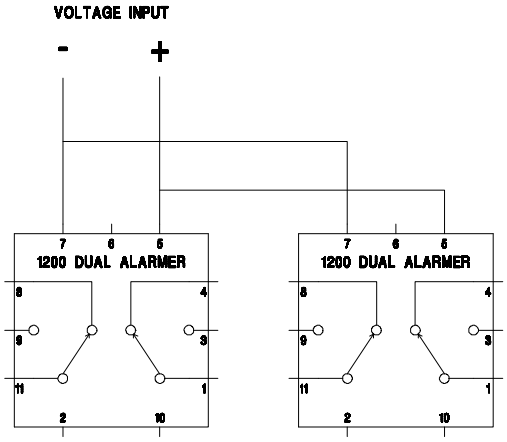
When connecting units in series, each unit will drop 5 volts at 20mA. As most 4-20mA loops are powered from 24V DC there is the possibility of having insufficient voltage available to power everything in the loop. Lower impedance units are available to special order in 100ohm, 47ohm & 22ohm. These can be identified by their part numbers, ie. 1200-100 is the 100ohm version.

CONNECTION DIAGRAM

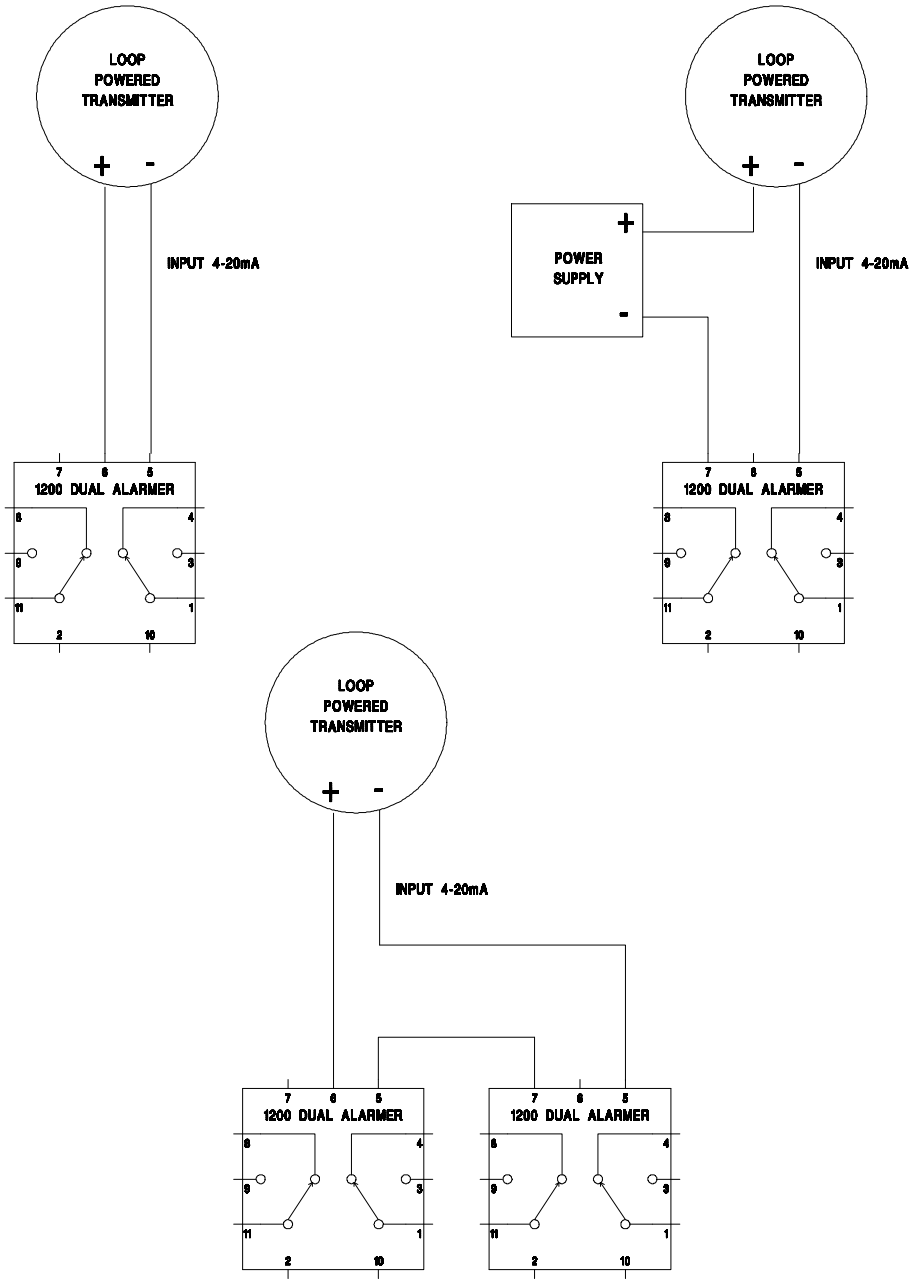


VOLTAGE INPUTS





CURRENT INPUTS



SPECIFICATIONS

INPUT SIGNAL Options	4-20mA 0-20mA 0-5V DC 1-5V DC 0-10V DC or to customer order
INPUT IMPEDANCE	4-20mA/0-20mA 250ohm other values to order 0-5V/1-5V/0-10V >250kohm
RELAY RATING	10A 400V 2500VA 10A 30V DC
POWER SUPPLY Options	110V 50/60Hz. 230V 50 Hz.
POWER CONSUMPTION	4VA approx. (old models 6VA).
TEMPERATURE LIMITS	-5/+60°C
HUMIDITY LIMITS	0-90% RH non condensing
SETTING ACCURACY	5% Typical
REPEATABILITY	< 0.5%.

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