

WATER SUPPLIES DEPARTMENT
STANDARD SPECIFICATION E-81-03
INTEGRATOR

1. GENERAL

An integrator is an equipment whose output signal is the time integral of its input signal. It is used for totalising a 4-20 mA analogue signal (such as water flow) for monitoring and control purposes. The equipment shall consist of an analogue to pulse converter unit and two electromechanical or digital totalising counters. One counter shall be 6-digit and resettable while the other shall be 8-digit and non-resettable.

2. DESIGN

The equipment shall meet the following design requirements :-

(a) Analogue to Pulse Converter Unit

Input signal	: 4-20 mA
Maximum input resistance	: 100 ohms
Output signal	: 24V d.c square wave pulses, minimum duration 30 msec. Pulse rate shall be directly proportional to the input signal
Maximum output pulse rate	: continuously adjustable between 0.02 and 5 pulses/sec
Maximum output load	: 250 mA
Inaccuracy	: less than 0.2% of span
Linearity	: better than 0.1% of span
Clip-off level	: with inputs less than 2% of full scale, the output of the converter unit shall be inhibited
Supply voltage effects	: less than $\pm 0.1\%$ of span for $\pm 10\%$ change in supply voltage
Operating temperature	: 0-55 °C

Temperature effects : less than $\pm 0.02\%$ of span per $^{\circ}\text{C}$

Relative humidity : 5-95 %

Supply voltage : 220V a.c. 50 Hz or 24V d.c.

(b) Counters

Input : 24V d.c. pulses

Maximum counting rate : 25 pulses/sec

3. CONSTRUCTION

The converter unit shall be suitable for DIN rail-mounted inside a panel.

The counters shall be suitable for flush mounting on a panel front. The numerical figures shall be not less than 4 mm and the overall facia dimensions shall be 52 mm x 28 mm with panel cut-out dimensions of 48 mm x 24 mm or other approved dimensions.

The 6-digit counter shall be resettable by an integral push-button at the front of the counter.

4. EQUIPMENT PARTICULARS

The contractor should refer to the Particular Specification for the following particulars of the equipment :-

- (a) Actual signal (e.g. the flow rate) at full scale input.
- (b) Scale factor of counter display.
- (c) Output pulse rate at full scale input.
- (d) Choice of electromechanical or digital type totalising counters. Either of the counters can be supplied if not specified.
- (e) If specified, a locking device shall be provided to prevent accidental or unauthorised resetting of the 6-digit counter.