

FREQUENCY SCALER

Type 112-26

User Guide

Continuous development may necessitate
changes in these details without notice



PROCESS MEASUREMENT, CONTROL & DISPLAY INSTRUMENTATION

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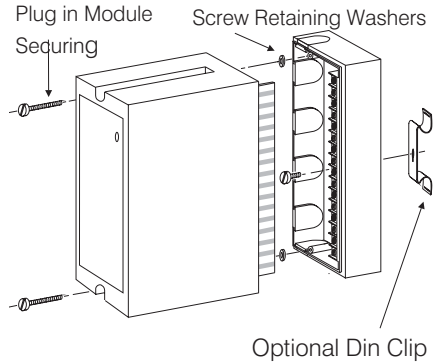


IMPORTANT - Installation, wiring, commissioning or re-ranging of this instrument should be restricted to authorised skilled personnel.
SWITCH OFF ALL POWER SUPPLIES AND ISOLATE SIGNAL WIRING FROM DANGEROUS VOLTAGES BEFORE COMMENCING WORK ON THE INSTRUMENT

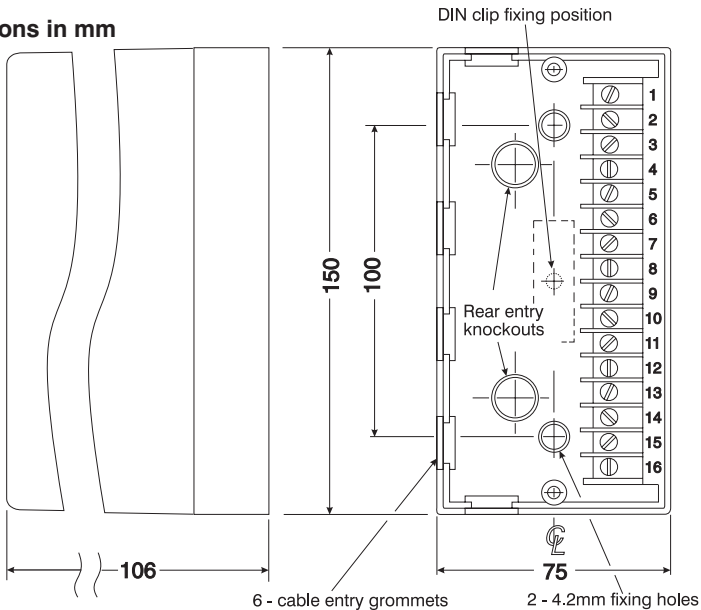
Installation

112 Series Modules are designed to be fitted to any flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

Grommets are provided on three sides of the base section and there are two rear entry knockouts in the bottom.



Dimensions in mm



Wiring

Grommets are provided on three sides of the base section and there are two rear entry knock outs in the bottom. Good instrumentation practice should be observed when wiring to the unit to ensure segregation of mains supply and signal wiring. Screened cables should be used for signal / sensor wiring with the screen earthed at one end only.

Power supply considerations

Power supply wiring to the instrument should be protected by a suitable fuse and double-pole isolating switch.

Access to Terminals

Isolate all supplies to the unit. Loosen the two module securing screws. *(NB these screws are retained in the top section by captive washers)*. Gently pull away the top section of the module from its base to expose the fixing points and wiring terminals. To refit the module, align the module edge connectors with the socket in the base and carefully press home. **NB** do not over tighten the module securing screws.

Terminal connections

Inputs

- 1 Transducer Supply (+12v) 10mA max
- 2 Input Signal (+)
- 3 Input Signal Common (-)
- 4 Normally Closed c/o Switch Contact
- 5 Normally Open c/o Switch Contact
- 6 *no connection*

} Options
see
Specification

Outputs

- 7 +V
- 8 Output
- 9 Output Common
- 10 Normally Open
- 11 Common
- 12 Normally Closed
- 13 *no connection*

} Pulse Output (see next page)

} Relay Output Option

Supply

- 14 Earth
- 15 Neutral
- 16 Line

Earth } DC
Negative (-) } Supply
Positive (+) } Option

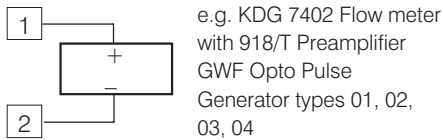
Please Note: Options are only available if specified at time of order.

Typical Connections

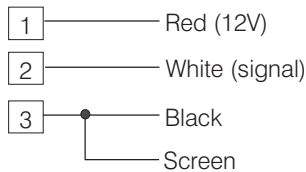
NB the 112-26 is configured internally for the appropriate application during manufacture. The unit cannot be used with another type of input transducer until reconfigured, preferably by returning to Stroud Instruments Ltd.

Inputs:

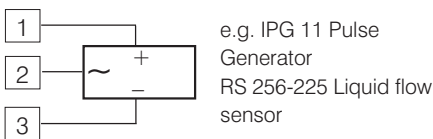
2 Wire Transmitter



Kent Pulse Unit Type HRP



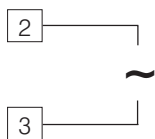
3 Wire Transmitter



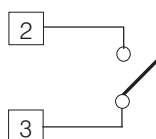
Kent Pulse Unit Type LRP



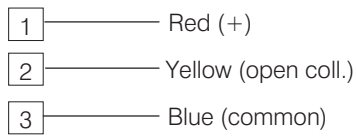
Voltage Change



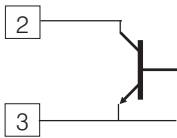
Contact Closure



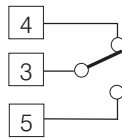
Kent Pulse Unit Type PSM-KSM



Open Collector

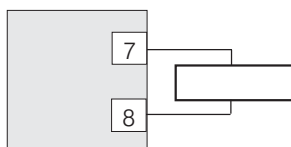


Changeover contacts

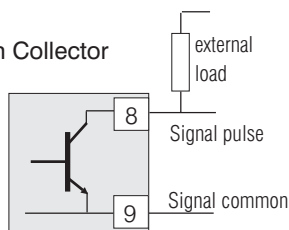


Outputs:

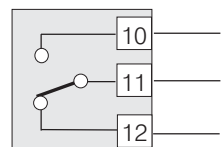
EM Counter



Open Collector



Relay



Internal Switches and Links

Please Note: The 112-26 Frequency Scaler is configured during manufacture to suit the application specified. A change in the type of input or output will require a return to manufacturer for re-configuration.

Gaining Access

Isolate all supplies to the unit and remove the plug in module as described under "Installation". The plate with the terminal connections label can now be removed by easing apart the longer sides of the module to release the interlocking tongue and groove. Observe and note the location of the two printed circuit boards - it is important that they are replaced in the same positions. Slide both boards out of the case.

Adjusting the Frequency Scaler Settings

The Transfer Function of the Scaler is:

$$F_{out} = F_{in} \times R \div N \div D$$

Where F_{in} is the Input Frequency,
 F_{out} is the Output Frequency,
 R is the Rate Multiplier setting,
 N is the Divider setting
and D is a further division by 10 or 100.
The factor adjustments are found on the smaller printed circuit board (see Fig 1). Switches SW1 to SW4 set the Rate Multiplier (R) and switches SW5 to SW8 set the Divider (N). J2 Links will provide further divisions (D) of 10 and 100. See Fig 3 on page 7 for block diagram.

Method:

(i) Set switches SW5 to SW8 to the nearest whole number lower or equal to the division required,
SW5 sets 1000's,
SW6 sets 100's,
SW7 sets 10's
SW8 sets units.

(ii) Calculate the Rate Multiplier setting (R) as follows:-

$$\text{Rate Multiplier Setting} = \frac{\text{Divider Setting}}{\text{Required Division}}$$

(iii) Set switches SW1 to SW4 to the value calculated in step (ii). The multiplier switch settings are

- SW1 = x 0.1
- SW2 = x 0.01
- SW3 = x 0.001
- SW4 = x 0.0001

Example:

Required division = 189.62

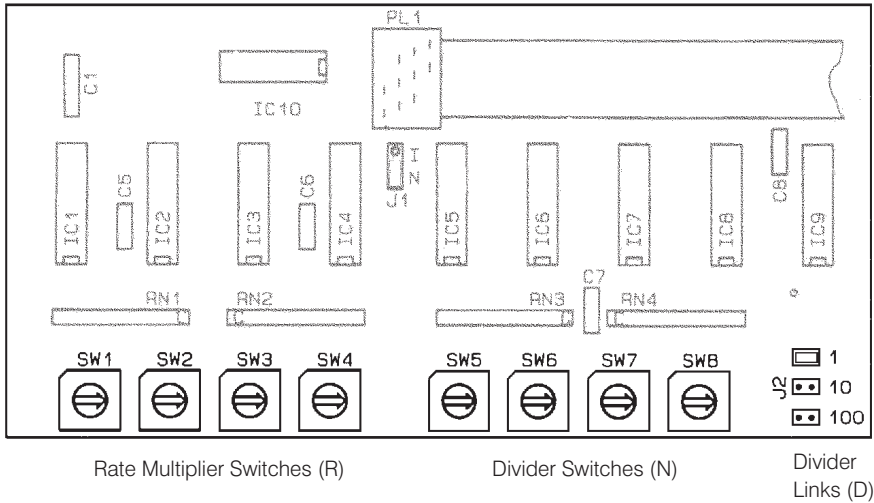
Set 189 on divider switches (ie SW5 = 0, SW6 = 1, SW7 = 8, SW8 = 9)

$$\text{Calculate Rate Multiplier Factor} = \frac{189}{189.62} = 0.99673$$

Set 9967 (factor = 0.9967) on rate multiplier switches (ie SW1 = 9, SW2 = 9, SW3 = 6, SW4 = 7)

NB: The settings in the example gives an overall division of 189.6257 and therefore the error in the system will be 0.003%.

Fig. 1



Supply Voltage

Mains powered units can be adapted for operation on 110V, 220V or 240V supplies. Fig 2 provides details of the required link settings which are effected by soldered tinned copper wire links. **IMPORTANT:** Links for 110V operation must be insulated with silicon rubber sleeving. *NB: DC powered units are an option specified at the time of ordering and have no facilities for changing the operating supply voltage.*

Trigger Level Adjustment

Versions of the 112-26 with a front of unit accessible LEVEL control may be adjusted to set the point at which the unit responds to a voltage level change at the input. This level is set correctly when the lower LED indicator flashes in sympathy with the input signal.

NB units which do not have the accessible LEVEL control are factory set for the required input signal and should require no further adjustment.

Re-assembly

Re-check your switch and link selections. Replace the printed circuit boards into the case ensuring that the larger board is located in the slot under the LED indicator window. Replace the bottom plate by first engaging the side with the two tongues into the slots in the case and then press the plate home to engage the side with the single tongue. Plug the reassembled module into the base section and secure with the two captive screws provided.

Fig. 2

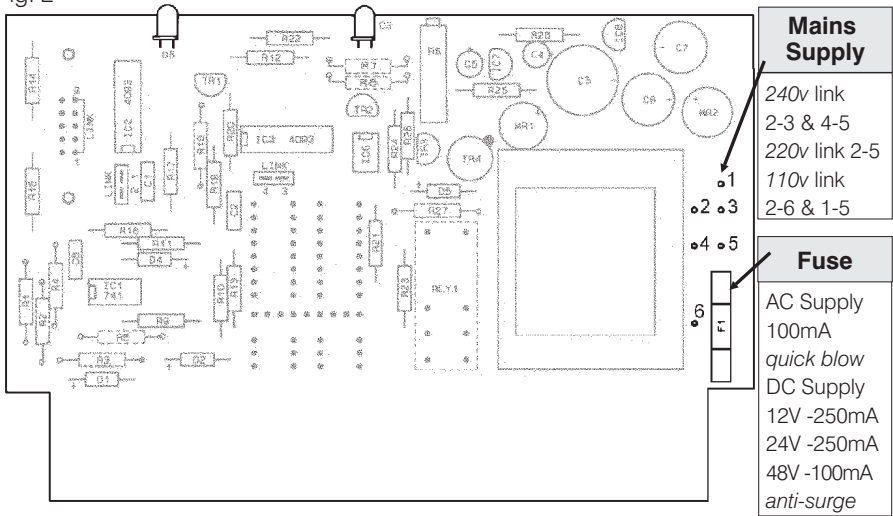
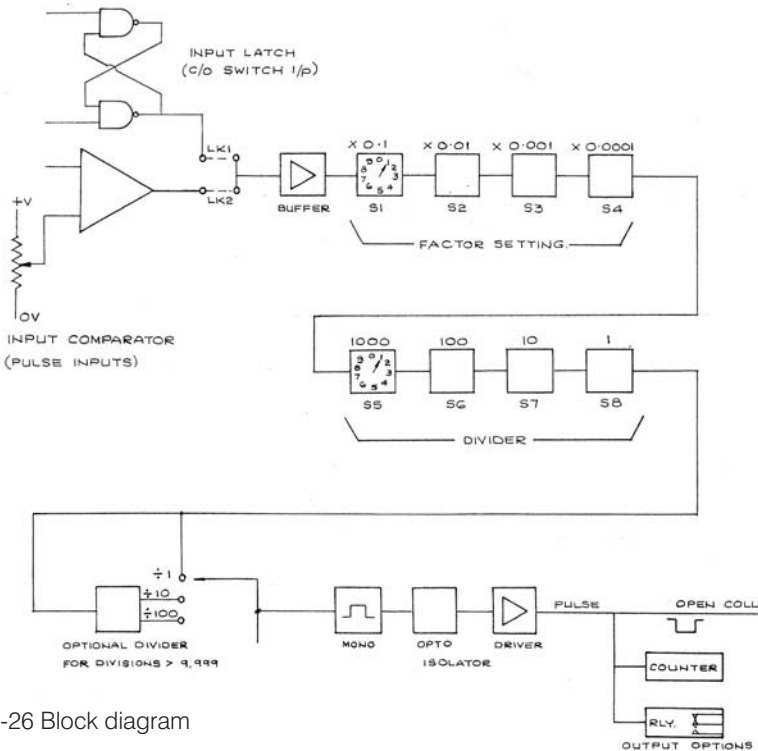


Fig. 3



112-26 Block diagram

Specification

TRANSFER FUNCTION

$$F_{out} = F_{in} \times R \div N \div D$$

R = 0.000 to 0.9999,

N = any integer from 1 to 9999

D = 1, 10, or 100.

NB In some applications, as the rate multiplier circuit is four decades long, the expected division will not occur until 10,000 input pulses have been received. Circuit characteristics dictate that output pulses will not be equally spaced.

INPUT PULSE RATE

0 - 20kHz.

INPUTS

(the required type to be specified at the time of order)

- a) Contact closure
- b) Change-over contacts *(high bounce rejection)*
- c) Voltage level change (10mV minimum, 50V maximum. sine, square or triangular)
- d) Open collector transistor
- e) Proximity switches, turbine meters, etc.

INPUT IMPEDANCE

100k ohms *(voltage change signals)*.

TRIGGER LEVEL

This is adjusted by a 15 turn potentiometer. *NB Optionally accessible through the front cover.* When the trigger level is correct, the lower LED will flash at the input signal frequency.

INPUT PROTECTION

Voltage change inputs, can withstand 250V RMS.

TRANSDUCER POWER SUPPLY

An optional supply is available for powering input signal equipment. Maximum power available is 12 Volts at 10mA.

OUTPUT OPTIONS

(the required type to be specified at the time of order)

- a) Optically isolated open collector transistor,
- b) 24 Volt pulse of duration 60ms
- c) Relay change-over contact (FSD = 10Hz max). Relay contacts are rated at:- 5A @ 250V AC resistive or 2.5A @ 24V DC resistive

NB Other pulse output voltages (e.g. 5V) and pulse widths available to order.

POWER SUPPLY

Standard AC and optional DC powered versions are available. Full details of the Power Supply options appear in the 112 Series General Information Sheet.

TEMPERATURE RANGE

Operating: - 10 to + 60°C

Storage: - 20 to + 70°C

ACCURACY

Error ± 1 output pulse.

WEIGHT

Approximately 750 grams.

ISOLATION

Input and output are isolated from each other and from the power supply. Maximum voltage 250 V RMS or 400 V DC. Resistance $\geq 50 \times 10^6$ ohms measured at 1000 V DC.

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