## 1. DESCRIPTION

The BA384G is a field mounting intrinsically safe, two input Rate Totaliser which will function with a wide variety of sensors. The instrument can display rate of flow and total flow of the two inputs and their sum or difference.

This abbreviated instruction sheet is intended to assist with installation, a comprehensive instruction manual describing safety certification, system design and configuration may be downloaded from the BEKA website or may be requested from the BEKA sales office.

The BA384G Rate Totaliser has IECEx, ATEX, ETL and cETL intrinsic safety certification for use in flammable gas and dust atmospheres. The certification information label, which is located on the top of the instrument assembly, shows the certification numbers and codes. Other certifications may be shown. Copies of certificates may be downloaded from the BEKA website.
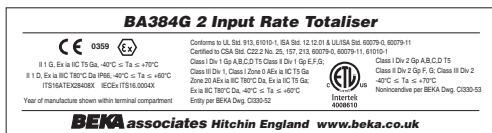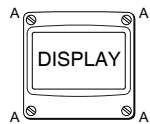
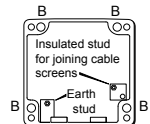Typical certification information label

2. INSTALLATION

The BA384G Rate Totaliser has a robust IP66 glass reinforced polyester (GRP) carbon loaded enclosure incorporating an armoured glass window & stainless steel fittings. It is suitable for exterior surface mounting in most industrial environments, or pipe mounting using an accessory kit.

If the enclosure is not bolted to an earthed post or structure, the earth terminal on the cable entry bonding plate, which may be assembled on the inside or outside of the enclosure, should be connected to local earthed metalwork or to the plant's potential equalising conductor.

Terminals A1, A2, A3 and A4 are only fitted when the Rate Totaliser includes optional alarms. Similarly terminals C1, C2, C3 and C4 are only fitted when the instrument has an optional 4/20mA output. See full manual for details.

The BA384G is CE marked to show compliance with the ATEX Directive 2014/34/EU and the EMC Directive 2014/30/EU.

Fig 1 BA384G installation procedure

Step A
Unscrew the four captive 'A' screws and separate the indicator assembly and the back-box.

Step B
Secure the enclosure back-box to a flat surface with M6 screws through the four 'B' holes. Alternatively use a pipe mounting kit.
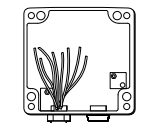
Step C
Remove the temporary hole plug and install an appropriate IP rated cable gland or conduit fitting. Feed the field wiring through the cable entry.
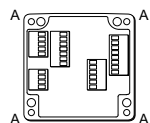
Step D
Terminate field wiring on the instrument assembly. Replace the assembly on the enclosure back-box and tighten the four 'A' screws.
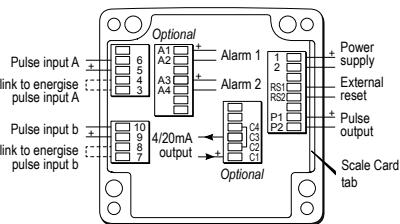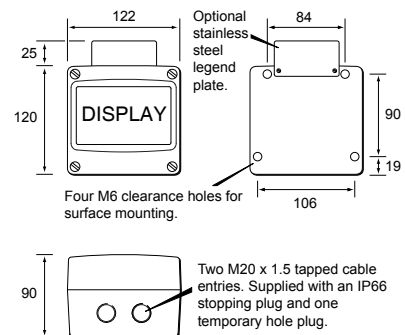
Fig 2 Dimensions and terminal connections

Four M6 clearance holes for surface mounting.

Two M20 x 1.5 tapped cable entries. Supplied with an IP66 stopping plug and one temporary hole plug.

EMC
For specified immunity all wiring should be in screened twisted pairs with screens earthed at one point within the safe area.
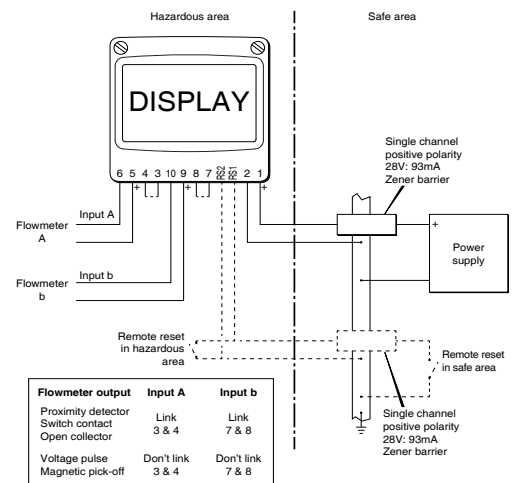
Fig 3 Typical measurement loop

Flowmeter output	Input A	Input b
Proximity detector Switch contact Open collector	Link 3 & 4	Link 7 & 8
Voltage pulse Magnetic pick-off	Don't link 3 & 4	Don't link 7 & 8

Scale card
The instrument's units of measurement and tag information are shown above the display on a slide-in scale card. New instruments are fitted with a scale card showing the information specified when the instrument was ordered, if this was not provided a blank scale card will be fitted which can easily be marked on-site. Custom printed scale cards are available from BEKA associates.

To remove the scale card carefully pull the tab perpendicularly away from the instrument assembly. See Fig 2 for the location of the scale card tab.
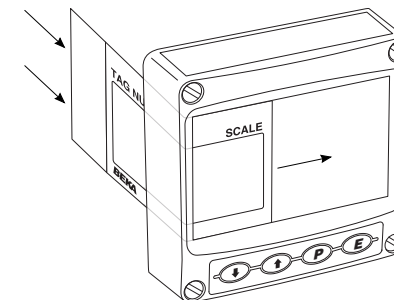
Fig 4 Inserting scale card into instrument assembly

To replace the scale card carefully insert it into the slot shown in Fig 2. Force should be applied evenly to both sides of the scale card to prevent it twisting. The card should be inserted until about 2mm of the transparent tab remains protruding.

3. OPERATION
The BA384G is controlled and configured via four front panel push buttons. In the display mode i.e. when the instrument is displaying flow the push button functions are:

⏷ or ⏶ Scrolls both displays between:
    Input A
    Input b
    Input A + b or Input A – b which is configurable

E + ⏷ Grand total - shows Lo followed by the least significant 8 digits of a 16 grand total.

E + ⏶ Grand total - shows Hi followed by the most significant 8 digits of a 16 digit grand total. If buttons are pressed for longer than 10 seconds the grand total will be reset to zero if the grand total reset function CLr Gtot is enabled.

    To reset the grand total to zero from the operating mode press the E and ⏶ buttons for ten seconds until CLr.no is displayed. Using the ⏷ or ⏶ button change the display to CLr.YES and press E which will reset the grand total and restore the original display.

⏷ + ⏶ If the local total reset function CLr tot is enabled in the configuration menu, simultaneously pressing the ⏷ and ⏶ buttons for more than three seconds allows total A, total b or both totals to be selected by operating the ⏷ or ⏶ button. Operating the E button will then reset the selected total to zero and clear any stored output pulses.

P + ⏷ Shows each for 2 seconds:
    Firmware and version numbers
    Function of instrument: 2CHtotAL
    Options fitted
        -A Alarm outputs
        -P Pulse output (always fitted)
        -C 4/20mA output

P + ⏷ Provides direct access to the alarm setpoints when the Rate Totaliser is fitted with optional alarms and the ALSP setpoints function has been enabled.

P + E Access to configuration menu
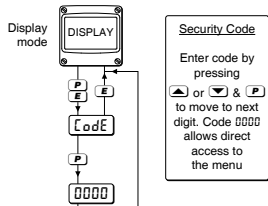
4. CONFIGURATION

Rate Totalisers are supplied configured as requested at time of ordering, if not specified default configuration will be supplied but can easily be changed on-site. Fig 5 shows the location of each function within the configuration menu with a brief summary of the function. Please refer to the full instruction manual for detailed configuration information and for description of optional outputs. Access to the configuration menu is obtained by pressing the P and E buttons simultaneously. If the Rate Totaliser's security code is set to default 0000 the first parameter FunCtion will be displayed. If the instrument is protected by a security code, CodE will be displayed. The four digit code must be entered to gain access to the menu.

Display mode

DISPLAY

CodE
0000

Security Code
Enter code by pressing ▲ or ▼ & P to move to next digit. Code 0000 allows direct access to the menu

* Followed by identical function for input b

When fitted with optional alarms functions appear here

When fitted with optional 4/20mA output functions appear here

FunCtion	inPut-A *	uPdAtE	Count	di5P-1	di5P-2	dP	FACtor-A	SCALEt-A *	SCALEr-A *	t-bASE	FiLtEr-A *	CLPoFF-A *	LoC CLr	E CLr	PULSE oP	CLr Gtot	CodE	rSEt dEF
Std	inPtYPE	0.5	A:b	totAL	Std	0000.0	00 t.00	00 t.00	00 t.00	tb-01	24	0000.0	CLr tot	E CLr	rSEt-both	no	0000	0000
	oPCoL												oFF				0000	
	dEbounCE												CLr Gtot					
	dEFAULt												oFF					

EnbL	SourCE	diUidE	durAt:on
oFF	SCALEd	1000	25

Function
▲ or ▼ to select
Function of instrument
Std linear
Lin 16 segment lineariser

Input-A
▲ or ▼ to select
Input type
oPCoL Open Collector.
UoLt5 L Pulse <1V >3V
UoLt5 H Pulse <3V >10V
CoiL Magnetic pick-off.
PrdEt Proximity detector.
ContACt Switch contact.

Debounce input-A
▲ or ▼ to select level of debounce.
dEFAULt
LiGHt
HEAUY

Update
▲ or ▼ to select interval between display updates, may be set to 0.5, 1, 2, 3, 4 or 5 seconds.

Count
▲ or ▼ to select arithmetic relationship between input A and input b may be set to
A:b Input A + Input b
A:-b Input A - Input b

Upper Display
▲ or ▼ to select display whether rAtE or totAL is shown on upper display

Lower Display
▲ or ▼ to select
LAbEL permanently identifies upper display.
oFF display off
Std alternates between display and identification

Decimal point
▲ or ▼ to select position of decimal point and P to toggle between rate and total displays.

K-factor input-A
▲ or ▼ to adjust value and P to move to next digit or decimal point.
Note: When Lin is selected 16 values for FACtor-A may be entered each starting at a specified rate display

Total scale factor input-A
Divides FACtor-A output to produce required total display.
Press ▲ or ▼ to adjust value and P to move to next digit or decimal point.

Rate scale factor input-A
Divides FACtor-A output to produce required rate display.
Press ▲ or ▼ to adjust value and P to move to next digit or decimal point.

Timebase
▲ or ▼ to select rate display timebase.
tb-01 for flow/sec
tb-60 for flow/min
tb-3600 for flow/hour

Filter input-A
▲ or ▼ to adjust value of each digit and P to transfer control to the next digit.
First digit: filter magnitude
Second digit: step response
Note: While making adjustments the filtered rate display is shown on lower display so stability can be assessed

Clip-off input-A
Rate display below which totalisation is inhibited
on or oFF.
Press ▲ or ▼ to adjust value and P to move to next digit.

Local total reset
▲ or ▼ to turn the local total reset function on or oFF. When on is selected, Total A, Total b or both totals may be reset when ▲ and ▼ are pressed simultaneously for more than 3 seconds in the display mode.

Local grand total reset
▲ or ▼ to turn the local grand total reset function on or oFF. When on, grand total display may be reset when E and ▲ are pressed simultaneously for more than 10 seconds in the display mode.

External reset
▲ or ▼ to select
CLr A nb
CLr A
CLr b
Reset action when external reset contacts are closed.

Clear grand total
Press ▲ or ▼ to select YES to reset grand total to zero
Confirm instruction by entering SurE. Press ▲ or ▼ to adjust each digit and P to move to next digit

Define Security Code
Enter by pressing ▲ or ▼ and P to move to next digit.

Reset configuration to factory defaults
Confirm instruction by entering SurE. Press ▲ or ▼ to adjust each digit and P to move to next digit

Unless otherwise specified menu functions are shown on the upper display

Pulse Enable
▲ or ▼ to toggle between on and oFF

Source of output pulse
▲ or ▼ to select pulse source
SCALEd Input pulse frequency may be divided and duration extended
OR
dirECt-A
dirECt-b
Retransmission of input-A or input-b without scaling

Divides scaled output pulse
▲ or ▼ to select frequency dividing factor for scaled output pulse.
1
10
100
1000
10000

Duration of each pulse
▲ or ▼ to select duration of scaled output pulse in ms.
0.1
05
1
25
5
10
25
50
100
250
500

SCALEd is not available when A:-b is selected in the Count function.

These functions only appear in sub-menu when pulse source is conditioned as SCALEd.

Fig 5 Configuration menu