1. DESCRIPTION

The BA358E is a panel mounting, intrinsically safe, 4/20mA rate totaliser primarily intended for use with flowmeters. It simultaneously displays the rate of flow (4/20mA current) and the total flow in engineering units on separate displays. It is loop powered but only introduces a 1.2V drop into the loop.

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

The BA358E has ATEX and IECEx intrinsic safety certification for use in flammable gas & dust atmospheres. FM and cFM approval also permits installation in the USA and Canada. The certification label, which is located on the top of the instrument enclosure shows the certificate numbers and the certification codes. Copies of certificates may be downloaded from our website.

BEKA associates Hitchin, England. www.beka.co.uk

II 1 G, Ex ia IIC T5 Ga,
-40°C ≤ Ta ≤ +70°C

II 1 D Ex ia IIIC T80°C Da IP20, -40°C ≤ Ta ≤ +70°C

ITS11ATEX27254X IECEx ITS11.0015X

CE 0359

Ex II 1 GD

FM: IS CL I, DIV 1, GP A,B,C,D; CL I, ZN 0, AEx ia IIC T5
Entity per BEKA Dwg. CI300-72
NI CL I, DIV 2, GP A,B,C,D; CL II, DIV2,GP E, F, G; CLIII T5
CL I, ZN 2, GP IIA, IIB, IIC
Nonincendive per BEKA Dwg. CI300-73

cFM: IS CL I, DIV 1, GP A,B,C,D; CL I, ZN 0, Ex ia IIC T5
Entity per BEKA Dwg. CI300-72
NI CL I, DIV 2, GP A,B,C,D; CL II, DIV2,GP E, F, G; CLIII T5
Nonincendive per BEKA Dwg. CI300-73
CL I, ZN 2 per CEC18-150

FM APPROVED   c FM APPROVED

WARNING
Potential electrostatic charging hazard see instructions

T5 Ta = 70°C, IP66 front of panel only
No direct sunlight exposure

S/No: 068985 / 02 / 001   Manufactured: 2015

BA358E RATE TOTALISER

Special conditions for safe use
The ATEX and IECEx certificates have an 'X' suffix indicating that special conditions apply for safe use.

WARNING
To avoid an electrostatic charge being generated instrument enclosure should only be cleaned with a damp cloth.

Special conditions also apply for use in IIIC conductive dusts - please see full manual.

2. INSTALLATION
The BA358E has IP66 front of panel protection but it should be shielded from direct sunlight and severe weather conditions. The rear of the rate totaliser has IP20 protection.

The BA358E is CE marked to show compliance with the European Explosive Atmospheres Directive 94/9/EC and the EMC Directive 2004/108/EC.

Cut-out dimensions
Recommended for all installations. Mandatory to achieve an IP66 seal between the instrument and the panel
136 +0.5/-0.0 x 66.2 +0.5/-0.0

65
7.5
72
144

DISPLAY

1 2 3 4   RS1 RS2   8 9   10 11   12 13 14
+   +   Reset   + -   + -   + - -

Terminals 2 & 4 are internally linked for joining return 4/20mA wire

Alarm 1   Alarm 2
Terminals for optional alarms. See full manual.

Separately powered
Loop powered
Common

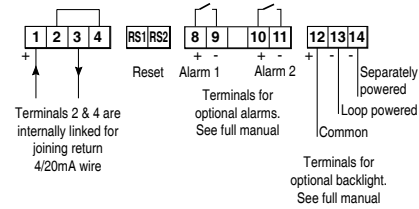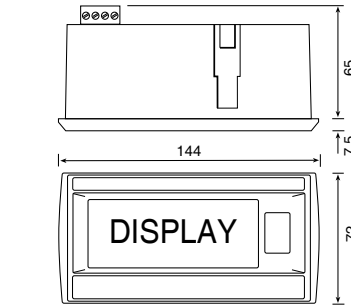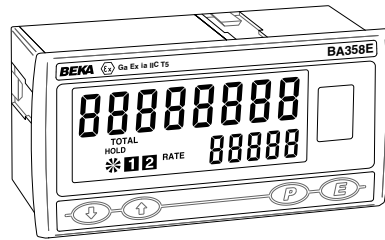Terminals for optional backlight. See full manual.

Fig 1 cut out dimensions & terminals

Abbreviated Instructions for

BA358E intrinsically safe panel mounting loop powered rate totaliser

BEKA   Ga Ex ia IIC T5   BA358E

88888888
TOTAL HOLD   ☀ 1 2   RATE   88888

↓ ↑   P E

1. Align foot and body of panel mounting clamp by turning screw anticlockwise
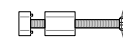
2. Position gasket behind instrument bezel

3. Insert instrument into the panel from the front

4. Insert panel clamp into recess and gently pull it onto the dovetail. Engage screw & turn clockwise to tighten the clamp, fit the other clamps. Recommended tightening torque 22cNm (1.95lbf.in) Equivalent to finger tight plus one half turn. DO NOT OVERTIGHTEN
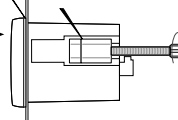
Four clamps required to achive IP66 front panel sealing

Fig 2 Installation procedure

EMC
For specified immunity all wiring should be in screened twisted pairs, with the screens earthed at one point within the safe area.

Hazardous area   Safe area

DISPLAY

RS1 RS2 3 4   2 1

Reset

2 channel Zener barrier 28V; 93mA; 300Ω diode return
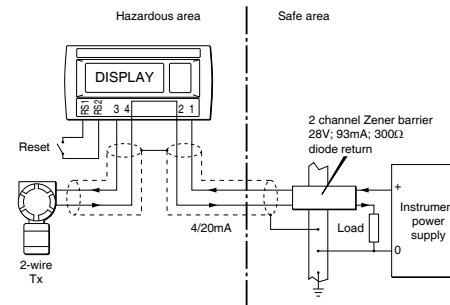
4/20mA   Load

Instrument power supply

2-wire Tx

Fig 3 Typical measurement loop

Scale card
The rate totaliser's units of measurement are shown on a printed scale card visible through a window at the right hand side of the display. The scale card is mounted on a flexible strip that is inserted into a slot at the rear of the instrument as shown below.
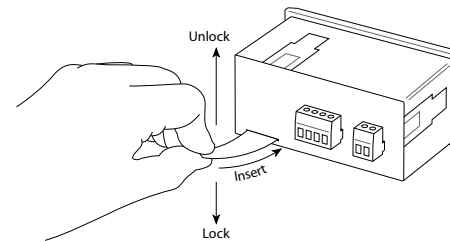

Unlock

Insert

Lock

Fig 4 Inserting flexible strip carrying scale card into slot at the rear of indicator.

Thus the scale card can easily be changed without removing the instrument from the panel or opening the instrument enclosure.

New rate totalisers are supplied with a printed scale card showing the requested units of measurement, if this information was not supplied when the instrument was ordered a blank card will be fitted.

A pack of self-adhesive scale cards printed with common units of measurement is available as an accessory from BEKA associates. Custom printed scale cards can also be supplied.

To change a scale card, unclip the protruding end of the flexible strip by gently pushing it upwards and pulling it out of the enclosure. Peel the existing scale card from the flexible strip and replace it with a new printed card, which should be aligned as shown below. Do not fit a new scale card on top of an existing card.

Align on these edges

Scale card

Align the self-adhesive printed scale card onto the flexible strip and insert the strip into the indicator as shown above.
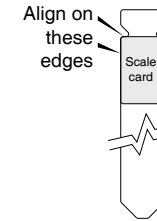
Fig 5 Fitting scale card to flexible strip

3. OPERATION
The BA358E is controlled and configured via the four front panel push buttons located below the display. In the display mode i.e. when the instrument is totalising, these push buttons have the following functions:

P Displays input current in mA or as a percentage of span. (configurable function)
Modified when optional alarms are fitted.

▼ Shows rate display calibration at 4mA input

▲ Shows rate display calibration at 20mA input

E Shows time since instrument was powered or total display was reset.

E+▼ Grand total
displays least significant 8 digits

E+▲ Grand total
displays most significant 8 digits

▼+▲ Resets total display
(configurable function)

P+▼ Shows firmware version

P+▲ Optional alarm setpoint access

P+E Access to configuration menu

4. CONFIGURATION

Totalisers are supplied calibrated as requested when ordered, if not specified default configuration will be supplied but can easily be changed on-site.

Fig 6 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 a description of the lineariser and the optional dual alarms.

Access to the configuration menu is obtained by pressing the **P** and **E** buttons simultaneously. If the totaliser security code is set to the default '0000' the first parameter 'FunC' will be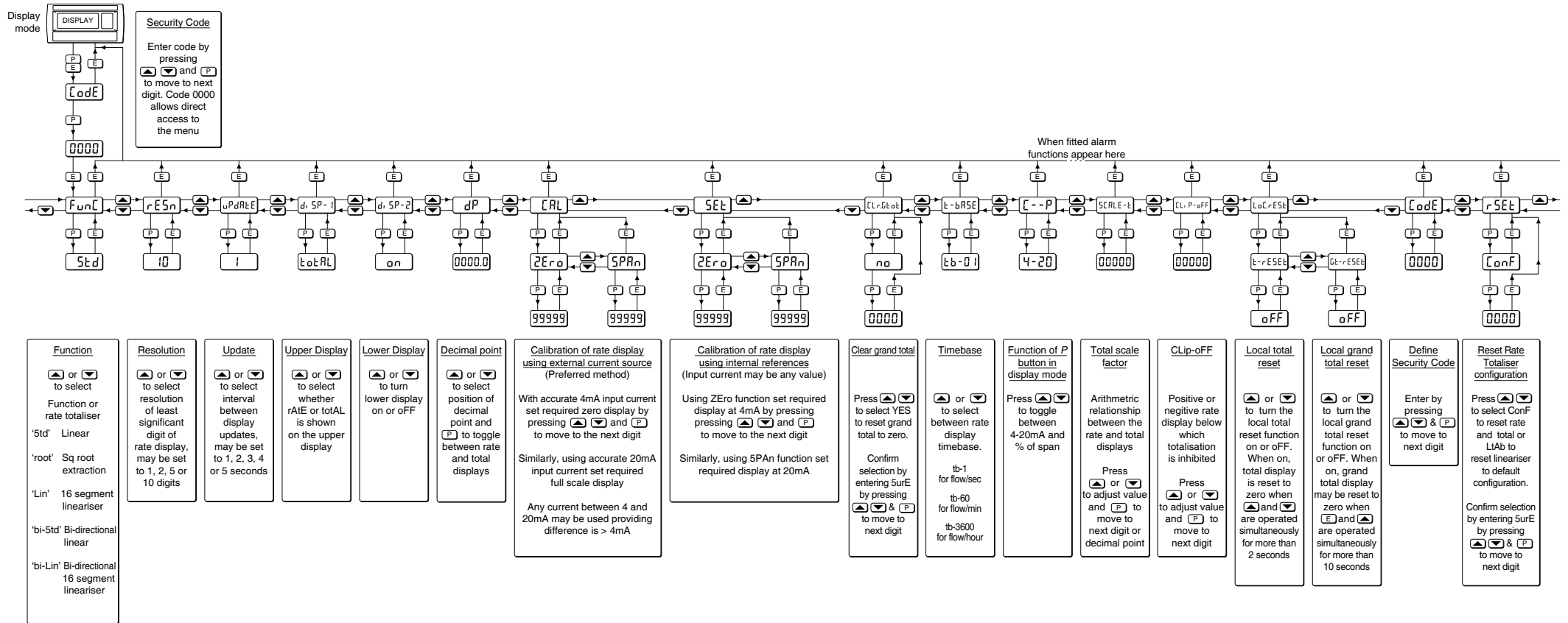 displayed. If the totaliser is protected by a security code, 'CodE' will be displayed and the code must be entered to obtain access to the menu.

Fig 6 Configuration menu

Display mode

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

When fitted alarm functions appear here

Function
▲ or ▼ to select
Function or rate totaliser
'5td' Linear
'root' Sq root extraction
'Lin' 16 segment lineariser
'bi-5td' Bi-directional linear
'bi-Lin' Bi-directional 16 segment lineariser

Resolution
▲ or ▼ to select resolution of least significant digit of rate display, may be set to 1, 2, 5 or 10 digits

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

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

Lower Display
▲ or ▼ to turn lower display on or oFF

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

Calibration of rate display using external current source (Preferred method)
With accurate 4mA input current set required zero display by pressing ▲ ▼ and P to move to the next digit
Similarly, using accurate 20mA input current set required full scale display
Any current between 4 and 20mA may be used providing difference is > 4mA

Calibration of rate display using internal references (Input current may be any value)
Using ZEro function set required display at 4mA by pressing ▲ ▼ and P to move to the next digit
Similarly, using 5PAn function set required display at 20mA

Clear grand total
Press ▲ ▼ to select YES to reset grand total to zero.
Confirm selection by entering 5urE by pressing ▲ ▼ & P to move to next digit

Timebase
▲ or ▼ to select between rate display timebase.
tb-1 for flow/sec
tb-60 for flow/min
tb-3600 for flow/hour

Function of P button in display mode
Press ▲ ▼ to toggle between 4-20mA and % of span

Total scale factor
Arithmetic relationship between the rate and total displays
Press ▲ or ▼ to adjust value and P to move to next digit or decimal point

CLip-oFF
Positive or negitive rate display below which totalisation is inhibited
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, total display is reset to zero when ▲ and ▼ are operated simultaneously for more than 2 seconds

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

Define Security Code
Enter by pressing ▲ ▼ & P to move to next digit

Reset Rate Totaliser configuration
Press ▲ ▼ to select ConF to reset rate and total or LtAb to reset lineariser to default configuration.
Confirm selection by entering 5urE by pressing ▲ ▼ & P to move to next digit