1. DESCRIPTION

The BA377E-SS is an intrinsically safe, one input instrument in a rugged 316 stainless steel enclosure that can be configured as a Timer or as a Clock. As a Timer the BA377E-SS is able to measure and display the elapsed time between external events, or control external events via two optional factory fitted control outputs. When configured as a Clock the BA377E-SS displays local time and the optional control outputs can turn *on* and *off* twice in each twenty four hour period.

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 BA377E-SS has IECEx, ATEX and UKEX intrinsic safety certification for use in flammable gas and dust atmospheres. ETL and cETL approval permits installation in the USA and Canada. The certification information label, which is located on the top of the instrument enclosure, 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

Special conditions for safe use

The IECEx, ATEX and UKEX intrinsic safety certificate numbers have an 'X' suffix indicating that for some applications special conditions apply for safe use.

a. When installed in an Ex e, Ex p or Ex t panel enclosure all connections to the BA377E-SS must be made by appropriately rated Zener barriers or galvanic isolators.

This means that when installed in an Ex e, Ex p or Ex t panel enclosure the BA377E-SS remains an intrinsically safe instrument.

b. The front of the stainless steel enclosure complies with the requirements for Ex e, Ex p & Ex t type of protection.

Therefore when correctly installed the BA377E-SS Timer or Clock will not invalidate the Ex e, Ex p or Ex t panel enclosure certification.

Use in combustible dust atmospheres

See full instruction manual for installation information requirements and special conditions for safe use in combustible dust atmospheres.

2. INSTALLATION

Although the BA377E-SS has IP66 front of panel protection it should be shielded from continuous direct sunlight and severe weather conditions. The rear of the instrument has IP20 protection.
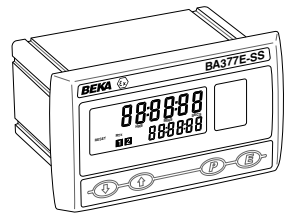
Cut-out dimensions

Mandatory to achieve an IP66 seal between instrument and panel and to maintain certification of panel enclosure in which it is mounted.
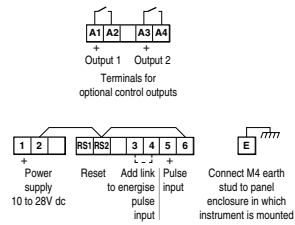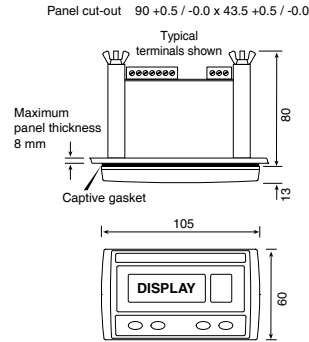
Fig 1 Cut-out dimensions and terminals
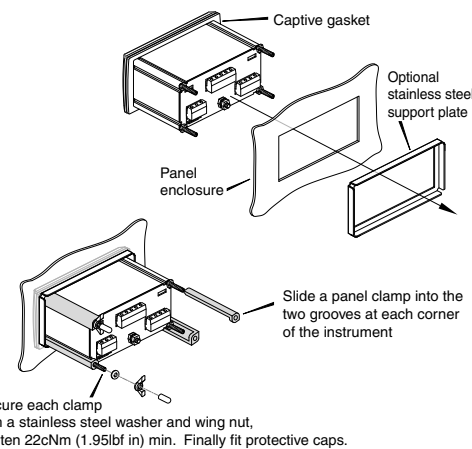
Fig 2 Installation procedure

EMC

For specified immunity all wiring should be in screened twisted pairs with screens earthed at one point within the safe area.
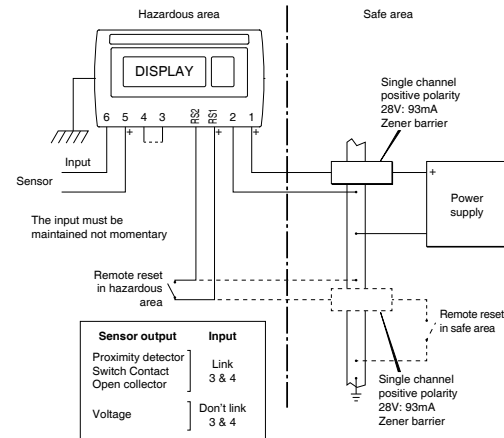
Fig 3 Use with Zener barriers

Scale card

The Timer or Clocks 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
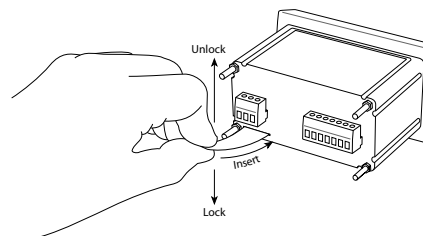
Fig 4 Inserting flexible strip carrying scale card into slot at the rear of Timer or Clock.

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

New Timer or Clocks are supplied with a printed scale card showing the requested units of measurement, if this information is not supplied when the Timer or Clock is 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 the self-adhesive printed scale card onto the flexible strip and insert the strip into the Timer or Clock as shown.
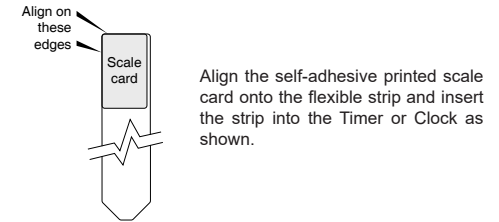
Fig 5 Fitting scale card to flexible strip

3. OPERATION

The Timer or Clock is controlled by four front panel push buttons. When in the Timer operating mode they have the following functions:

P + E   Access to configuration menu.

▼   When local control is enabled starts the Timer

▲   When local control is enabled stops the Timer.

E + ▲   Shows the grand total (run time) in hours and tenths of an hour irrespective of Timer configuration. If buttons are held for longer than ten seconds the grand total may be reset to zero if the grand total reset sub-function Clr Gtot is enabled in the LoC rSEt configuration function.

To reset the grand total to zero from the display mode press the E + ▲ buttons for ten seconds until Clr.no is displayed, using the ▼ or ▲ button change the display to Clr.YES and press E.

▼ + ▲   Resets the Timer to zero or to the set time SEt t depending on whether the Timer is configured to *time-up* or *time-down* when the two buttons are operated simultaneously for more than three seconds. This is a configurable function.

P + ▲   When enabled in the configuration menu, operating these two buttons simultaneously provides direct access to the set time SEt t and allows adjustment when the timer is in the display mode.

P + ▼   Shows in succession, firmware version number, instrument function ELAPSE and any output accessories that are fitted:
- A   Dual Control Outputs

See full instruction manual for description of use when configured as a Clock

4. CONFIGURATION

Timer or Clocks are supplied configured as requested at time of ordering, if not specified default Timer configuration will be supplied but can easily be changed on-site.

Fig 6 shows the location of each function within the menu when configured as a Timer with a brief summary of the function. Please refer to the full instruction manual for detailed configuration information, description of the optional outputs and the menu when configured as a Clock.

Access to the configuration menu is obtained by pressing the P and E buttons simultaneously. If the Timer or Clock'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
P/E
CodE
P
0000

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

Only included when optional Control Outputs are fitted

FunCtion — inPut — diSP-2 — StArtStoP — unitS — SEt t — CYCLES — RESEt t — uP or dn — P-FAiL — LoC rSEt — oP1 — oP2 — CLr Gtot — CodE — rSEt dEF

ELAPSE
inPtYPE — dEbounCE
Std
LoCAL
12:00:00
00:00:00
EnbL — ACCd
dn
idLE
rSEtEnbL — CLr Gtot
As oP1
CLr.no
0000
0000

0000
oP.CoL
dEFAuLt
oFF
0000
oFF
oFF
0000

Function
▲ or ▼ to select
Function of instrument
ELAPSE Interval measurement
CLoC Time display
Confirm selection by entering SurE by pressing ▲ ▼ & P to move to next digit

Input
▲ or ▼ to select
Input type
oP.CoL Open Collector
UoltS L Voltage <1V >3V
UoltS H Voltage <3V >10V
Coi L 0 < >40mV
PrdEt Proximity detector
ContACt Switch contact

Debounce
▲ or ▼ to select
level of debounce.
dEFAuLt
Li GHt
HEAVY

Lower Display
CYCLES not enabled
▲ or ▼ to select display
Std Set time SEt t
oFF lower display disabled
CYCLES enabled
▲ or ▼ to select display
Std Cycle No. & total cycle with status shown at start of each operation
LAbEL Cycle No. & total cycle with status shown periodically
oFF lower display disabled

Start & stop timer
CYCLES not enabled
▲ or ▼ to select how timer is controlled
LoCAL Start ▲ button Stop ▲ button
Control 1 Start Input high (open) Stop Input low (closed)
Control 2 Start Input low (closed) Stop Input high (open)

Units of display
▲ or ▼ to select
hours minutes seconds
12:00:00
12:00
30:00
30

Set time
▲ or ▼ to adjust value and P to move control to next digit

Enable access to Set Time from display mode
▲ or ▼ to select
on or oFF

Security code for direct access to Set Time
Enter code by pressing ▲ or ▼ and P to move to next digit
Code 0000 allows direct access

Direction of count
▲ or ▼ to select
uP or dn

Power fail
▲ or ▼ to select how timer functions when power is restored after failure
idLE Stopped, requires reset & start input
PAuSE Paused, requires start input
Continue Resumes timing

Local total reset
▲ or ▼ to turn the local total reset function on or oFF
When on is selected pressing ▲ and simultaneously for more than 3 seconds in the display mode resets the total display

Local grand total clear
▲ or ▼ to turn the local grand total reset function on or oFF
When on is selected pressing E and simultaneously for more than 10 seconds in the display mode resets the grand total

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
Entering by pressing ▲ or ▼ to adjust each digit

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

EnbL — CYCL Cnt — rSt dELA
oFF
00
00000000

Enable cycle function
▲ and ▼ to toggle between on and oFF

Cycle count
▲ and ▼ to adjust flashing digit and P to move to next digit.
Sets number of cycles between 1 and 99 to be performed.
00 for continuous cycling

Restart delay
▲ and ▼ to adjust flashing digit and P to move to next digit.
Sets delay between cycles in the same units as SEt t

Timer repeat cycle function

EnbL — oP1on — oP1oFF — oP1dELA
oFF
StArt
StoP
00000

Enable output 1
▲ and ▼ to toggle between on and oFF

Output on at
▲ and ▼ to select required function
rESEt
run
PAuSE
dELAY
donE
n rESEt
n run
n PAuSE
n dELAY
n donE
Select action that energises output 1

Output off at
▲ and ▼ to select required function
rESEt
run
PAuSE
dELAY
donE
n rESEt
n run
n PAuSE
n dELAY
n donE
Select action that de-energises output 1

Output on delay
▲ and ▼ to adjust flashing digit and P to move to next digit
Set delay in seconds before output 1 is energised.

Output 1 configuration

Manuals, certificates and data-sheets can be downloaded from http://www.beka.co.uk/ba377e-ss

Fig 6 Timer Configuration menu