Badger Meter Europa GmbH

OPERATING INSTRUCTIONS
Batch Controller BC-2

April 2002

Version BC-2-04/02-e

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1. General

The BC 2 is designed for use with a pulse generating flow meter, manufactured by Badger Meter. Such are oscillating piston meters, nutating disc meters, turbine meters, pelton wheel meters, oval gear meters and some special instruments.

If supplied with a flow meter, the BC 2 is programmed and scaled readily by Badger Meter, according to customers orders. In this case, you need to read only the chapters marked with a vertical bar for initial set-up and normal operation. If you want to re-program an instrument, please take into consideration that it may have been supplied with a "PROGRAM-DISABLE" jumper for customers safety.

1.1 System description

The BC 2 consists of a dual preset counter with two relay – and two transistor outputs, an electronic scaling function ("electronic gears"), a power supply for the pulse transmitter, display and a time switch.

1.2 Specification

1. Display: 6 digit, (7,6 mm high LCD display)
2. Power requirements: 230 VAC (+/- 10%). 0/60 Hz, 6 VA
3. Sensor power: 12 VDC (+/- 25%) @ 100 mA
4. Count input: Switch selectable to accept count pulses from a variety of sources, including switch contacts, outputs from CMOS or TTL circuits and all standard RLC sensors.

   If ordered with a meter, count input is set-up correct by Badger Meter.

Current sourcing – Unit provides 3.9 K pull-down load for sensors with current sourcing outputs. (Max. input voltage 28 VDC @ 7 mA)

Current sinking - Unit provides 7.8 K pull-up load for sensors with current sinking outputs. (Max. sensor current 1.6 mA)

Debounce – Damping capacitor provided for switch contact debounce. Limits count speed to 100 pps max. and input pulse width to 5 msec. min.

LO BIAS – Input Trigger levels V IL = 1.5 V V IH = 3.75
HI BIAS – Input Trigger levels V IL = 5.5 V V IH = 7.5V

Note: Bias levels +/- 10% @ 12 VDC sensor voltage. These levels vary proportionally with the sensor supply voltage.

5. Prescale value range – 0 to 9.99999

If ordered with a flow meter, K factor is entered by Badger Meter.

6. Maximum count rates: High frequency

The following chart lists the count rates for all the possible prescale values.

Prescale value	Count rate
0,00000 to 1	2000 counts/second
1,00001 to 2	1500 counts/second
2,00001 to 3	1300 counts/second
3,00001 to 4	1100 counts/second
4,00001 to 5	1000 counts/second
5,00001 to 6	900 counts/second
6,00001 to 7	800 counts/second
7,00001 to 8	750 counts/second
8,00001 to 9	700 counts/second
9,00001 to 9.99999	650 counts/second

Low frequency - 100 cps for switch contact closures.
Note: These units will operate with VCM (E-H) modules.

7. Control inputs

Remote reset - Active low (V IL = .5 V max) internally pulled up to 5 VDC through a 10 KOhm resistor (I SNK = .5 mA). Response time = 10 sec. A low will reset the unit and deactivate outputs.

Program disable - Active low (V IL = .5 V max) internally pulled up to 5 VDC through a 10 KOhm resistor (I SNK = .5 mA). A low will inhibit the changing of presets, prescale and time outputs, as well as testing outputs in self-test.

Up/Down control - Active low (V IL = .5 max) internally pulled up to 5 VDC through a 10Kohm resistor (I SNK = .5 mA). Response time = 150 ? sec. This input determines the direction of the count, and is independent of reset to zero or reset to preset modes of operation.

8. Outputs

Solid state	-	Current sinking NPN open collector transistors. I SNK = 1000 mA max, VOH = 30 VDC max. VOL = 1 V @ 100 mA. One solid-state output for each preset level.
Relays	-	Form C contacts rated 6 amps @ 120/260 VAC, 28 VDC (resistive load) 1/8H.P @120 VAC (inductive load). One relay output for each preset level.
Programmable timed output	-	The timed output can be programmed from .01 sec to 99.99 sec, +/- (1% + 10 msec). The timed output is set for 1 sec at the factory.

9. Memory retention - The BC 2 counters have a "no power EPROM", which maintains all information when the AC power is removed. The life expectancy of this device is at least 10.000 power down cycles, and length of memory retention for a single power down can be as long as 10 years.

10. Input, power and output connections - There are two plug-in compression type barrier strips, located at the rear of the unit. These strips can be removed form the rear of the unit for ease of wiring. After wiring is complete, the connector can be plugged back into the unit.

11. Operating temperature range - 0°C to 50°C

12. Storage temperature range - -40°C to 70°C

13. Construction – BC 2a - Black plastic front bezel with black plastic insert. Front panel meets IP65 acc. to DIN, when properly installed. (Panel gasket and mounting clip included with unit)

14. Weight - 360 g

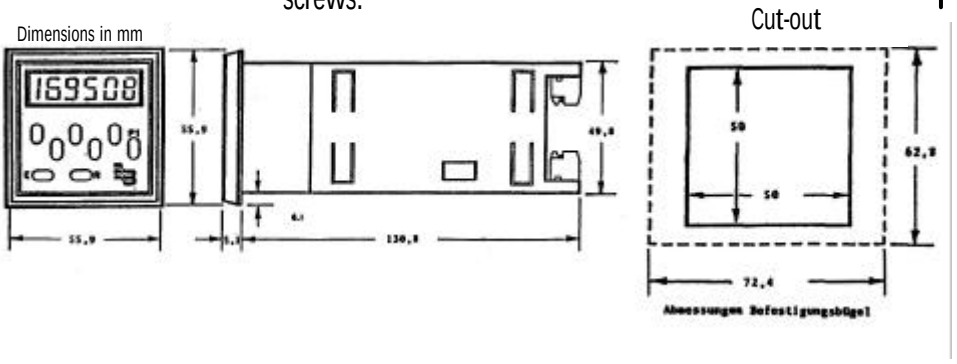
2. Set-up

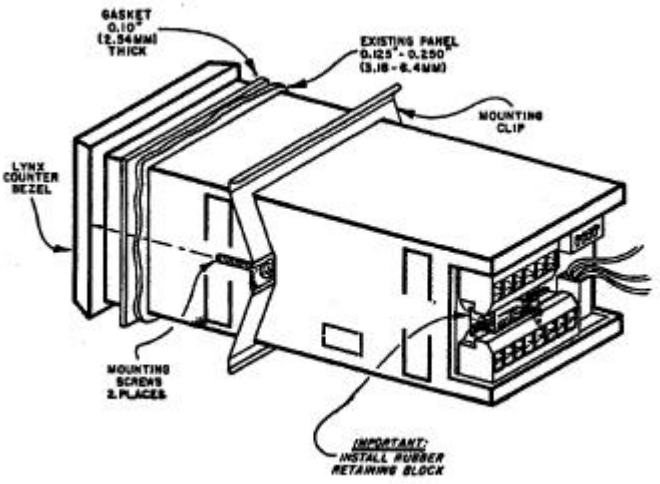
2.1 Mounting

2.1.1 Panel mounting

The BC 2 is designed to be panel mounted with a gasket to provide a water-tight seal. One mounting clip and two screws are provided for easy installation. Consideration should be given to the thickness of the panel. A panel which is too thin may distort and not provide a water-tight seal (recommended minimum panel thickness is 3,2 mm)

After the panel cut-out has been completed and deburred, carefully apply the gasket to the panel. DO NOT APPLY THE ADHESIVE SIDE OF THE GASKET TO THE COUNTER BEZEL. Insert the unit into the panel. As depicted in the drawing, install the two tinnerman nuts and two self-tapping screws onto the mounting clip. To install the mounting clip: hold the mounting clip with both hands, so that the two corners rest on the index finger of each hand. While doing this, place the thumb of each hand over the mounting screws. By pressing on the screws, flex the clip enough to slide it over the back end of the case until the clip touches the back of the panel. Insure that the case is still fully inserted into the panel. While maintaining slight pressure on the clip, tighten the two mounting screws. CATION: Only minimum pressure is required to seal panel. DO NOT overtighten mounting screws.

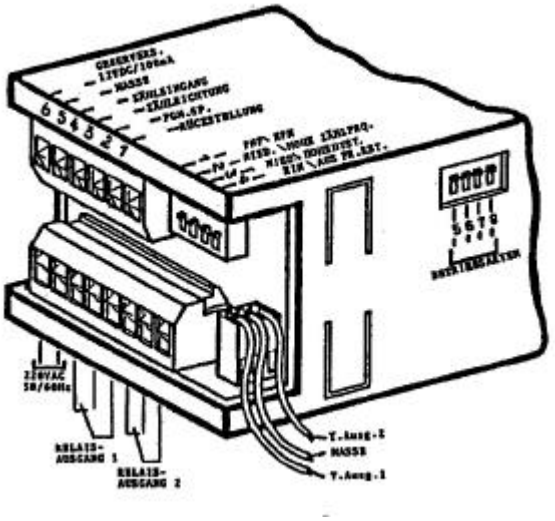




Drawing No. 1

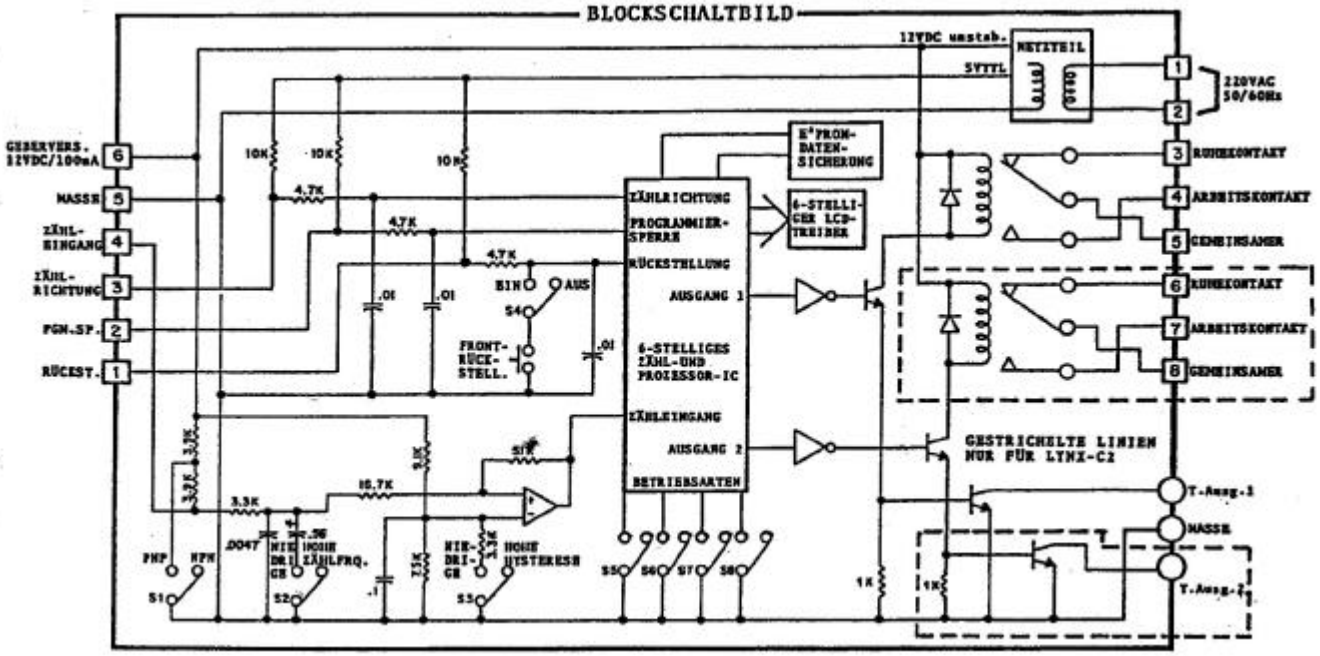
2.2 Electrical connections

As depicted in drawing no. 2 showing the rear view of the BC 2 counter, there are two terminal blocks, where all wiring connections are made. Remove the blocks for easy access to the terminal screws. To remove, insert a screwdriver into one of the slots on the underside of the block and twist. The block can then be lifted off the pins for wiring. CAUTION: Terminal blocks should not be removed with power applied to the unit. For the solid-state outputs, a three-pin connector is supplied. NOTE: The solid-state connector housing is polarized to the body of the bottom terminal block and must be inserted properly.



Drawing No. 2

All the input connections are made to the top 6-terminal block (labelled TBA). The power and relay output connections are made to the bottom 8-terminal block (labelled TBB), and the solid-state outputs are connected to the three-pin connector. (The input connections are the same for one or two preset counters.)


BLOCKSCHALTBILD
12VDC unstab.
5VTTL
NETZTEIL
220VAC 50/60Hz
GEBERVERS. 12VDC/100mA
MASSE
ZÄHL-EINGANG
ZÄHL-RICHTUNG
PGM.SP.
RÜCKST.
10K
4.7K
.01
S4
EIN
AUS
FRONT-RÜCK-STELL.
E²PROM-DATEN-SICHERUNG
ZÄHLRICHTUNG
PROGRAMMIER-SPERRE
RÜCKSTELLUNG
AUSGANG 1
6-STELLIGES ZÄHL-UND PROZESSOR-IC
ZÄHLEINGANG
AUSGANG 2
BETRIEBSARTEN
6-STELLIGER LCD-TREIBER
RUHEKONTAKT
ARBEITSKONTAKT
GEMEINSAMER
GESTRICHELTE LINIEN NUR FÜR LYNX-C2
T-Ausg.1
T-Ausg.2
PNP
NPN
S1
S2
S3
S5
S6
S7
S8
HOHE HYSTERESE

Drawing No. 3

2.2.1 Inputs

Terminal 6 on TBA (the first terminal from left) is the DC OUT (+12 V) terminal. This is for sensor supply and can provide up to 100 mA of current. Terminal 5 is the COMM (common) terminal, which is the common line to which the sensor and other input commons are connected. (Do NOT connect relay commons or solid-state output commons to this point.) Terminal 4 is the CNT.IN (count input) terminal. When the signal at this terminal is pulled low (zero volt), a count will be registered. (See Count Input and Count Rates under the specifications section.) Terminal 3 is the UP/DN (count direction control) terminal. When this terminal is at a high level, the count direction is "UP". When the terminal is grounded, the count direction is "DOWN". Terminal 2 is the PGM.DIS (program disable) terminal. When this terminal is at a high level, the preset values, prescale value and timed output value(s) can be changed using the front panel buttons. (Outputs can also be tested using self-test under this condition. See self-test description for further details.) When terminal 2 is at a low level (connected to COMM.) changing these values and testing the output is no longer possible. Terminal 1 is the RMT.RST (remote reset) terminal. When this terminal is at a low level (connected to COMM.), the unit will reset, and the outputs will run off (if activated). As long as reset is low, the unit is held at reset.

Then connecting and installing the input wires, the following guidelines should be followed. (This is especially true of "electrically noisy" environments.)

A. Never run count and control signal leads in the same conduit or race ways with conductors feeding motors, solenoids, SCR controls, heaters, etc. Ideally, signal wires should be run by themselves in a separate conduit.

B. Signal leads within electrical enclosures should be routed as far from contactors, motor starters, control relay, transformers and other similar components as possible.

C. When shielded wire is used, connect the shield to the signal common terminal of the BC 2 counter and leave the other end of the shield unconnected and insulated from machine ground.

2.2.2 Power and outputs

As mentioned before, power and output connections are made to the bottom terminal block (labelled TBB), and the solid-state output connector (located at the lower right corner of the unit). Primary AC power is connected to terminals 1 and 2 (marked A.C. Power, located on the left-hand side of the terminal block TBB). For best results, the AC power should be relatively "clean" and within the specified +/- 10% variation limits. Drawing power from heavily loaded circuits, or from circuits that also power loads that cycle on and off, should be avoided.

Terminals 3, 4 and 5 are used to connect to output relay 1. Terminal 3 is the normally closed contact. Terminal 4 is the normally open contact, and terminal 5 is the output relay common. Terminals 6, 7 and 8 (dual preset only) are used to connect to output relay 2. Terminal 6 is the normally closed contact. Terminal 7 is the normally open contact, and terminal 8 is the output relay common.

The solid-state output connector has three wires (two wires for the single preset unit) coming from the top of the connector housing. The yellow wire (first wire as viewed from the back of the unit) is for solid-state output 1 (labelled 01 SNK.). This internally connects to an NPN open collector transistor. The black wire is the common for the solid-state outputs. This terminal should NOT be used as the common for the input or control terminals. The blue wire is used to connect to solid-state output 2 (labelled 02 SNK.).

2.3 Switch set-up

S1 – SNK.: Provides a 7.8K pull-up resistor for sensor with sinking outputs.
SRC.: Provides a 3.9K pull-down resistor for sensors with sourcing outputs.

S2 – HI FRQ.: Removes damping capacitor and allows operation up to the high speed count specifications.
LO FRQ.: Connects damping capacitor for switch contact debounce. Limits count speed to 100 cps. Minimum count ON/OFF times – 5 msec.

S3 – HI BIAS: Sets input trigger levels at mid-range, to accept outputs from 2-wire proximity sensors, resistive photo-cells, and logic pulses with full 1 to +12 V swings. (V IL = 5,5 V, V IH = 7,5 V)
LO BIAS: Sets input trigger levels to the low range, to accept logic pulses with 0 to +5 V swings. (V IL = 1,5 V, V IH = 3.75 V

S4 – DIS.RST.: Disables front panel reset
EN-RST.: Enables front panel reset.

2.4 Modes of operation

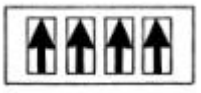
Mode settings of the switches are shown below. The mode number corresponds to a binary code, represented by the DIP switch positions. When the switch is "UP", it is equivalent to a zero. When the switch is "DOWN, it is equivalent to a one. The mode switch settings can be easily observed from the front panel by using the self-test. At the end of the self-test, the state of these mode switches is displayed. The mode selection DIP switches are located along the side of the unit's case.

NOTES:

1) For all the following modes of operation, when the unit is set for a Reset to Zero mode, the UP/DN terminal (count direction) is normally left high (in "UP" position). When the unit is set for a Reset to Preset mode, the UP/DN terminal is normally tied to common (in the "DOWN" position). However, even though these are the usual conditions for the UP/DN terminal, it does not have to operate in this fashion (i.e. the unit can count down in a Reset to Zero mode, or count up in a Rest to Preset mode, and still maintain normal operating functions).

2) The timed output must be less than the time required to count from the reset condition to the preset point. Otherwise, the output will appear to be latched-on.

MODE 0: Latch outputs at presets, manual reset to zero



In this mode, as the unit counts form zero, output 1 will latch on when preset 1 is reached, and output 2 will latch on when preset 2 is reached. When a manual reset* occurs, the unit will reset to zero and the outputs, if latched on, will unlatch. Counts will continue to accumulate after the outputs have turned on.

MODE 1: Timed outputs at presets, manual reset to zero

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached, and output 2 will turn on when preset 2 is reached. The outputs will turn off after their respective programmed time values have occurred. When a manual reset occurs, the unit will reset to zero. Manual reset* will terminate the timed outputs if the outputs are still turned on. Counts will continue to accumulate after the preset levels have been reached.

MODE 2: Output 1 turn off at preset 2, latch output 2 at preset 2, manual reset to zero

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached. When preset 2 is reached, output 2 will turn on and output 1 will turn off. Output 2 will remain latched on until a manual reset occurs. Manual rest* will turn off both outputs and the unit will reset to zero. Counts will continue to accumulate after the preset levels have been reached.

MODE 3: Output 1 turn off at preset 2, timed output 2 at preset 2, manual reset to zero

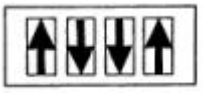
In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached. When preset 2 is reached, output 2 will turn on and output 1 will turn off. Output 2 will turn off after its programmed time value has occurred. When a manual reset occurs, the unit will reset to zero. Manual reset* will turn off both outputs if they are still activated. Counts will continue to accumulate after preset levels have been reached.

MODE 4: Output 1 turn off at preset 2, timed output 2 at preset 2, automatic reset to zero at preset 2

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached. When preset 2 is reached, output 2 will turn on, output 1 will turn off, and the unit will automatically reset to zero. Output 2 will turn off after its programmed time value has occurred. Manual reset* will turn off both outputs, if activated, and reset the count to zero. During automatic reset, no counts will be lost if the count rate does not exceed the maximum count rate specified.

MODE 5: Timed outputs at presets, automatic reset to zero at preset 2

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached, and output 2 will turn on when preset 2 is reached. The outputs will turn off after their respective programmed time values have occurred. Also, when preset 2 is reached, the unit will automatically reset the count to zero and start the cycle over (output 2 will remain on until its time value has occurred). Manual reset* will turn off both outputs and reset the count to zero. During automatic reset, no counts will be lost if the count rate does not exceed the maximum count rate specified.

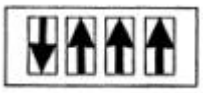


MODE 6: Output 1 turn off at preset 2, timed output 2 at preset 2, automatic reset to zero after timed output 2

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached. When preset 2 is reached, output 2 will turn on and output 1 will turn off. Output 2 will turn off after its programmed time value has occurred. At the end of timed output 2, the unit will automatically reset to zero and start the cycle over again. During automatic reset, no counts will be lost if the count rate does not exceed the maximum count rate specified. Manual reset* will turn off both outputs, if turned on, and reset the count to zero.

MODE 7: Timed outputs at presets, automatic reset to zero after timed output 2

In this mode, as the unit counts from zero, output 1 will turn on when preset 1 is reached, and output 2 will turn on when preset 2 is reached. The outputs will turn off after their respective programmed time values have occurred. At the end of timed output 2, the unit will automatically reset to zero and start the cycle over again. During automatic reset, no counts will be lost, if the count rate does not exceed the maximum count rate specified. Manual reset* will turn off both outputs, if turned on, and reset the count to zero.



MODE 8: Latch output at preset 1 and zero, manual reset to preset 2

In this mode, as the unit counts from preset 2, output 1 will latch on when preset 1 is reached, and output 2 will latch on when zero is reached. When a manual reset* occurs, the unit will reset to preset 2 and the output, if latched on, will unlatch. Counts will continue to register after the outputs have turned on.

MODE 9: Timed output at preset 1 and zero, manual reset to preset 2

In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached, and output 2 will turn on when zero is reached. The outputs will turn off after their respective programmed time values have occurred. When a manual reset* occurs, the unit will reset to preset 2. Manual reset will terminate the timed outputs if the outputs are still activated. Counts will continue to accumulate after the outputs have activated.

MODE 10: Output 1 turn off at zero, latch output 2 at zero, manual reset to preset 2

In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached. When zero is reached, output 2 will turn on and output 1 will turn off. Output 2 will remain latched on until a manual reset occurs. Counts will continue to accumulate after preset levels have been reached. Manual reset* will turn off all outputs, if activated, and the unit resets to preset 2.

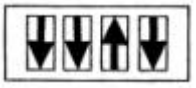
MODE 11: Output 1 turn off at zero, timed output 2 at zero, manual reset to preset

In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached. When zero is reached, output 2 will turn on and output 1 will turn off. Output 2 will turn off after its programmed time value has occurred. Counts will continue to accumulate after the preset levels have been reached. When a manual reset* occurs, the unit will reset to preset 2. Manual reset will also turn off both outputs, if still activated.

MODE 12: Output 1 turn off at zero, timed output 2 at zero, automatic reset to preset 2 at zero

In this mode, as the unit counts from preset 2, output 1 will turn on when the preset is reached. When zero is reached, output 2 will turn on, output 1 will turn off, and the unit will automatically reset to preset 2. Output 2 will turn off after its programmed time value has occurred. Manual reset* will turn off both outputs, if turned on, and reset the count to preset 2. During automatic reset, no counts will be lost if the count rate does not exceed the maximum specified count rate.

MODE 13: Timed outputs at preset 1 and zero, automatic reset to preset 2 at zero



In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached, and output 2 will turn on when zero is reached. The outputs will turn off after their respective programmed time values have occurred. Also, when zero is reached, the unit will automatically reset the count to preset 2 and start the cycle over (output 2 will remain on until its time value has occurred). Manual reset* will turn off both outputs, if turned on, and reset the count to preset 2. During automatic reset, no counts will be lost if the count rate does not exceed the maximum count rate specified.

MODE 14: Output 1 turn off at zero, timed output 2 at zero, automatic reset to preset 2 after timed output 2

In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached. When zero is reached, output 2 will turn on and output 1 will turn off. Output 2 will turn off after its programmed time value has occurred. At the end of timed output 2, the unit will automatically reset to preset 2 and start the cycle over. During automatic reset, no counts will be lost if the count rate does not exceed the maximum count rate specified. Manual reset* will turn off both outputs, if activated, and reset the count to preset 2.

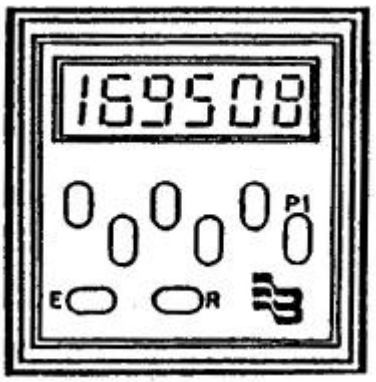
MODE 15: Timed outputs at preset 1 and zero, automatic reset to preset 2 after timed output 2

In this mode, as the unit counts from preset 2, output 1 will turn on when preset 1 is reached, and output 2 will turn on when zero is reached. The outputs will turn off after their respective programmed time values have occurred. At the end of timed output 2, the unit will automatically reset to preset 2 and start the cycle over. During automatic reset, no counts will be lost if the count rate does not exceed the maximum specified count rate. Manual reset* will turn off either output, if turned on, and reset the count to preset 2.

* - Manual reset, either by front panel reset (if enabled) of remote reset, is always active and will override any present condition or state of the counter.

3. Front panel function description

These units employ eight front panel buttons for control and data entering. The button functions are as described below:



Drawing No. 4

Reset "R"

This button resets the counter to either zero or preset, depending on the mode of operation selected. For this button to operate, the enable/disable reset button switch at the rear of the unit must be set to the enable (EN.) position. This button is also used, in conjunction with the two preset buttons (one button on the single preset unit), to view and change the timed output value. When reset is activated, all processes are stopped or interrupted (i.e. outputs turn off, display is halted, etc.). This is the case under any mode of operation, in any data entry mode.

Preset "P1" and P2"

The preset buttons are labelled, and are the two right-hand buttons of the top two rows, located on the front of the unit. When the "P1" button is pressed, preset 1 is displayed and the "Preset Enter" mode is accessed. (See "To Enter A New Preset Value".) These values will remain displayed for approximately 10 sec. after release of the button. The preset buttons are also used, in conjunction with the reset button, to view and change the timed output values. (See "To Enter A New Timed Output Value" section.)

Enter "E"

This button is used in the "Preset Enter" mode and in the "Timed Output Enter" mode. After the desired value is obtained on the display, this button is pressed. This enters the value into the internal processor. This new value, at that instant, is used in the processing of preset or timed output values "E" can also be used at the end of self-test to exit self-test.

Prescale "PS"

When the "PS" button is pressed, the prescale value is displayed and the "Prescale Enter" mode is accessed. (See "To Enter A New Prescale Value".) This value will remain displayed for approximately 10 sec. after release of the button.

3.1 To enter a new prescale value

1. Press "PS". This will display the prescale value and it will remain displayed for approximately 10 sec. after release of the button. (At this time, the prescale display mode can be exited without change by pressing the "E" button.)

2. Once the prescale value is displayed, changing the digit value can be done by pressing the button directly beneath the digit position to be changed. (To change this value, "PGB.DIS." must be at a high level.) Each time the button is pressed, the digit will increment by one. Also, pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Do this for all the digits to be changed.

3. Press the "E" (Enter) button to enter the value into the unit's memory. AS SOON AS the "E" button is pressed, this new value is used as the operating data. If the "E" button is not pressed within 10 sec. after the last digit has been changed, the value will disappear (go back to normal display mode) and continue to operate on the previous value.

3.2 To enter a new preset value

1. Press "P1" (or "P2", if a two preset unit). This will display the respective preset value and it will remain displayed for approximately 10 sec. after release of the last button pushed. (At this time, the preset display mode can be exited, without a change, by pressing the "E" button.)

2. Once the preset value is displayed, changing the digit value can be done by pressing the button directly beneath the digit to be changed. (To change this value, "PGM.DIS." must be at a high level.) Each time the button is pressed, the digit will increment by one. Also, pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Do this for all the digits to be changed.

3. Press the "E" (Enter) button to enter the value into the unit's memory. AS SOON AS the "E" button is pressed, this new value is used as the operating data. This means, if the preset value is entered, and the old or new value has not been reached, the new value will be used without process disruption. (Preset on the fly.) If the "E" button is not pressed within 10 sec. after the last digit has been changed, the value will disappear (go back to normal display mode) and the unit will continue to operate on the previous value. During the displaying, changing and entering of a new preset value, all functions of the unit are operational (i.e. counting, resetting, outputs firing, etc.).

3.3 To enter a new timed output value

1. Press and hold the button and then press the "R" (Reset) button. The respective timed output value will now be displayed and will remain displayed for approximately 10 Sec. after release of the button pushed. (At this time, the timed output display mode can be exited, without change, by pressing the "E" button.)

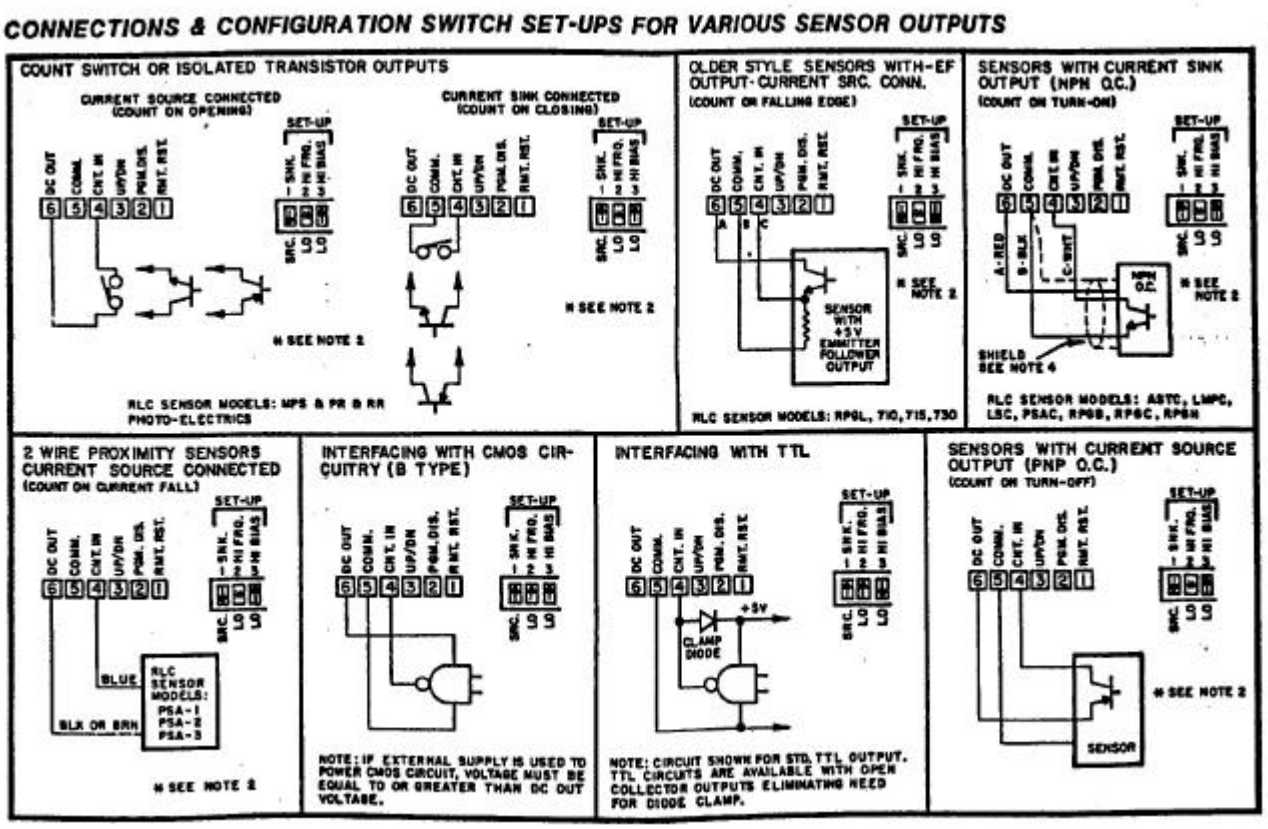
2. Once the timed output is displayed, changing the digit value can be done by pressing the button directly beneath the digit to be changed. (To change this value, "PGM.DIS" must be at a high level.) Each time the button is pressed, the digit will increment by one. Also, pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Do this for all the digits to be changed. (This value can be set between 0,01 Sec. and 99,99 Sec.)

3. Press the "E" (Enter) button to enter the value into the unit's memory. AS SOON AS the "E" button is pressed, this new value is used as the operating data. If the "E" button is not pressed within 10 Sec. after the last digit has been changed, the value will disappear (go back to normal display mode) and the unit will continue to operate on the previous value. During the displaying, changing and entering of a new timed output value, all functions of the unit are operational (i.e. counting, resetting, output firing, etc.).

4. Hints for applications other than flow metering

Badger Meter uses BC 2 as a useful complement to their range of flow meters. The design of BC 2 also allows a lot of other industrial counting applications. Please check specifications (1.2) before trying an application not mentioned in this manual.

4.1 Some sensor examples



Drawing No. 5

Notes:

1. Sensor supply voltage and current
   The +12 V sensor supply voltage on the "DC OUT" terminal is nominal with +/- 25% variation due to line and internal load variations. All RLC sensors will accommodate this variation.

2. HI/LO FRQ selection
   The HI/LO FRW selection switch must be set on LO FRQ when switch contacts are used to generate count input signals. Since the LO FRQ mode also provides very high immunity against electrical noise pickup, it is recommended that his mode also be used, whenever possible, with electronic sensor outputs, as added insurance. The LO FRQ mode can be used with any type of sensor output, provided count pulse widths never decreases below 5 milliseconds, and the count rate does not exceed 100 cps.

3. V IL and V IH levels given are nominal values, +/- 10% when counter voltage on "DC OUT" terminals is +12 VDC. These nominal values will vary in proportion to the variations in "DC OUT" terminal voltage, caused by line voltage and load changes.

4. When shielded cable is used, the shield should be connected to COMM at the counter and left unconnected at sensor end.

5. Trouble shooting

5.1 Self-test

This unit has a built-in self-test feature, which can be activated without loosing counts or preset values, missing preset points or timed output durations, or interfering with control functions. With this test, all digits are cycled though, then the mode select switch settings are displayed. At this point, the outputs can also be tested.

To enter self-test, the two left-hand digit buttons (located on the front panel) simultaneously. At this time, whatever count value was displayed will disappear and be replaced by a string of six zeros. This will be shown for about a half a second, then a string of ones will appear for the same time duration. Following these, a string of twos and so on, up to none will be displayed. After the nines are shown, five decimal points will appear. After this portion, an interlace pattern of 1, 0, 1, 0, 1, 0 then 1, 2, 1, 2, 1, 2 and so on, until all digits from zero to nine have been displayed.

The next portion of self-test will display a group of ones and zeros. These ones and zeros are the settings of the mode select switches (the four DIP switches located along the side of the unit). This pattern directly corresponds to the number representing the mode of operation. If the switches are changed at his point of self-test, the settings can be seen to change. These changes will not affect counter operation immediately, but any changes will take effect when self-test is exited. When the switch is "DOWN", the LCD will show a one. When the switch is "UP", the LCD will show a zero. If no testing of the output is required, press the "E" button until the unit exits self-test (the unit will go back to the count display mode). Also, if no activity occurs on the switches or the front panel button within 18 sec, after the unit pauses at the mode switch display, the unit will automatically exit the self-test.

During the time the mode switch settings are displayed, the outputs can be tested. To activate the output, press the "P1" "P2" button.

Note:

The "PGM:DIS" terminal must be at a high level for the outputs to be activated. Also, caution should be used when testing the outputs, so as not to cause any undesirable or hazardous conditions in the system. (To turn off the outputs, release the button.)

If the outputs are not tested, the state(s) of the outputs will remain the same as they were prior to self-test. If the outputs are tested in self-test, the outputs will be off after exiting self-test.

Rapid advantage of the self-test routine can be done by pressing and releasing any of the front panel buttons except for the "R" button. (Pressing "R" at any time, except when entering the timed output mode, will reset the unit.)

5.2 Power-up diagnostics

The BC 2 has internal diagnostics, which will check the stored data during power-up. When the data is saved (power-down), computations are made with these values. The results of these computations are stored in the memory to serve as a check against possible error. On power-up, these same computations are repeated on the stored data. If these results do not agree with the stored results, then a "P" will appear on the right side of the display. Normal operation of the unit will continue while this "P" is displayed. To remove the "P" from the display, press the "E" button. Then check programmed values to be certain they are correct.

5.3 Service address

There are no user serviceable parts inside. If necessary, address to your local agent or to Badger Meter Europa GmbH for further service.

Hotline

Tel. +49-7025-9208-0 or -31
Fax +49-7025-9208-15

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