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SBC
CONSOLE

READ THOROUGHLY BEFORE INSTALLING EQUIPMENT

INSTALLATION and OPERATING INSTRUCTIONS

BINMASTER®
Division of Garner Industries
7201 No. 98th Street P. O. Box 29709
Lincoln, NE 68507 Lincoln, NE 68529
(402) 434-9102 Fax (402)434-9133
www.binmaster.com

SBC

INTRODUCTION

The SBC is the control console for the SBR system and can control up to 30 SBR remote sensors. The SBC is available in both NEMA 1 and NEMA 4X versions. A measurement of any of the 30 remotes can be initiated easily with the push of a couple of buttons. Individual bin heights can be programmed into the console for each remote sensor. The measurement is displayed in distance to product, height of product, and percentage of product in the storage vessel. The display also shows the status of the bob, informing the user if the bob is measuring, retracting, or is retracted. All measurements and user information are stored in nonvolatile memory; therefore, the information will not be lost if power is removed.

INSTALLATION AND WIRING

The SBC requires a 16VAC-power connection from a transformer (such as 388-0023 or 388-0039) and an RS-485 data connection from the SBR, please refer to wiring diagram on the last page of this manual. The 16VAC power wires should be installed according to all local and/or national electrical codes. The recommended wire size for the power connection is 14 or 16 gauge wire. The SBC communicates with the SBR remotes via the RS-485 cable. This cable must be a good quality twisted pair with a shield (e.g., Belden 9463). The shield must be connected to the proper terminal on the terminal block in both the SBC and the SBR. The RS-485 data cable must run from one remote to the next (daisy-chained; see Figure 1) and all connections are to be made at the terminal blocks. All communication is done over the same twisted pair wire. Branch circuit wiring is not allowed on the RS-485 network. The maximum overall length for the RS-485 cable is 4000 feet. Please verify the polarity of the RS-485 wires during installation. The system will not work if RS-485 wires are reversed. The SBC can communicate with up to 30 SBR remotes; therefore, the address in each SBR must be set correctly. The factory default address for the SBR remote is one (1). To change the bin address refer to the SBR manual or the diagram on the inside cover of the SBR.

PROGRAMMING

The SBC console operates in two modes, the Setup Mode and the Measurement Mode. The Setup Mode is used to program the individual bin heights and select either English or Metric units. The Measurement Mode is used to request measurements from a SBR remote. The SBC unit has a 20 character by 4 line LCD and three buttons (**+**), (**-**), and (**ENTER**). The (**+**) key will mean one of two things, either “increment” or “yes” and the (**-**) key will mean “decrement” or “no”. The (**ENTER**) key is used to accept an entry. The following explanation will describe how to program the different options on the SBC unit.

The LCD displays the introduction screen with software version and date each time power is applied. If technical assistance is needed, this version and date will be helpful. Pressing any key from the intro screen accesses the Main Menu. There are two selections from the Main Menu, (**+**) for Setup Mode, and (**-**) for Measure Mode.

Setup Mode

Programming bin heights and selecting units are done in the Setup Mode. The Setup Menu is accessed by pressing the (**+**) key from the Main Menu. The Setup Menu has three choices, (**+**) for Units Menu, (**-**) for Set Bin Height Menu, and (Enter) to return to the Main Menu. The Unit Menu is accessed by press the (**+**) key. This reveals two options, (**+**) for English (feet) and (**-**) for Metric (meters). A flashing cursor denotes the current selection. English (feet) is the default choice in this version of software. To return to the Setup Menu, press (**Enter**). Pressing the (-) from the Setup Menu accesses the Set Bin Height menu. In this menu, the user will first select the bin. This is done by pressing the (**+**) increment or (**-**) decrement keys. As the increment or decrement keys are pressed, the bin height for that bin is display on the LCD. This is an easy way to review the programmed bin height for any of the 30 bins. Edit or enter a new bin height for the selected bin by pressing the (**Enter**) key. The cursor is now located at the hundreds place of the bin height. The bin height can be programmed from 0 to 199.9 feet or meters.

> ***A word of caution***: This programmed bin height does not stop the bob from falling beyond this programmed bin height. For example, let's assume a vessel is 20 foot tall and is programmed in the SBC at 10 feet. When a measurement is activated, the bob actually travels 12 ft to the product. The LCD will display 12 feet to the product, a negative 2-ft of product, and a meaningless percentage. Therefore, it is recommended to program the bin height to the actual height of the vessel or to the limited length of cable in the SBR. It is important that the bob be limited from extending down a hopper and into an airlock, or screw conveyor. Please refer to the SBR manual for the specifics of limiting the cable length for your vessel.

Press the (**+**) increment or (**-**) decrement key, to select the value for the hundreds place. Pressing the (**Enter**) will move the cursor to the tens decimal place. Again increment or decrement to the desired value and press (**Enter**). Repeat the same process for the ones and tenths decimal places. Once the (**Enter**) key is pressed for the tenths place, a conformation message will appear, pressing the (**+**) key will save that value to the nonvolatile memory. The (**-**) key allows you to immediately edit the value if it was entered incorrectly. Once the height for that bin is accepted, a message "**Next Bin? (+/-)**" will appear. Press the (**+**) key if you want to enter another bin's height. If you do not desire to enter more bin heights, decline the option by pressing the (**-**) key and it will return you to the Setup Menu.

By pressing the (**Enter**) key at the Setup Menu you can return to the Main Menu. The other selection from the Main Menu is Measurement Mode. The Measurement Mode is selected by pressing the (**-**) key from the Main Menu.

Measurement Mode

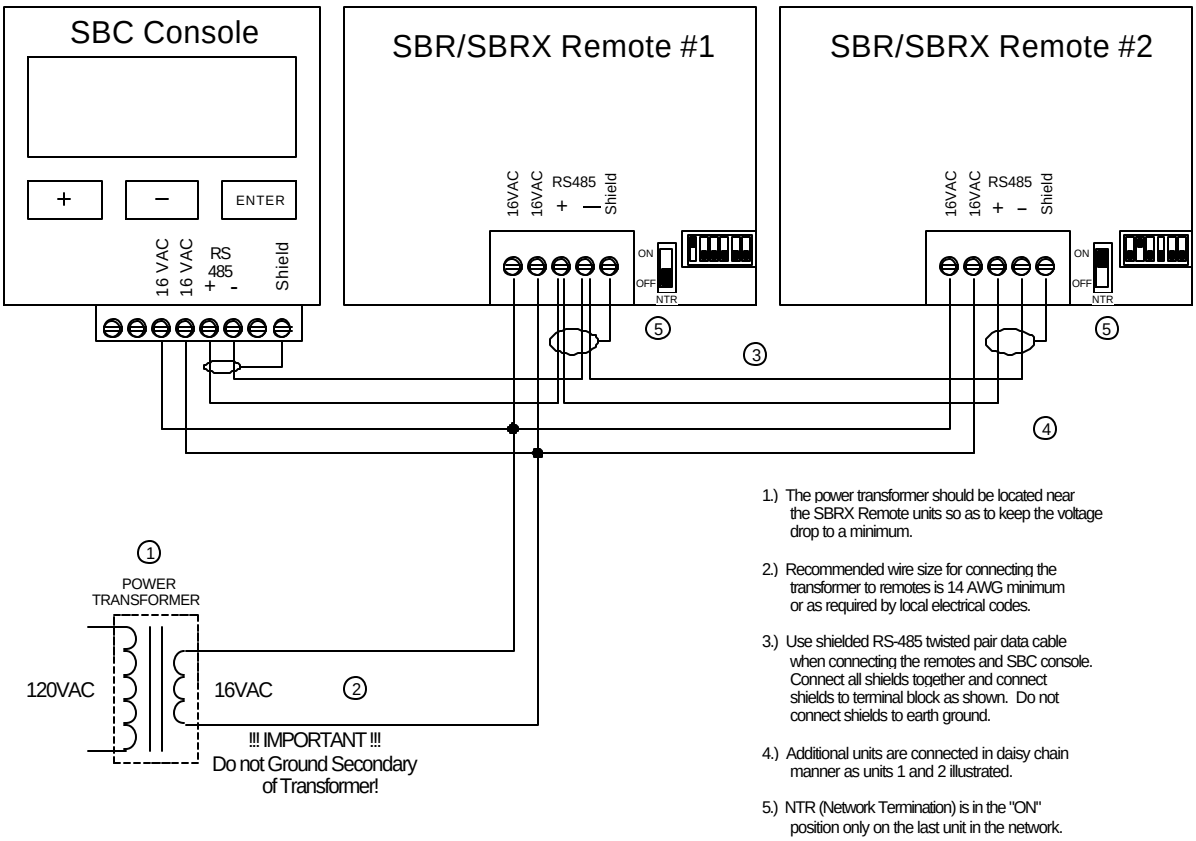
The Measurement Mode is used to select a bin to take a measurement or to review the last measurement on any bin. The selection of the bin number is made using the (**+**) increment and (**-**) decrement keys. The (**Enter**) will accept the bin to measure. While increasing and decreasing the bin number, the last measurement will be displayed on the third line of the LCD. The user can use this to review the last measurement of each bin. Remember that this information is only as accurate as the last time a measurement was taken. If the level of the product has changed, a new measurement must be taken for the information to be up to date. When the (**Enter**) key is pressed and a bin is selected, a conformation message will appear. Answering (**+**) yes will cause the SBR to take a measurement. Declining the conformation message will allow the user to select a different bin to measure. After a measurement cycle is completed, the last line of the LCD should state that the "Bob is retracted". At this point pressing any key will display the message "**Measure same bin? (+/-)**" If you answer yes, the same SBR will again take a measurement. If you answer no, the unit will ask you if you want to measure a different bin. If you confirm this, it will be ready to accept a new bin number to measure. If you answer no, it will return you to the Main Menu.

Error Messages and Measurement Override Feature

The SBR/SBRX remote sensors measures both the distance down to the product and the distance while retracting the cable. In doing this, the SBC console can compare these two measurements and decide if the bob was completely retracted or not. If an error message stating "**Bob is STUCK**" is displayed, this means the bob did not retract completely. Another measurement cycle would attempt to free the bob, but it may require some assistance to be freed. It is recommended that action be taken as soon as possible before a significant amount of product is piled on the bob. If the user has some concern about burying the bob, the SBR/SBRX remote has a feature to disable measurements during a filling cycle. Please refer to the SBR manual for further discussion of the Measurement Override Feature. If this feature is implemented and someone attempts to measure during a filling cycle, the LCD will display '**Measurement Override - Process is Filling - Press any key**"

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SBC Interconnect Wiring Diagram



1.) The power transformer should be located near the SBRX Remote units so as to keep the voltage drop to a minimum.

2.) Recommended wire size for connecting the transformer to remotes is 14 AWG minimum or as required by local electrical codes.

3.) Use shielded RS-485 twisted pair data cable when connecting the remotes and SBC console. Connect all shields together and connect shields to terminal block as shown. Do not connect shields to earth ground.

4.) Additional units are connected in daisy chain manner as units 1 and 2 illustrated.

5.) NTR (Network Termination) is in the "ON" position only on the last unit in the network.

FIGURE 1