

BMS Output Interface

Introduction

The Building Management System output option for your controller provides a local BMS/PLC/SCADA system with 4-20mA signals proportional to measured values along with ON/OFF, clean contact relays for Alarm, Flow and the status of all output relays.

Connections

All connections for BMS outputs are made via the BMS Connector Board, cabled through spare glands in the base of the enclosure. The BMS Connector Board provides clear labeling of all 4-20mA and relay status outputs. The configuration of the event outputs is discussed below.

4-20mA Outputs

The BMS output option is available in 4 or 8 channel configurations (8 channel KPI only), with 4-20mA signals proportional to Temperature, Conductivity, pH and ORP, along with umPY + PIT on two metals for KPI series controllers.

It is recommended that a **250 Ohm** sense resistor is used at the BMS end of the connection for each 4-20mA input – providing the BMS a **1-5 volt DC input** across the range of measurement.



Note: In cases where the BMS requires a 2-10 volt analog input (500 Ohm sense resistor), the 4-20mA output may only be accurate up 95% of the maximum scale.

Event Outputs

Both the 4 and 8 channel BMS options provide for ON/OFF, clean contact switching for the current status of Alarm, Flow and all available relay outputs. Relay numbering is consistent within each family of controllers, but dynamic across the full range, so relay numbers may change depending on your software configuration.

The relay numbering for each software configuration is easily obtained by running the **Test Outputs** routine. To enter the Test Outputs routine, press and hold the **READ** key for 5 seconds. Now press the **ENTER** key to move the cursor to the MAN/AUTO selection. Press the **DOWN** arrow key to select AUTO Test outputs operation. The controller will now cycle the output relays from REL1 through all available relays for 5 seconds each. As each output turns ON, the module and relay number are displayed in the Test Outputs window as follows:

Line 3: **RL1 – pH ON (5)**

Flow and Alarm relays are common across all controllers and are clearly labeled on the BMS Connector Board.



The COMMON of each Event Output relay can be supplied by a USER signal (+5, +12, etc, from BMS into RLY(S) COM) or use an internal +12 volt DC signal from the controller(for isolated inputs). This selection is made by placing the jumper on **JP2** to either **+12V** or **RLYS COMM**.

The jumpers on JP1 are connecting each Event Output relay COMMON to the supply selected with JP2 (to save on external wiring – in most cases a common supply is sufficient). By removing these

jumpers the user can choose to individually wire each relay, providing true clean contact switching for all outputs.

Conversions

Each 1 - 5 volt DC analog input will need to be converted back into its appropriate unit of measurement. Conversions for each input are as follows:

Parameter	Conversion	Units
Temperature (0 – 100)	= ((value) - 1) / 4 * 100	С
Conductivity (0 – 10)	= ((value) - 1) / 4 * 10	mS/cm
ORP (0 – 1000)	= ((value) - 1) / 4 * 1000	mV
pH (0 – 14)	= ((value) - 1) / 4 * 14	рН
Corrosion		
umPY1 (0 – 100)	= ((value) - 1) / 4 * 100	umPY
PIT1 (0 – 100)	= ((value) - 1) / 4 * 100	PIT
umPY2 (0 – 100)	= ((value) - 1) / 4 * 100	umPY
PIT2 (0 – 100)	= ((value) - 1) / 4 * 100	PIT

Note: (value) = DC volts @ input

Example: pH = ((4) - 1) / 4 * 14= (3) / 4 * 14 = 0.75 * 14 = 10.50 pH

Testing

Once all connections have been made and all conversions entered into the BMS, the BMS interface must be verified.

For all analog inputs the reading on your BMS display should be within 1% of the reading displayed in the data display window on the controller. If the BMS allows, these readings can be calibrated to more accurately represent the controllers' reading.

If one or more readings is out of tolerance or cannot be calibrated check your conversions and record voltages at the input. If the voltage is OK the problem is most likely in the conversion. If the voltage is not OK, check the sense resistor value and all cabling. LED's L1 thru 8, on the 4-20 Interface Board, illuminate to highlight open circuit or high resistance current loops.

For testing of Event Outputs, run the Test Outputs routine whilst watching the BMS display. You should see each relay output cycle ON for 5 seconds them OFF. Turn Flow ON and OFF and watch for the flow indication at the BMS. Set an Alarm in the controller (remove sensor, alter SET point etc) and look for an Alarm indication at the BMS.

4 – 20 mA connection diagram and instruction

1. Introduction

The 4-20 mA interface for Aquarius controllers comes equipped with push terminal sockets for easy connection to cables. The interface offers both 4-20mA outputs for ORP, pH, Conductivity and Temperature for standard controller range and Corrosion for KPI range as well as alarm contacts.

2. Connection diagram

Below is a diagram of connections for the interface. The 4-20mA connection return GND are either side of the signal output terminals and are common.

The relay alarm contacts can be configured in various ways. Each relay output can be independent, common ground or +12V signal. JP1 and JP2 configures these options as follows.

JP1 Jumper on – Common Ground (Default)

JP1 Jumper off – Isolated signal

JP2 Jumper on centre and relay common – Common relay signal from external source connected to RLY (S) COM (Default)

JP2 Jumper on centre and +12V – Connects 4-20mA +12Vdc to relay common.

