

Introduction

BECSys5, BECSysBW and BECSys7 controllers optionally support a MODBUS TCP/IP interface to 3rd party applications. Typical examples include Building Management Systems (BMS), Energy Management Systems (EMS), Building Automation and Control (BAC) systems, or Supervisor Control and Data Acquisition (SCADA) systems. Throughout the

rest of this document, the general term BMS will be used to refer to all of these systems, and any other 3rd party system that is to interface with BECSys controllers. This guide provides the detailed information needed for a developer to

implement a MODBUS interface from a BMS to these BECSys controllers.

Physical Connection

The BECSys MODBUS interface connects over standard 10BaseT or 100BaseT Ethernet networks through an optional MODBUS Ethernet board (part numbers listed in the Specifications section at end of this document). A complete description of Ethernet connection requirements may be found in the “Ethernet Application Note”, ENG-4604-DOC.

MODBUS Interface Details

Through the MODBUS interface to BECSys controllers, a large number of parameters can be accessed. Not only can Inputs (Readings) be monitored, but also System Information, Set Points, Alarm Points, Control Status and Alarms. In addition, most Set Points and Alarm Points can be modified from the BMS through the MODBUS TCP/IP interface.

BECSys controllers contain built-in logic that prevents invalid parameter settings. If an attempt is made to change a parameter to an invalid value, the controller will not accept the invalid value. For example, if an attempt is made to change a Set Point to a value greater than the corresponding High Alarm Point (or lower than the Low Alarm Point), the change will not take effect. This is because BECSys controllers require the Set Point to remain within the boundaries defined by the corresponding Low and High Alarm Points. Unfortunately, MODBUS has no provision for signaling back to the BMS the reason the change was rejected.

When interfacing via MODBUS TCP/IP, internal data logs are not retrievable since the MODBUS protocol includes no support for data log downloads. Therefore, it is the responsibility of the BMS to monitor status and maintain historical information, if so desired. (Data logs are still maintained on the BECSys controller, and can be downloaded by BECSys for Windows if desired.)

The MODBUS protocol does not support any password protection features. Responsibility for security/password protection rests with the BMS.

BECSys controllers with the MODBUS TCP/IP interface can still be accessed by BECSys for Windows, either through the same Ethernet connection or via optional 56k data/fax modem. Up to 2 simultaneous BECSys for Windows connections are supported concurrently with a MODBUS TCP/IP connection.

Only a single MODBUS TCP/IP connection can be active at any given time. If a second MODBUS connection is established, the first connection will be terminated. The purpose for this is to assure communication recovery after a broken connection between the BMS and the BECSys controller. In such cases, the BMS merely needs to establish a new connection to the BECSys controller to resume communication.

The tables that follow detail the specific codes, data formats, and interpretation of the parameters available to the BMS via the MODBUS TCP/IP connection. In general, sections referred to as “Monitoring” include inputs or readings with corresponding Alarm Points and Alarm status. Sections referred to as “Control” include control settings, status and alarms. Most controls are based upon a reading, and grouped immediately thereafter.

Note that while all parameters are accessible, only those that are configured on the controller will have meaningful values. For example, the Flow Rate Reading (code 0x200F) is an input collected from a system flow rate sensor connected to the controller. If a flow rate sensor is not connected to the controller, this parameter will not return meaningful information. It is up to the application developer to know (or determine) what features are implemented and configured in the BECSys controller being accessed.

Where multiple Units or Formats are listed, the value returned will be formatted according to the selection made in the controller. For example, if the controller is configured to represent temperature in °F, the Temperature input (code 0x2003)



returned will be in °F. Again, it is up to the application developer to know (or determine) the configuration of the BECSys controller being accessed.

NOTE: For all MODBUS TCP/IP messages, the Unit Identifier field must be set to a value of 0xFF, per the “MODBUS Messaging on TCP/IP Implementation Guide.”

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| --- | --- | --- | --- | --- | --- | --- | --- |
| System Information | MODBUS code | | RW | Cmds | Size | Format | Interpretation and/or Units |
| Hex | Dec |
| 7 digit product number - upper 16 bits | 0x0001 | 1 | R | 3,4 | 16 bit | 32 bit unsigned integer | BECSys5(115VAC)=1100167, BECSys5(230VAC)=1100216, BECSysBW=1100214, BECSys7=1100177 |
| 7 digit product number - lower 16 bits | 0x0002 | 2 | R | 3,4 | 16 bit |
| 6 digit serial number - upper 16 bits | 0x0003 | 3 | R | 3,4 | 16 bit | 32 bit unsigned integer | Example: 002239 |
| 6 digit serial number - lower 16 bits | 0x0004 | 4 | R | 3,4 | 16 bit |
| Firmware Version | 0x0005 | 5 | R | 3,4 | 16 bit | unsigned, 2 implied decimals | Example: v2.37 |
| System Date | 0x0006 | 6 | RW | 3,4,6,16 | 16 bit | unsigned integer | days since 2000-1-1 |
| System Time | 0x0007 | 7 | RW | 3,4,6,16 | 16 bit | unsigned integer | minutes |
| System Reset Date | 0x0008 | 8 | R | 3,4 | 16 bit | unsigned integer | days since 2000-1-1 |
| System Reset Time | 0x0009 | 9 | R | 3,4 | 16 bit | unsigned integer | minutes |
| Low Battery | 0x3320 | 13088 | R | 2 | 1 bit |  | 1=battery low; 0=battery ok |
| General Alarm | 0x3001 | 12289 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Alarm Relay state | 0x310C | 12556 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |

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| Sample Stream Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Sample Stream Flow | 0x3000 | 12288 | R | 2 | 1 bit |  | 1=flow; 0=no flow |
| No Flow (Sample Stream) Alarm | 0x330A | 13066 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Flow restored, delaying feeds | 0x3325 | 13093 | R | 2 | 1 bit |  | 1=delay active; 0=delay not active |

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| pH Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| pH Reading | 0x2000 | 8192 | R | 3,4 | 16 bit | unsigned, 1 or 2 implied decimals |  |
| pH High Alarm Point | 0x2300 | 8960 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals |  |
| pH Low Alarm Point | 0x230E | 8974 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals |  |
| pH High Alarm | 0x3310 | 13072 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| pH Low Alarm | 0x3311 | 13073 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| pH Control | | | | | | |  |
| pH set point | 0x2200 | 8704 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals |  |
| pH Proportional Span | 0x2400 | 9216 | RW | 3,4,6,16 | 16 bit | unsigned, 1 implied decimal |  |
| pH Feed Down Relay state | 0x3100 | 12544 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| pH Feed Up Relay state | 0x3101 | 12545 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| pH feed down limit alarm | 0x3300 | 13056 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| pH feed up limit alarm | 0x3327 | 13095 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |



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| ORP Monitoring | | | MODBUS code | | | | | | RW | | | Cmds | | | Size | | | Format | | Interpretation/Units | |
| Hex | | | Dec | | |
| ORP reading | | | 0x2001 | | | 8193 | | | R | | | 3,4 | | | 16 bit | | | signed integer | | mV | |
| ORP High Alarm Point | | | 0x2301 | | | 8961 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| ORP Low Alarm Point | | | 0x230F | | | 8975 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| ORP High alarm | | | 0x3312 | | | 13074 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
| ORP Low alarm | | | 0x3313 | | | 13075 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
| Free Chlorine Monitoring | | | | | | | | | | | | | | | | | | | |  | |
| Free Cl reading | | | 0x2004 | | | 8196 | | | R | | | 3,4 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Free Cl High Alarm Point | | | 0x2304 | | | 8964 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Free Cl Low Alarm Point | | | 0x2312 | | | 8978 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Free Cl High alarm | | | 0x3314 | | | 13076 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
| Free Cl Low alarm | | | 0x3315 | | | 13077 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
| Main Sanitizer Control; based upon ORP, Free Cl, or both (bracketed) readings | | | | | | | | | | | | | | | | | | | |  | |
| ORP set point | | | 0x2201 | | | 8705 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| ORP Proportional Span | | | 0x2401 | | | 9217 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned integer | | mV | |
| Alternate ORP set point | | | 0x2202 | | | 8706 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| Bracketed ORP High set point | | | 0x2216 | | | 8726 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| Bracketed ORP Low set point | | | 0x2217 | | | 8727 | | | RW | | | 3,4,6,16 | | | 16 bit | | | signed integer | | mV | |
| Free Cl set point | | | 0x2205 | | | 8709 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Free Cl Proportional Span | | | 0x2402 | | | 9218 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Alternate Free Cl set point | | | 0x2206 | | | 8710 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Bracketed Free Cl High set point | | | 0x2218 | | | 8728 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Bracketed Free Cl Low set point | | | 0x2219 | | | 8729 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | ppm | |
| Cl Feed Relay state | | | 0x3102 | | | 12546 | | | R | | | 2 | | | 1 bit | | |  | | 1=relay active; 0=relay inactive | |
| Cl limit alarm | | | 0x3301 | | | 13057 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
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| Total Chlorine Monitoring | MODBUS code | | | | | | RW | | | Cmds | | | Size | | | Format | | | Interpretation/Units | |  |
| Hex | | | Dec | | |
| Total Cl reading | 0x200D | | | 8205 | | | R | | | 3,4 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| Total Cl High Alarm Point | 0x230C | | | 8972 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| Total Cl Low Alarm Point | 0x231B | | | 8987 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| Total Cl High alarm | 0x333B | | | 13115 | | | R | | | 2 | | | 1 bit | | |  | | | 1=alarm active; 0=alarm not active | |
| Total Cl Low alarm | 0x333C | | | 13116 | | | R | | | 2 | | | 1 bit | | |  | | | 1=alarm active; 0=alarm not active | |
| Combined Chlorine Monitoring | | | | | | | | | | | | | | | | | | |  | |
| Combined Cl reading | 0x2012 | | | 8210 | | | R | | | 3,4 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| Combined Cl High Alarm Point | 0x2305 | | | 8965 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| Combined Cl High alarm | 0x333D | | | 13117 | | | R | | | 2 | | | 1 bit | | |  | | | 1=alarm active; 0=alarm not active | |
| UV Control | | | | | | | | | | | | | | | | | | |  | |
| UV Combined Cl set point | 0x2215 | | | 8725 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 or 2 implied decimals | | | ppm | |
| UV Turndown Relay state | 0x3126 | | | 12582 | | | R | | | 2 | | | 1 bit | | |  | | | 1=relay active; 0=relay inactive | |
| Flow Rate Monitoring | | MODBUS code | | | | | | RW | | | Cmds | | | Size | | | Format | | Interpretation/Units | |
| Hex | | | Dec | | |
| Flow Rate reading | | 0x200F | | | 8207 | | | R | | | 3,4 | | | 16 bit | | | unsigned, 1 implied decimal | | gpm | |
| unsigned, 1 implied decimal | | lpm | |
| unsigned, 2 implied decimals | | kgpm | |
| unsigned, 2 implied decimals | | klpm | |
| Flow Rate Low Alarm Point | | 0x231E | | | 8990 | | | RW | | | 3,4,6,16 | | | 16 bit | | | unsigned, 1 implied decimal | | gpm | |
| unsigned, 1 implied decimal | | lpm | |
| unsigned, 2 implied decimals | | kgpm | |
| unsigned, 2 implied decimals | | klpm | |
| Low Flow alarm | | 0x3324 | | | 13092 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |
| Recirculation Pump Status | | | | | | | | | | | | | | | | | | |  | |
| Recirculation Relay state | | 0x3104 | | | 12548 | | | R | | | 2 | | | 1 bit | | |  | | 1=relay active; 0=relay inactive | |
| VFD Control | | | | | | | | | | | | | | | | | | |  | |
| VFD % output | | 0x2100 | | | 8448 | | | R | | | 3,4 | | | 16 bit | | | unsigned with 1 implied decimal | | % | |
| VFD Out of Range alarm | | 0x3332 | | | 13106 | | | R | | | 2 | | | 1 bit | | |  | | 1=alarm active; 0=alarm not active | |



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| SuperChlor/DeChlor Control | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| SuperChlor ORP set point | 0x220F | 8719 | RW | 3,4,6,16 | 16 bit | signed integer | mV |
| SuperChlor Free Cl set point | 0x2210 | 8720 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals | ppm |
| SuperChlor Relay state | 0x3109 | 12553 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| SuperChlor Timeout | 0x3322 | 13090 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| DeChlor ORP set point | 0x2211 | 8721 | RW | 3,4,6,16 | 16 bit | signed integer | mV |
| DeChlor Free Cl set point | 0x2212 | 8722 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals | ppm |
| DeChlor Relay state | 0x310A | 12554 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| DeChlor limit alarm | 0x332F | 13103 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Booster Sanitizer Control | | | | | | |  |
| Cl Booster ORP Trigger set point | 0x2209 | 8713 | RW | 3,4,6,16 | 16 bit | signed integer | mV |
| Cl Booster ORP set point | 0x220B | 8715 | RW | 3,4,6,16 | 16 bit | signed integer | mV |
| Cl Booster Free Cl Trigger set pnt | 0x220A | 8714 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals | ppm |
| Cl Booster Free Cl set point | 0x220C | 8716 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals | ppm |
| Cl Booster Relay state | 0x3103 | 12547 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Cl Booster limit alarm | 0x3337 | 13111 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Ozone Control | | | | | | |  |
| Ozone ORP set point | 0x220D | 8717 | RW | 3,4,6,16 | 16 bit | signed integer | mV |
| Ozone Free Cl set point | 0x220E | 8718 | RW | 3,4,6,16 | 16 bit | unsigned, 1 or 2 implied decimals | ppm |
| Ozone limit alarm | 0x3338 | 13112 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Ozone Relay state | 0x310B | 12555 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |

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| Conductivity Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Conductivity reading | 0x2002 | 8194 | R | 3,4 | 16 bit | unsigned integer | µmohs (conductivity) |
| unsigned integer | ppm (tds) |
| Conductivity High alarm | 0x3316 | 13078 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Conductivity Low alarm | 0x3317 | 13079 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Conductivity High Alarm Point | 0x2302 | 8962 | RW | 3,4,6,16 | 16 bit | unsigned integer | µmohs (conductivity) |
| unsigned integer | ppm (tds) |
| Conductivity Low Alarm Point | 0x2310 | 8976 | RW | 3,4,6,16 | 16 bit | unsigned integer | µmohs (conductivity) |
| unsigned integer | ppm (tds) |
| TDS Control | | | | | | |  |
| TDS set point | 0x221A | 8730 | R | 3,4 | 16 bit | unsigned integer | ppm (tds) |
| TDS Relay state | 0x3125 | 12581 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| TDS limit alarm | 0x3328 | 13096 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |

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| Temperature Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Temperature reading | 0x2003 | 8195 | R | 3,4 | 16 bit | unsigned integer | °F |
| unsigned integer | °C |
| Temperature High Alarm Point | 0x2303 | 8963 | RW | 3,4,6,16 | 16 bit | unsigned integer | °F |
| unsigned integer | °C |
| Temperature Low Alarm Point | 0x2311 | 8977 | RW | 3,4,6,16 | 16 bit | unsigned integer | °F |
| unsigned integer | °C |
| Temperature High alarm | 0x3318 | 13080 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Temperature Low alarm | 0x3319 | 13081 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Heater Control | | | | | | |  |
| Heater set point | 0x2203 | 8707 | RW | 3,4,6,16 | 16 bit | unsigned integer | °F |
| unsigned integer | °C |
| Alternate Heater set point | 0x2204 | 8708 | RW | 3,4,6,16 | 16 bit | unsigned integer | °F |
| unsigned integer | °C |
| Heater Relay state | 0x3105 | 12549 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Heater limit alarm | 0x3302 | 13058 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |



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| Liquid Chemical Inventory Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| pH Inventory Level reading | 0x2005 | 8197 | R | 3,4 | 16 bit | unsigned, 1 implied decimal | feet |
| unsigned, 1 implied decimal | meters |
| pH Inventory Level Low Alarm Point | 0x2313 | 8979 | RW | 3,4,6,16 | 16 bit | unsigned, 1 implied decimal | feet |
| unsigned, 1 implied decimal | meters |
| pH Inventory Low Alarm | 0x330C | 13068 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Cl Inventory Level reading | 0x2006 | 8198 | R | 3,4 | 16 bit | unsigned, 1 implied decimal | feet |
| unsigned, 1 implied decimal | meters |
| Cl Inventory Level Low Alarm Point | 0x2314 | 8980 | RW | 3,4,6,16 | 16 bit | unsigned, 1 implied decimal | feet |
| unsigned, 1 implied decimal | meters |
| Cl Inventory Low Alarm | 0x330D | 13069 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |

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| Turbidity Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Turbidity reading | 0x2007 | 8199 | R | 3,4 | 16 bit | unsigned, 2 implied decimals | NTUs |
| Turbidity High Alarm Point | 0x2306 | 8966 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | NTUs |
| Turbidity High alarm | 0x330B | 13067 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Polymer Control | | | | | | |  |
| Polymer High set point | 0x2207 | 8711 | R | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | NTUs |
| Polymer Low set point | 0x2208 | 8712 | R | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | NTUs |
| Polymer Feed Relay state | 0x3107 | 12551 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |

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| Surge Pit Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Surge Pit Level reading | 0x2008 | 8200 | R | 3,4 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Surge Pit High Alarm Point | 0x2307 | 8967 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Surge Pit Low Alarm Point | 0x2316 | 8982 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Surge Pit High alarm | 0x330E | 13070 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Surge Pit Low alarm | 0x330F | 13071 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Low Surge Pit EMERG OFF | 0x3308 | 13064 | R | 2 | 1 bit |  | 1=EMERGENCY OFF triggered;  manual restart required |
| Autofill Control | | | | | | |  |
| Autofill set point | 0x2213 | 8723 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Alternate Autofill set point | 0x2214 | 8724 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Autofill Relay state | 0x3124 | 12580 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Autofill limit alarm | 0x3323 | 13091 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Autofill limit alarm | 0x3323 | 13091 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |



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| Filter Influent Pressure Monitoring | MODBUS | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Filter Influent Pressure reading | 0x200A | 8202 | R | 3,4 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Filter Influent Pressure High Alarm Point | 0x2309 | 8969 | RW | 3,4,6,16 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Filter Influent Pressure Low Alarm Point | 0x2318 | 8984 | RW | 3,4,6,16 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Filter Influent Pressure High alarm | 0x331A | 13082 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Filter Influent Pressure Low alarm | 0x331B | 13083 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Filter Effluent Pressure Monitoring | | | | | | |  |
| Filter Effluent Pressure reading | 0x200B | 8203 | R | 3,4 | 16 bit | unsigned integer | PSI |
| unsigned integer | Kpa |
| Filter Effluent Pressure High Alarm  Point | 0x230A | 8970 | RW | 3,4,6,16 | 16 bit | unsigned integer | PSI |
| unsigned integer | Kpa |
| Filter Effluent Pressure Low Alarm Point | 0x2319 | 8985 | RW | 3,4,6,16 | 16 bit | unsigned integer | PSI |
| unsigned integer | Kpa |
| Filter Effluent Pressure High alarm | 0x331C | 13084 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Filter Effluent Pressure Low alarm | 0x331D | 13085 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Filter Differential Pressure Monitoring | | | | | | |  |
| Filter Differential Pressure reading | 0x2010 | 8208 | R | 3,4 | 16 bit | unsigned integer | PSI |
| unsigned integer | Kpa |
| Filter Differential Pressure High Alarm Po | 0x231D | 8989 | RW | 3,4,6,16 | 16 bit | unsigned integer | PSI |
| unsigned integer | Kpa |
| Filter Diff High alarm | 0x331E | 13086 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Strainer Monitoring | | | | | | |  |
| Strainer Out Vacuum reading | 0x200C | 8204 | R | 3,4 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Strainer Vacuum High Warning Point | 0x230B | 8971 | RW | 3,4,6,16 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Strainer Vacuum High Alarm Point | 0x231A | 8986 | RW | 3,4,6,16 | 16 bit | signed, 1 implied decimal | inches of mercury |
| signed, 1 implied decimal | cm of mercury |
| signed integer | PSI |
| signed integer | Kpa |
| Strainer Vacuum High Warning | 0x3339 | 13113 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Strainer Vacuum High Alarm | 0x331F | 13087 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| High Strainer Vacuum EMERG OFF | 0x3309 | 13065 | R | 2 | 1 bit | 1=EMERGENCY OFF triggered; manual restart required | |
| Pump Effluent Pressure Monitoring | | | | | | |  |
| Pump Effluent pressure reading | 0x200E | 8206 | R | 3,4 | 16 bit | signed integer | PSI |
| signed integer | Kpa |
| Pump Effluent Pressure High Alarm Poin | 0x230D | 8973 | RW | 3,4,6,16 | 16 bit | signed integer | PSI |
| signed integer | Kpa |
| Pump Effluent Pressure Low Alarm Point | 0x231C | 8988 | RW | 3,4,6,16 | 16 bit | signed integer | PSI |
| signed integer | Kpa |
| Pump Effluent Pressure High alarm | 0x333E | 13118 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Pump Effluent Pressure Low alarm | 0x333F | 13119 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Total Dynamic Head Monitoring | | | | | | |  |
| Total Dynamic Head reading | 0x2011 | 8209 | R | 3,4 | 16 bit | unsigned, 1 implied decimal |  |
| Total Dynamic Head High Alarm Point | 0x231F | 8991 | RW | 3,4,6,16 | 16 bit | unsigned, 1 implied decimal |  |
| Total Dynamic Head Low Alarm Point | 0x2320 | 8992 | RW | 3,4,6,16 | 16 bit | unsigned, 1 implied decimal |  |
| High Total Dynamic Head Alarm | 0x3330 | 13104 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Low Total Dynamic Head Alarm | 0x3331 | 13105 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |



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| Backwash Control Status | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| BW isolate Relay state | 0x310D | 12557 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 1 Relay state | 0x310E | 12558 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 2 Relay state | 0x310F | 12559 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 3 Relay state | 0x3110 | 12560 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 4 Relay state | 0x3111 | 12561 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 5 Relay state | 0x3112 | 12562 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 6 Relay state | 0x3113 | 12563 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 7 Relay state | 0x3114 | 12564 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 8 Relay state | 0x3115 | 12565 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 9 Relay state | 0x3116 | 12566 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 10 Relay state | 0x3117 | 12567 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 11 Relay state | 0x3118 | 12568 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 12 Relay state | 0x3119 | 12569 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 13 Relay state | 0x311A | 12570 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 14 Relay state | 0x311B | 12571 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 15 Relay state | 0x311C | 12572 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Filter 16 Relay state | 0x311D | 12573 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Pri Valve Relay state | 0x311E | 12574 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW Turbidity Valve Relay state | 0x311F | 12575 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW 2nd isolate Relay state | 0x3120 | 12576 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW 3rd isolate Relay state | 0x3121 | 12577 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| BW 4th isolate Relay state | 0x3122 | 12578 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Backwash Accessory Relay state | 0x3123 | 12579 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Low Valve Pressure EMERG OFF | 0x332D | 13101 | R | 2 | 1 bit |  | 1=EMERGENCY OFF triggered;  manual restart required |
| Low Valve Pressure | 0x332E | 13102 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| BW Freq limit alarm | 0x3303 | 13059 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Backwash alarm: Dur limit alarm | 0x3305 | 13061 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Backwash alarm: Valve limit alarm | 0x3306 | 13062 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| BW Valve limit alarm EMERG OFF | 0x3307 | 13063 | R | 2 | 1 bit |  | 1=EMERGENCY OFF triggered;  manual restart required |
| Backwash Pit Monitoring | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Backwash Pit Level reading | 0x2009 | 8201 | R | 3,4 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Backwash Pit High Alarm Point | 0x2308 | 8968 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| Backwash Pit Low Alarm Point | 0x2317 | 8983 | RW | 3,4,6,16 | 16 bit | unsigned, 2 implied decimals | feet |
| unsigned, 2 implied decimals | meters |
| High BW Pit alarm | 0x3321 | 13089 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| BW Pit limit alarm | 0x3329 | 13097 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |

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| Other Control Functions | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Enzyme Relay state | 0x3106 | 12550 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |
| Sensor Wash Relay state | 0x3108 | 12552 | R | 2 | 1 bit |  | 1=relay active; 0=relay inactive |



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| Communications Timeout Alarms | MODBUS code | | RW | Cmds | Size | Format | Interpretation/Units |
| Hex | Dec |
| Backwash Master Comm Timeout | 0x3333 | 13107 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Backwashing Slave Comm Timeout | 0x3334 | 13108 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Linked BECSys5/BW Comm Timout | 0x3336 | 13110 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Relay Exp 1 Comm Timeout | 0x332A | 13098 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Relay Exp 2 Comm Timeout | 0x332B | 13099 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |
| Relay Exp 3 Comm Timeout | 0x332C | 13100 | R | 2 | 1 bit |  | 1=alarm active; 0=alarm not active |

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| Specifications | |
| Part Numbers | |
| Ethernet board with MODBUS TCP/IP and BECSys for Windows protocols | 1200612 |
| Ethernet+Fax/Data Modem board with MODBUS TCP/IP and BECSys for Windows protocols | 1200613 |
| Firmware requirement | |
| BECSys controller firmware version | v1.40 or higher |

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| Related Documents | | |
| Reference Information | Format(s) | Document # |
| BECSys BMS Application Note | .pdf | ENG-5508-DOC |
| BECSys5 Data Sheet | .pdf | ENG-4262-DOC |
| BECSys5 Installation & Technical Manual | .pdf | 8620013 |
| BECSys7 Data Sheet | .pdf | ENG-4263-DOC |
| BECSys7 Installation & Technical Manual | .pdf | 8620015 |
| BECSysBW Data Sheet | .pdf | ENG-4264-DOC |
| BECSysBW Installation & Technical Manual | .pdf | 8620020 |
| BECSys for Windows Data Sheet | .pdf | ENG-4377-DOC |
| BECSys Ethernet Application Note | .pdf | ENG-4604-DOC |