# POWERSHIELD

# *PowerShield*
# Sentinel / B2000

---

## *Modbus Port 2 Interface Manual*

The information contained in this manual is copyright,
and is not to be reproduced without the written authority
of PowerShield Ltd

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
|---|---|---|---|---|---|
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006                                    Page 1 of 6

# *Contents*

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
|---|---|---|---|---|---|
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006                     Page 2 of 6

# 1 Introduction

This document describes the Sentinel/B2000 Modbus Port 2 Interface. This interface allows third party systems, such as SCADA systems, to access information from the Sentinel/B2000.

# 2 Physical Interface

The Modbus Port 2 interface is only accessible through Port 2 (external UART 2). This port can have either an RS232 or RS485 serial option module installed. With the RS232 option module it is possible to configure the interface to control the RTS signal so that RS232 to RS485 converters can be used. The RS485 option module provides a 2 wire half-duplex RS485 interface.

# 3 Protocol

The interface supports either Modbus ASCII or Modbus RTU at various standard Baud rates (see Configuration) and operates as a Modbus slave. The Modbus address can be configured. Note: Modbus RTU is not supported in versions 3.5.5 and earlier.

# 4 Available Information

The interface allows a third party system to read the following information form the Sentinel/B2000 –
- Register map revision number
- Sitename
- Software Version number
- Alarm status for all alarms and input alarms
- Alarm details for all active alarms
- Monoblock voltages
- String voltages
- String states (including whether a string is configured)
- Which monoblocks are in a string
- Current sensor reading for each string
- Temperature sensor reading for each string
- State of contact inputs

The interface allows a third party system to write to the Sentinel/B2000 to clear a particular alarm

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
| --- | --- | --- | --- | --- | --- |
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006        Page 3 of 6

# 5 Configuration

The following options can be configured (using PowerShield Configuration software) for the Modbus alarm interface
- Enable/disable Modbus port 2 interface. All messages will be ignored if the Modbus port 2 interface is disabled.
- Baud rate (select from 9600, 19200, 28800, 57600)
- Modbus address (1 to 254)
- Handshaking options (see below)

The parity, number of data bits and stop bits cannot be configured and is fixed at the following –
- No parity
- 8 data bits
- 1 stop bit

The following handshaking options are supported –
- Xon/Xoff
- RTS/CTS
- Half-duplex RS485 (RTS used to control the RS485 transmitter)

# 6 Functions Supported

The Modbus Port 2 interface uses a completely separate register space to the service port (i.e. the register space used by PowerShield Configuration software and Link to communicate with a Sentinel/B2000).

## 6.1 Register Map Revision Number

The revision number of the port 2 modbus register map can be read by reading the appropriate input status register. The revision number will be incremented when new modbus registers are added to this specification, allowing the modbus master to determine which registers are supported by the Sentinel/B2000.

## 6.2 Alarm Types
The alarm types are numbered as follows –

| Alarm Type | Description |
|---|---|
| 0 | Monoblock voltage alarm during Charge or Discharge |
| 1 | Monoblock voltage alarm when on Float |
| 2 | Temperature alarm |
| 3 | Current alarm during Charge |
| 4 | Current alarm during Discharge |
| 5 | Measurement module communications alarm |
| 6 | Current alarm when on Float |
| 7 | Not used |
| 8 | Slave monitor off-line |
| 9 | String voltage alarm during Charge or Discharge |
| 10 | String voltage alarm when on Float |
| 11 | String state change to Discharge |
| 12 | Monoblock voltage variation alarm |
| 13 | Logging memory invalid (format required) |
| 14 | Logging memory full |
| 15 | Logging memory nearly full |

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
|---|---|---|---|---|---|
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006                                             Page 4 of 6

| | |
|---|---|
| 16 | Long term logging memory full |
| 17 | Long term logging memory nearly full |
| 18 | Mains failure |
| 19 | String state change to Charge |
| 20 | String state change to Float |
| 21 | Automatic battery test failed to start |
| 22 | Automatic battery test overrun |
| 23 | Alarm notification failure |
| 24 | Not used |
| 25 | Not used |
| 26 | Not used |
| 27 | Not used |
| 28 | Not used |
| 29 | Not used |
| 30 | Not used |
| 31 | Not used |

## 6.3  Read Alarm Status

The status of all alarms (including input alarms) can be read by reading the appropriate discrete input register. An input ON ("1") indicates that the alarm is active, and input OFF ("0") indicates that the alarm is inactive.

## 6.4  Read and Clear Alarm Status

The status of the alarms can also be read by reading the alarm status holding registers (Function 03). A bit set to 1 indicates that the alarm is active, and a bit set to 0 indicates that the alarm is inactive.
Alarms can be cleared by writing to the holding registers (Function 06 or 16) and setting the bit to 1 for each alarm type that must be cleared. If the bit is set to 0 the alarm is not cleared.

## 6.5  Input Registers

The following data can be read by reading the appropriate input registers (Function 04):

- Site name
- Number of active alarms
- Software version number
- String voltages,
- String state (also indicates whether the string is configured)
- Monoblock voltages
- String current
- String temperature
- Alarm details for each alarm type

## 6.6  Contact Input Status

The state of all contact inputs in the system can be read by reading the appropriate discrete input (Function 02). This provides the open/closed state of the contact, regardless of whether the contact input is in an alarm state. The alarm state of the contact input can also be read (see 6.3).

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
|---|---|---|---|---|---|
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006    Page 5 of 6

# 7 Modbus Registers

Refer to the Excel spreadsheet, PowerShield part number *6300-050 Sentinel Modbus Port 2 Interface Register List.xls*, for the tables of Modbus registers.

# 8 Restrictions

## 8.1 Monoblock voltages

- It is not possible to read a block of input registers that overlaps with the monoblock voltage registers. When reading monoblock voltages all registers in the range read in a single Modbus request must be within the range 0060 (hex) to 055F (hex). For example, do not try to read 4 registers starting at 005E (hex) or 4 registers starting at 055E (hex).
- There is more processing involved in acquiring monoblock voltages and that processing may require communication with a slave Sentinel/B2000, so the response time will be slower, when reading monoblock voltages, than other register reads.
- The maximum number of monoblock voltages that can be read in a single request is 100. If more than 100 monoblock voltages registers are requested the Sentinel/B2000 will return an Illegal Data Address exception.

| name | Sentinel Modbus Port 2 Interface | 6300-49 | | rev | C |
|------|----------------------------------|---------|--|-----|---|
| filename | 6300-049C Sentinel Modbus Port 2 Interface.doc | date | 03/10/06 | | |

Copyright © PowerShield Ltd 2006      Page 6 of 6