MODBUS

GasPoint Expansion Module GP-MBUS4

Installation and Setup Instructions

"INNOVATORS IN GAS DETECTION"

BW Technologies

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Installation and Setup Instructions

Manufacturer's Notes and Warnings

1. Read and understand this manual before installation. Read and understand the BW GasPoint manual, including any Safety Warnings and Cautions contained in the manuals.
2. Installation of the BW GasPoint and MODBUS Module should be done by qualified personnel.

GENERAL DESCRIPTION Model No: GP-MBUS4

The BW GasPoint MODBUS Expansion Module, for the 12-bit version of the BW GasPoint, is an add-on optional card that allows the BW GasPoint to interface to a MODBUS system with a suitable controller (master device). The BW GasPoint MODBUS Expansion Module is fully compatible with BW GasPoint Monitors that have serial numbers with the preface "3-" and up (i.e., 3-000100 and up).

GasPoint MODBUS Expansion Module Specifications

- Communications Protocol: MODBUS RTU slave.
- Baud rates: 1200, 2400, 9600, 19200 bps field selectable. Word length: 8.
- Parity and stop bits: field selectable.
- Electrical interface RS 485; suitable for multi-drop applications.
- Reception and Transmission: Half Duplex (2 or 4 wire field selectable)*.
- Useable speed will depend on cable type and distance. See cable selection table.
- MODBUS addressable: 1-247.
- Number of devices on network: 32 (max).
- Supports MODBUS function codes: 3, 5, 6, and 7.
- Power Supply: Powered by BW GasPoint.
- Power Consumption: <70 mA @ 24 VDC.
- Cable: Screened twisted pair (See cable speed table).
  Characteristic Impedance: 100 to 150 ohms (120 typical).

MODBUS Data Registers: Read Only Registers

- Gas concentration (toxic gas in PPM v/v; combustible gas in % LEL; O_2 in % V/V)
- Operating mode (normal, calibrate, start up)
- Status (alarm, warning, fault, sensor error)
- Gas type (toxic gases such as CO, H_2S, etc., combustible gases, and O_2)
- Sensor software/firmware revision
- High alarm relay setting (latch/unlatch, normally energized/de-energized)
- Low alarm relay setting (latch/unlatch, normally energized/de-energized)
- Fault relay setting
- MODBUS address
- Baud rate

MODBUS Data Registers: Read/Write Data Registers

- High alarm setpoint
- Low alarm setpoint
- Reset latched alarms
- Remote relay contact trigger

*The 4 wire (separate receive and transmit pairs) is an option. MODBUS communications is always half duplex.

NOTE: It is recommended that the users familiarize themselves with the MODBUS specification document, Modicon PI-MBUS-300 Rev.J.

INSTALLATION

This section describes how to wire up the MODBUS Expansion Module to the BW GasPoint Transmitter.

Switch Configuration

There are three DIP switches on the BW GasPoint. These DIP switch settings are loaded only upon start up. If a change is required, please power down the unit. These changes should be performed only when unit is powered down.

1. Set the OPTION DIP Switches

The OPTION dipswitch configures the BAUD rate of the expansion module. The rates are set according to Table 1.

Table 1: Baud Rate

BAUD RATE	DIP Switch Positions	
	D1	D0
19200	Open	Open
9600	Close	Open
2400	Open	Close
1200	Close	Close

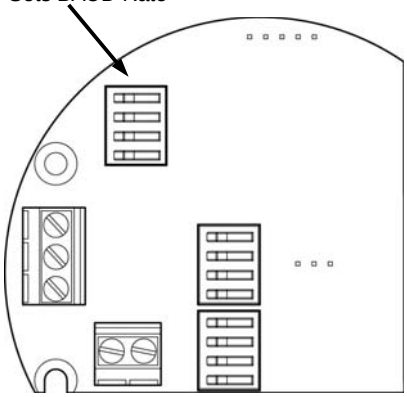
- set to 9600 as default

Table 2: Parity Configuration

PARITY CHECKING	DIP Switch Positions	
	D3	D2
No parity, one stop bit	Open	Open
Odd parity, one stop bit	Open	Close
Even parity, one stop bit	Close	Close

- set to even parity, one stop bit as default

OPTION:
Sets BAUD Rate



2. Set the Address DIP Switches

ADDRESS SWITCHES

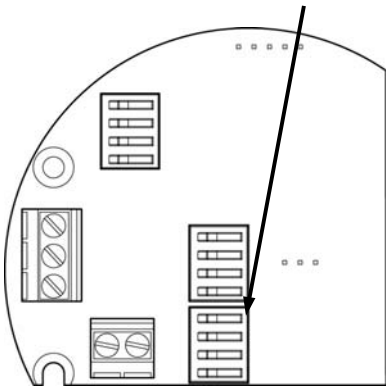
Switches A7, A6, A5, A4, A3, A2, A1, and A0 set the local address of the BW GasPoint. An address is selected by setting the binary equivalent of the address on the dip switches, where A0 is the least significant bit.

Table 3: Address Switches

Slave Address	Binary Equivalent	DIP Switch Positions - Open position indicates binary 0 - Close position indicates binary 1							
		A7	A6	A5	A4	A3	A2	A1	A0
01	00000001	Open	Open	Open	Open	Open	Open	Open	Close
02	00000010	Open	Open	Open	Open	Open	Open	Close	Open
03	00000011	Open	Open	Open	Open	Open	Open	Close	Close
04	00000100	Open	Open	Open	Open	Open	Close	Open	Open
05	00000101	Open	Open	Open	Open	Open	Close	Open	Close
06	00000110	Open	Open	Open	Open	Open	Close	Close	Open
07	00000111	Open	Open	Open	Open	Open	Close	Close	Close
08 .	00001000 .	Open .	Open .	Open .	Open .	Close .	Open .	Open .	Open .

- set to address 01 as default

Local Address:
Sets the device address



IMPORTANT NOTES:

Ensure each unit has its own unique address.

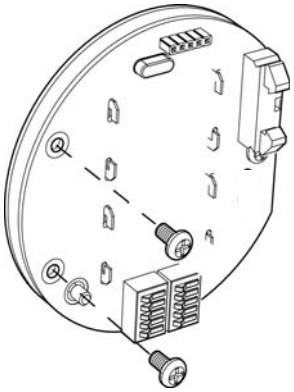
If an address equal to 0 or greater than 247 is set, the unit will default to 247.

WIRING

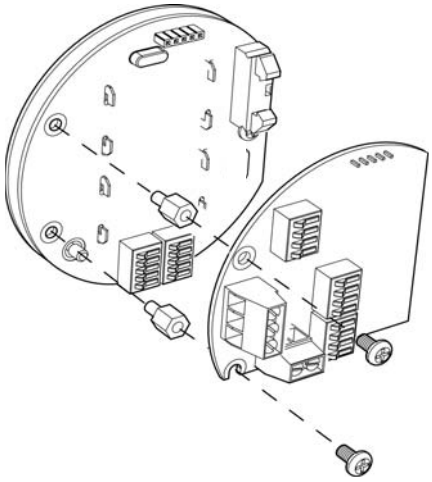
Installation

1. Remove the faceplate from the BW GasPoint Unit.
2. Remove the two screws from the BW GasPoint board array as indicated in A.
3. Remove the two standoffs from the MODBUS module and install in the positions indicated. Then secure the BW GasPoint expansion module as shown in B.

A.



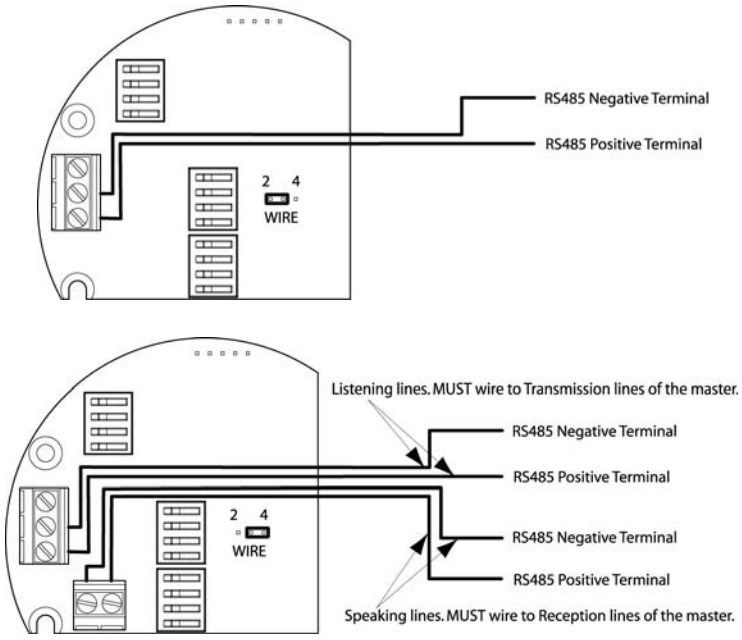
B.



Wiring

The BW GasPoint Expansion Module can be configured as a two-wire or a four-wire system.

Figure 1: Two and Four-Wire Systems



Note: 1. A termination resister might be needed if BW GasPoint is the last device in the network. Refer to page 5 for more information.
2. BW GasPoint Expansion Module is powered by the BW GasPoint directly - No extra power wiring is required. Refer to the BW GasPoint Manual for system wiring information.

A GUIDE TO CABLE SELECTION

The MODBUS Expansion Module for the BW GasPoint is an add-on optional card that allows the BW GasPoint to interface to a MODBUS network with a suitable controller (master device).

Table 4: Network Cable Types

Note: The information in this table is intended to be used as a guide only. Individual installations and environments may require alternative types or configurations. Contact your cable supplier for more information.

Belden No.	Characteristic[1] Impedance ohms	Approvals Standards	Cost	Pairs	Speed[2]	Distance (metres)	Core AWG	Diameter (mm)**	Shielding[3]
3076F	120	IEC61158-2	Med	1	High	<800	18	6.4	Med
3077F	120	IEC61158-2	Med	1	High	<500	22	5.0	Med
3078F	150	IEC61158-2	Med	1	High	<1200	22	9.5	Med
3079A	150	NEC	High	1	High Low	<1200 <2000	22	8.0	Good
9841	120	UL2919	High	1	High	<500	24	5.9	Good
9842	120	UL2919	Med	2	High	<500	24	8.6	Good
9860	100	UL2448	High	1	High	<1000	16	11.2	Good
3073F*	100	UL1277	High	1	High	<500	18	9.7	Good
3074F*	150	UL1277	High	1	High Low	<1200 <2000	18	11.4	Good
9207	100		Med	1	Low High	<500 <100	20	8.4	Good
9182	150	UL2666	Low	1	Low High	<1000 <200	22	8.9	Med
8162	100	UL2493	Med	2	High Low	<100 <300	24	8.7	Med
8132	120	UL2919	Low	2	Low	>100 <300	28	5.6	Good
9501	100 nominal	UL2464	V Low	1	Low	<100	24	4.0	Poor
9502	100 nominal	UL2464	V Low	2	Low	<100	24	5.6	Poor

Notes: Cable shield must be grounded.
A 2-pair cable or two 1-pair cables will be required for full duplex operation.
**May be run with power cables up to 600V. All other cables are low voltage types.*
***Overall diameter*
[1]The cable should be terminated at each end with a 1/2W resistor of the characteristic impedance in ohms (only 2 resistors per network, independent of the number of devices on the network).
[2]High speed=9600 and 19200 bps
[2]Low speed=2400 and 1200 bps
[3]Good shielding indicates suitability for harsh electrical environments.

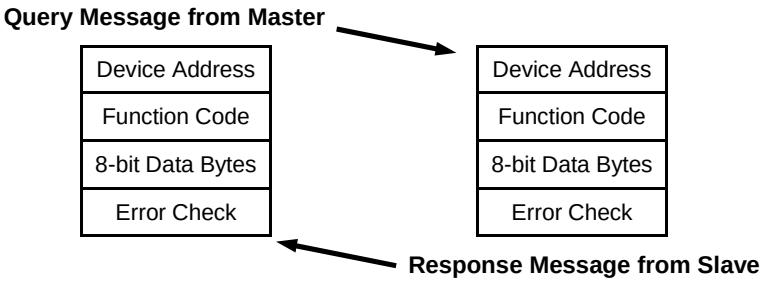
MODBUS PROTOCOL

Introducing MODBUS Protocol

MODBUS communication is based on a master–slave technique, in which only one device (the master) can initiate transactions (queries). The other devices (the slaves) respond by supplying the requested data to the master, or by taking the action requested in the query. The master can address individual slaves or can initiate a broadcast message to all slaves. Slaves return a message (a response) to queries that are addressed to them individually. Responses are not returned to broadcast queries from the master.

The MODBUS protocol establishes the format for the master's query by placing the device (or broadcast) address, a function code defining the requested action, any data to be sent and an error-checking field into the message. The slave's response message is also constructed using MODBUS protocol. The response contains fields confirming the action taken, any data to be returned and an error-checking field. If an error occurred in receipt of the message, or if the slave is unable to perform the requested action, the slave will construct an error message and send it as the response.

The Query–Response Cycle



The Query: The function code in the query tells the addressed slave device which kind of action to perform. The data bytes contain any additional information that the slave will need to perform the function. For example, function code 03 will query the slave to read holding registers and respond with their contents. The data field must contain the information telling the slave which register to start at and how many registers to read. The error check field provides a method for the slave to validate the integrity of the message contents.

The Response: If the slave makes a normal response, the function code in the response is an echo of the function code in the query. The data bytes contain the data collected by the slave, such as register values or status. If an error occurs, the function code is modified to indicate that the response is an error response, and the data bytes contain a code that describes the error. The error check field allows the master to confirm that the message contents are valid.

RTU MODBUS Message Framing

In RTU serial transmission mode, a MODBUS message is placed by the transmitting device into a frame that has a known beginning and ending point. This allows receiving devices to begin at the start of the message, read the address portion, determine which device is addressed (or all devices, if the message is broadcast) and know when the message is completed. Partial messages can be detected and errors can be set as a result.

In RTU mode, messages start with a silent interval of at least 3.5 character times. This is most easily implemented as a multiple of character times at the baud rate that is being used on a network (shown as T1-T2-T3-T4 in Table 5). The first field then transmitted is the device address.

The allowable characters transmitted for all fields are hexadecimal 0-9, A-F. Networked devices monitor the network bus continuously, including during the "silent" intervals. When the first field (the address field) is received, each device decodes it to determine if it is the addressed device.

Following the last transmitted character, a silent interval of at least 3.5 character times marks the end of the message. A new message can begin after this interval.

The entire message frame must be transmitted as a continuous stream. If a silent interval of more than 1.5 character times occurs before completion of the frame, the receiving device flushes the incomplete message and assumes that the next byte will be the address field of a new message.

Similarly, if a new message begins earlier than 3.5 character times following a previous message, the receiving device will consider it a continuation of the previous message. This will set an error, as the value in the final CRC field will not be valid for the combined messages. A typical message is shown below:

Table 5: RTU Message Frame

Start	Address	Function	Data	CRC Check	End
T1-T2-T3-T4	8 BITS	8 BITS	n x 8 BITS	16 BITS	T1-T2-T3-T4

The address field of a message frame contains eight bits (RTU). Valid slave devices are assigned addresses in the range of 1–247. A master addresses a slave by placing the slave address in the address field of the message. When the slave sends its response, it places its own address in the address field of the response to let the master know which slave is responding.

Address 0 is used for the broadcast address, which all slave devices recognize.

The function code field of a message frame contains eight bits (RTU). For the BW GasPoint, valid codes are 3, 5, 6, and 7.

When a message is sent from a master to a slave device, the function code field tells the slave what kind of action to perform. When the slave responds to the master, it uses the function code field to indicate either a normal (error-free) response or that some kind of error occurred (called an exception response). For a normal response, the slave simply echoes the original function code. For an exception response, the slave returns a code that is equivalent to the original function code with its most significant bit set to logic 1.

In addition to its modification of the function code for an exception response, the slave places a unique code into the data field of the response message. This tells the master what kind of error occurred or the reason for the exception.

The master device's application program has the responsibility of handling exception responses. Typical responses are to post subsequent retries of the message, to try diagnostic messages to the slave and to notify operators.

The data field of messages sent from a master to slave devices contains additional information that the slave must use to take the action defined by the function code. This can include items such as discrete and register addresses, the quantity of items to be handled and the count of actual data bytes in the field.

For example, if the master requests a slave to read a group of holding registers (function code 03), the data field specifies the starting register and how many registers are to be read.

If no error occurs, the data field of a response from a slave to a master contains the data requested. If an error occurs, the field contains an exception code that the master application can use to determine the next action to be taken.

The data field can be nonexistent (of zero length) in certain kinds of messages.

CRC Error Checking

In RTU mode, messages include an error-checking field that is based on a Cyclical Redundancy Check (CRC) method. The CRC field checks the contents of the entire message. It is applied regardless of any parity check method used for the individual characters of the message.

The CRC field is 2 bytes, containing a 16-bit binary value. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message and compares the calculated value to the actual value it received in the CRC field. If the two values are not equal, an error results.

IMPLEMENTED FUNCTIONS/REGISTER DEFINITIONS

The function code identifies the command being issued to the device. It is one byte in length and has a value of 3, 5, 6, or 7.

Table 6: Function Codes Supported by BW GasPoint

Function Code	Description
3	Read Holding Registers
5	Force Single Coil
6	Preset Single Register
7	Read Exception Status

In most cases, there is no response for a query that contains an invalid slave address, an invalid function code, invalid CRC data or a non-supported broadcast mode, etc. In some cases, BW GasPoint might issue an Exception 1 as an error response. For example, function 05, 06 are only available in normal operating mode. If function 05, 06 are transmitted in start up mode or calibration mode, BW GasPoint will issue an Exception 1 as a response.

Response Exception 1

Field Name	Example (Hex)
Slave Address	01
Function	85
Exception Code	01
CRC Low Byte	83
CRC High Byte	50

Response Exception 1

Field Name	Example (Hex)
Slave Address	01
Function	86
Exception Code	01
CRC Low Byte	83
CRC High Byte	A0

The following pages describe MODBUS functions supported by the BW GasPoint.

FUNCTION 03 READ HOLDING REGISTERS

Description

Reads the binary contents of holding registers (4X references) in the slave. Broadcast is not supported.

The 15 holding registers BW GasPoint supports are listed below:

Table 7: Register Addresses and Descriptions

Register Address	Holding Register	Description of bits and data values, all values are in 16 bit registers.
*0	*40001	*Gas concentration reading
*1	*40002	*Bitmapped Operating Mode Status Bit 0 =1 calibration mode =0 not in calibration mode Bit 1 =1 Start mode =0 not in Start up mode The rest indicates BW Gas Point is in normal operation mode.
*2	*40003	*Bitmapped Status (bits not listed are not used) bit 7 =1 indicates sensor life expired. bit 6 =1 indicates sensor communications failure fault occurred. bit 5 =1 indicates sensor drift fault occurred. bit 4 =1 indicates sensor test failure fault occurred. bit 3 =1 indicates replace sensor warning. bit 2 =1 indicates BW GasPoint is in low alarm condition. bit 1 =1 indicates BW GasPoint is in high alarm condition. bit 0 =1 indicates BW GasPoint is in fault alarm condition.
*3	*40004	*Software revision (XXYY in Hex is revision XX.YY)
*4	*40005	*Bitmapped DIP Switch Configuration (bits not listed are not used) Bit 10 =1 indicates sensor self-test disabled. Bit 9 =1 indicates High Alarm Relay is in latching mode. Bit 8 =1 indicates High Alarm Relay is normally energized. Bit 1 =1 indicates Low Alarm Relay is in latching mode. Bit 0 =1 indicates Low Alarm Relay is normally energized.
5	40006	Low alarm setting
6	40007	High alarm setting
*7	*40008	*MODBUS address (1 to 247)
*8	*40009	*BAUD rate value (Hex)
*9	*40010	*Full scale of measurement
*10	*40011	*Gas Type 1 - H_2S 2 - CO 3 - Combustibles 4 - O_2 5 - SO_2 6 - HCN 7 - CL_2 8 - CLO_2 9 - H_2 10 - HCL 11 - NH_3 12 - Hydrocarbons 13 - NO_2
*11	*40012	*Bitmapped gas type indicator: Bit 12 =1 NO_2 Bit 11 =1 Hydrocarbons Bit 10 =1 NH_3 Bit 9 =1 HCL Bit 8 =1 H_2 Bit 7 =1 CLO_2 Bit 6 =1 CL_2 Bit 5 =1 HCN Bit 4 =1 SO_2 Bit 3 =1 O_2 Bit 2 =1 Combustibles Bit 1 =1 CO Bit 0 =1 H_2S
*12	*40013	*Gas concentration factor
*13	*40014	*Reserved for future use.
*14	*40015	*Reserved for future use.

Notes: (*) Read only registers
The real reading of 40001, 40006, 40007, and 40010 can be calculated by dividing the value by the gas concentration factor (40013). The respective units are as follows:

- *For combustibles and hydrocarbons, 40001, 40006, 40007, and 40010 are measured in % LEL.*
- *For O_2, 40001, 40006, 40007, and 40010 are measured in % v/v.*
- *For all the rest, 40001, 40006, 40007, and 40010 are measured in ppm v/v.*

Query

The query message specifies the starting register and quantity of registers to be read. Registers are addressed starting at zero: registers 1–16 are addressed as 0–15.

Here is an example of a request to read register 40005–40007 from slave device 17:

Read Holding Registers Query

Field Name	Example (Hex)
Slave Address	11
Function	03
Starting Address High	00
Starting Address Low	04
Number of Points High	00
Number of Points Low	03
CRC Low Byte	46
CRC High Byte	9A

Response

The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits, and the second byte contains the low order bits.

Here is an example of a response to the query above:

Read Holding Registers Response

Field Name	Example (Hex)
Slave Address	11
Function	03
Byte Count	06
Data High (Register 40005)	00
Data Low (Register 40005)	01
Data High (Register 40006)	00
Data Low (Register 40006)	0A
Data High (Register 40007)	00
Data Low (Register 40007)	14
CRC Low Byte	F1
CRC High Byte	78

The contents of register 40005 are shown as the two byte values of 00 01 hex, or 1 decimal. The contents of registers 40006 and 40007 are 00 0A and 00 14 hex, or 10 and 20 decimal, respectively.

BW GasPoint supports 15 holding registers listed in Table 7. If starting address is not within the range, BW GasPoint will issue an Exception 2 as a response. If the number of points is too many, BW GasPoint will issue an Exception 4 as a response.

Response Exception 2

Field Name	Example (Hex)
Slave Address	11
Function	83
Exception Code	02
CRC Low Byte	C1
CRC High Byte	34

Response Exception 4

Field Name	Example (Hex)
Slave Address	11
Function	83
Exception Code	04
CRC Low Byte	41
CRC High Byte	36

FUNCTION 05 FORCE SINGLE COIL

Description

Forces a single coil (0X reference) to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.

Table 8: BW GasPoint Coil Structure

# of Coil: 8 Address: 7 Read/Write OVERRIDE (password)	# of Coil: 7 Address: 6 Read/Write HIGH ALARM RELAY Remote Control	# of Coil: 6 Address: 5 Read/Write LOW ALARM RELAY Remote Control	# of Coil: 5 Address: 4 Read/Write LATCHED LOW/HIGH ALARM Remote CLEAR	# of Coil: 4 Address: 3 Read only LOW/HIGH ALARM LATCHING STATUS	# of Coil: 3 Address: 2 Read only LOW ALARM RELAY STATUS	# of Coil: 2 Address: 1 Read only HIGH ALARM RELAY STATUS	# of Coil: 1 Address: 0 Read only FAULT ALARM RELAY STATUS

Bits 7 to 4 can be accessed by this function. A write to any other coils will have no response.

Coil 8: OVERRIDE (Read/Write)
The controller sets this coil to indicate that it has assumed control of the coils. The controller then has the ability to alter coils 7, 6, and 5. Force coil 8 to be set just like a password to alter coils 7, 6, and 5.

Coil 7: HIGH ALARM RELAY Remote Control (Read/Write)
If coil 8 is set, then this coil controls the High Alarm Relay. Setting this coil energizes the coil of the High Alarm Relay. Clearing this coil de-energizes the coil of the High Alarm Relay. Once this coil has been written, the status of High Alarm Relay can be read in coil 2, or Holding Register 40003. Please refer to function 3 and function 7 for more information.

Coil 6: LOW ALARM RELAY Remote Control (Read/Write)
If coil 8 is set then this coil controls the Low Alarm Relay. Setting this coil energizes the coil of the Low Alarm Relay. Clearing this coil de-energizes the coil of the Low Alarm Relay. Once this coil has been written, the status of Low Alarm Relay can be read in coil 3, or Holding Register 40003. Please refer to function 3 and function 7 for more information.

Coil 5: LATCHED LOW/HIGH ALARM Remote CLEAR (Read/Write)
If coil 8 is set then this coil has the ability to clear latched alarms. If this coil is set, the latched alarms will be cleared. This coil should be kept clear after latched alarms has been cleared. The status of LOW/HIGH ALARM LATCHING can be read in coil 4, or Holding Register 40003. Please refer to function 3 and function 7 for more information.

NOTE: This operation is valid only when the sensor is not currently measuring gas levels over the alarm point(s). Please be aware, if coil 8 is set, the user **cannot** clear latched alarms locally by pressing the Calibration Pushbutton on the BW GasPoint unit.

Query

The query message specifies the coil reference to be forced. Coils are addressed starting at zero: coil 1 is addressed as 0.

The requested ON/OFF state is specified by a constant in the query data field. A value of FF 00 hex requests the coil to be ON. A value of 00 00 requests it to be OFF. All other values are illegal and will not affect the coil.

Here is an example of a request to force coil 8 ON in slave device 17:

Force Single Coil Query	
Field Name	**Example (Hex)**
Slave Address	11
Function	05
Coil Address High	00
Coil Address Low	07
Force Data High	FF
Force Data Low	00
CRC Low Byte	3F
CRC High Byte	6B

Response

The normal response is an echo of the query, returned after the coil state has been forced.

Here is an example of a response to a query above:

Force Single Coil Response

Field Name	Example (Hex)
Slave Address	11
Function	05
Coil Address High	00
Coil Address Low	07
Force Data High	FF
Force Data Low	00
CRC Low Byte	3F
CRC High Byte	6B

BW GasPoint supports only force coil 8, 7, 6, and 5. If the coil is not within the range, BW GasPoint will issue an Exception 2 as a response. If the force data is neither FF00 Hex nor 0000 Hex, BW GasPoint will issue an Exception 4 as a response.

Coil 8 can be forced to set or clear at any time, but coils 7, 6, and 5 can only be forced to set or clear when coil 8 is in set condition. If there is an attempt to force coils 7, 6, or 5 when coil 8 is in clear condition, BW GasPoint will issue an Exception 8 as a response.

Function 05 is available only when BW GasPoint is in normal operation mode. BW GasPoint will issue an Exception 1 as a response to a Function 05 query during start mode or calibration mode.

Response Exception 2

Field Name	Example (Hex)
Slave Address	11
Function	85
Exception Code	02
CRC Low Byte	C2
CRC High Byte	94

Response Exception 4

Field Name	Example (Hex)
Slave Address	11
Function	85
Exception Code	04
CRC Low Byte	42
CRC High Byte	96

Response Exception 8

Field Name	Example (Hex)
Slave Address	11
Function	85
Exception Code	08
CRC Low Byte	42
CRC High Byte	93

Response Exception 1

Field Name	Example (Hex)
Slave Address	01
Function	85
Exception Code	01
CRC Low Byte	82
CRC High Byte	95

FUNCTION 06 PRESET SINGLE REGISTER

Description

Presets a value into a single holding register (4x reference). When broadcast, the function presets the same register reference in all attached slaves.

BW GasPoint supports only preset register 40006, low alarm setpoints; and preset register 40007, high alarm setpoints. Refer to function 3 for more information.

To avoid accidentally writing the register, 2000 hex (8192 decimal) must be added to the register value as a password. Both low and high alarm setting points must be less than the full scale of measurement. For example, the full scale of measurement is 1000 ppm for CO. To set 200 ppm as the high alarm setpoint, the value of register 40007 should be 20C8 hex (8392 decimal).

Query

The query message specifies the register reference to be preset. Registers are addressed starting at zero: register 1 is addressed as 0.

Here is an example of a request to preset register 40007 to set high alarm setpoint as 200 in slave device 17:

Preset Single Register Query

Field Name	Example (Hex)
Slave Address	11
Function	06
Register Address High	00
Register Address Low	06
Preset Data High	20
Preset Data Low	C8
CRC Low Byte	73
CRC High Byte	0D

The normal response is an echo of the query, returned after the register contents have been preset.

Response

Here is an example of a response to the query above:

Preset Single Register Response

Field Name	Example (Hex)
Slave Address	11
Function	06
Register Address High	00
Register Address Low	06
Preset Data High	20
Preset Data Low	C8
CRC Low Byte	73
CRC High Byte	0D

If the register address in the query is not 0005 or 0006, GasPoint will issue an Exception 2 as a response. If the preset data in the query does not include the password, GasPoint will issue an Exception 8 as a response. If the preset data is out of range, BW GasPoint will issue an Exception 4 as a response.

Function 06 is available only when BW GasPoint is in normal operation mode. BW GasPoint will issue an Exception 1 as a response to a Function 06 query during start mode or calibration mode.

Response Exception 2

Field Name	Example (Hex)
Slave Address	11
Function	86
Exception Code	02
CRC Low Byte	C2
CRC High Byte	64

Response Exception 4

Field Name	Example (Hex)
Slave Address	11
Function	86
Exception Code	04
CRC Low Byte	42
CRC High Byte	66

Response Exception 8

Field Name	Example (Hex)
Slave Address	11
Function	86
Exception Code	08
CRC Low Byte	42
CRC High Byte	63

Response Exception 1

Field Name	Example (Hex)
Slave Address	01
Function	86
Exception Code	01
CRC Low Byte	82
CRC High Byte	65

FUNCTION 07 READ EXCEPTION STATUS

Description

Reads the contents of eight exception status coils within the GasPoint. Broadcast is not supported.

Table 9: BW GasPoint Coil Structure

# of Coil: 8 Address: 7 Read/Write	# of Coil: 7 Address: 6 Read/Write	# of Coil: 6 Address: 5 Read/Write	# of Coil: 5 Address: 4 Read/Write	# of Coil: 4 Address: 3 Read only	# of Coil: 3 Address: 2 Read only	# of Coil: 2 Address: 1 Read only	# of Coil: 1 Address: 0 Read only
OVERRIDE (password)	HIGH ALARM RELAY Remote Control	LOW ALARM RELAY Remote Control	LATCHED LOW/ HIGH ALARM Remote CLEAR	LOW/HIGH ALARM LATCHING STATUS	LOW ALARM RELAY STATUS	HIGH ALARM RELAY STATUS	FAULT ALARM RELAY STATUS

Coils 3, 2 and 1 are the status of the of the coils of Low Alarm Relay, High Alarm Relay and Fault Alarm Relay, respectively. Logic 1, or ON, means the coil of the relay is physically powered on. Logic 0, or OFF, means the coil of the relay is physically powered off. Coil 4 is the Low/High Alarm Latching Status coil. Logic 1, or ON, means the BW GasPoint has latched an alarm. Logic 0, or OFF, means the BW GasPoint has not latched any alarm. Refer to function 5 for more information about coils 8, 7, 6, and 5.

Query

Here is an example of a request to read the exception status in slave device 17:

Read Exception Status Query

Field Name	Example (Hex)
Slave Address	11
Function	07
CRC Low Byte	4C
CRC High Byte	22

Response

The normal response contains the status of the eight exception status coils. The coils are packed into one data byte, with one bit per coil. The status of the lowest coil reference is contained in the least significant bit of the byte.

Here is a response to the query above:

Read Exception Status Response

Field Name	Example (Hex)
Slave Address	11
Function	07
Coil Data	01
CRC Low Byte	E2
CRC High Byte	35

In this example, the coil data is 01 hex (0000 0001 binary).

Left to right, the coils are: OFF-OFF-OFF-OFF-OFF-OFF-OFF-ON. The status is shown from the highest to the lowest addressed coil.

There is no exception for function 7.

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