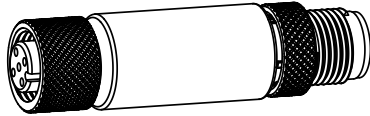


S15C Bimodal to Modbus® Converter

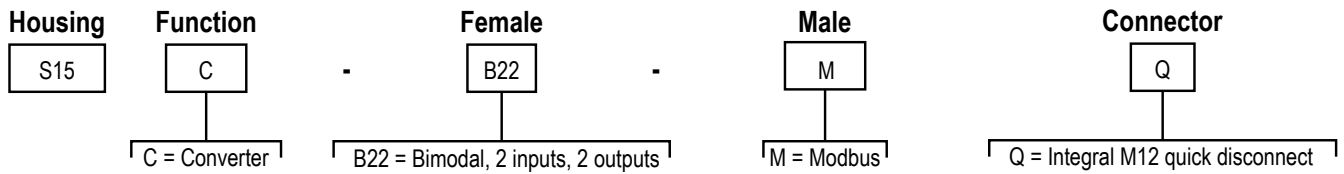


Datasheet



- Compact bimodal to Modbus® device converter that connects discrete inputs and outputs the value
- Outputs a discrete value as an input to a defined Modbus register
- Discrete input/output can be independently configured as NPN or PNP
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use

Models



Configuration

Figure 1. Pin 2 Logic Flow

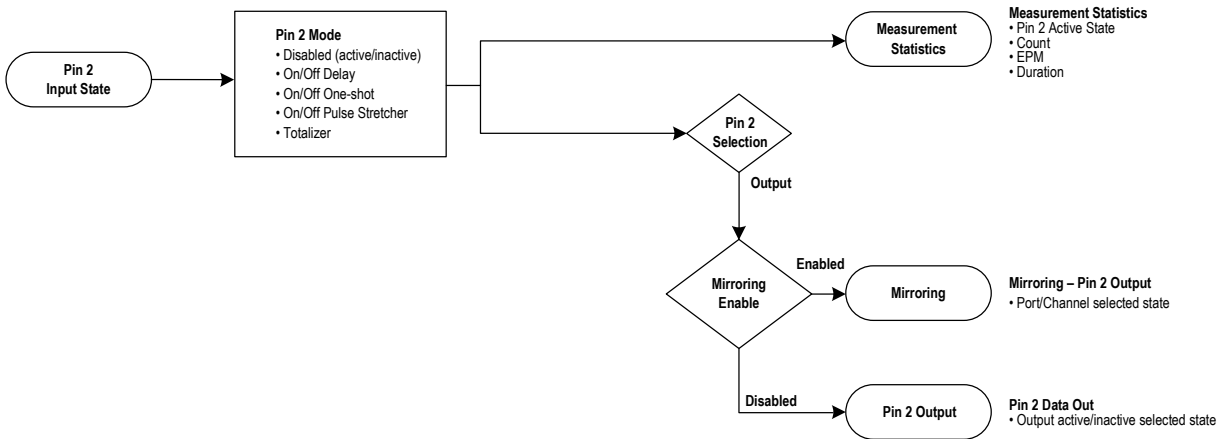


Figure 2. Pin 4 Logic Flow

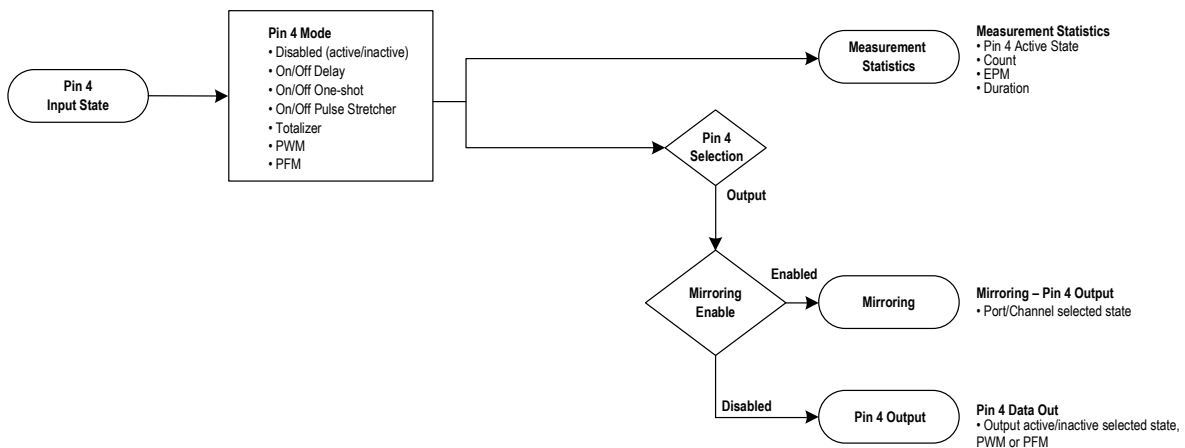


Table 1: Measurement Reads

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40001	Pin 4 Active State	0..1	0 = Inactive, 1 = Active	—	RO	—
40002	Pin 2 Active State	0..1	0 = Inactive, 1 = Active	—	RO	—
40003	Pin 4 Count Higher (H)	0..65535	Pin 4 Count Value Upper	—	RO	Upper 16 of 32 bits = Running count of the received input pulses
40004	Pin 4 Count Lower (L)	0..65535	Pin 4 Count Value Lower	—	RO	Lower 16 of 32 bits = Running count of the received input pulses
40005	Pin 4 Duration H	0..65535	Pin 4 Duration Value Upper	—	RO	Upper 16 of 32 bits = Duration of the last input pulse in μs with 50 μs granularity
40006	Pin 4 Duration L	0..65535	Pin 4 Duration Value Lower	—	RO	Lower 16 of 32 bits = Duration of the last input pulse in μs with 50 μs granularity
40007	Pin 4 Events Per Minute H	0..65535	Pin 4 Events Per Minute Value Upper	—	RO	Upper 16 of 32 bits = Running count of the number of pulses received averaged over one minute Range 1 to 300,000 Max Counter Input Frequency: 5 kHz
40008	Pin 4 Events Per Minute L	0..65535	Pin 4 Events Per Minute Value Lower	—	RO	Lower 16 of 32 bits = Running count of the number of pulses received averaged over one minute Range 1 to 300,000 Max Counter Input Frequency: 5 kHz
40009	Pin 4 Totalizer Count H	0..65535	Pin 4 Totalizer Count Upper	—	RO	Upper 16 of 32 bits = Totalizer Count
40010	Pin 4 Totalizer Count L	0..65535	Pin 4 Totalizer Count Lower	—	RO	Lower 16 of 32 bits = Totalizer Count
40011	Pin 2 Count H	0..65535	Pin 2 Count Value Upper	—	RO	Upper 16 of 32 bits = Running count of the received input pulses
40012	Pin 2 Count L	0..65535	Pin 2 Count Value Lower	—	RO	Lower 16 of 32 bits = Running count of the received input pulses
40013	Pin 2 Duration H	0..65535	Pin 2 Duration Value Upper	—	RO	Upper 16 of 32 bits = Duration of the last input pulse in μs with 50 μs granularity
40014	Pin 2 Duration L	0..65535	Pin 2 Duration Value Lower	—	RO	Lower 16 of 32 bits = Duration of the last input pulse in μs with 50 μs granularity
40015	Pin 2 Events Per Minute H	0..65535	Pin 2 Events Per Minute Value Upper	—	RO	Upper 16 of 32 bits = Running count of the number of pulses received averaged over one minute Range: 1 to 300,000 Max Counter Input Frequency: 5 kHz
40016	Pin 2 Events Per Minute L	0..65535	Pin 2 Events Per Minute Value Lower	—	RO	Lower 16 of 32 bits = Running count of the number of pulses received averaged over one minute Range: 1 to 300,000 Max Counter Input Frequency: 5 kHz
40017	Pin 2 Totalizer Count H	0..65535	Pin 2 Totalizer Count Upper	—	RO	Upper 16 of 32 bits = Totalizer Count
40018	Pin 2 Totalizer Count L	0..65535	Pin 2 Totalizer Count Lower	—	RO	Lower 16 of 32 bits = Totalizer Count

Table 2: Metric Count Presets

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40100	Pin 4 Count H	0..65535	Pin 4 Count Value Upper	—	RW	—

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40101	Pin 4 Count L	0..65535	Pin 4 Count Value Lower	—	RW	—
40102	Pin 2 Count H	0..65535	Pin 2 Count Value Upper	—	RW	—
40103	Pin 2 Count L	0..65535	Pin 2 Count Value Lower	—	RW	—

Table 3: Pin 4 Port Configuration

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40200	Pin 4 IO Selection	0..5	0 = NPN input 1 = PNP input 2 = NPN output with pull up 3 = PNP output with pull down 4 = NPN output push/pull 5 = PNP output push/pull	1	RW	—
40201	Pin 4 Mode	0..8	0 = Disabled 1 = On Off Delay 2 = On One-shot 3 = Off One-shot 4 = On Pulse-stretcher 5 = Off Pulse-stretcher 6 = Totalizer 7 = PWM 8 = PFM	0	RW	—
40202	Pin 4 Delay Timer 1 Upper	0..65535	Pin 4 On Delay, One-shot, Pulse-stretcher time, Totalizer Count	0	RW	Upper 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count Mode 7 and 8 = Don't Care
40203	Pin 4 Delay Timer 1 Lower	0..65535	Pin 4 On Delay, One-shot, Pulse-stretcher time, Totalizer Count	0	RW	Lower 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count Mode 7 and 8 = Don't Care
40204	Pin 4 Delay Timer 2 Upper	0..65535	Pin 4 Off Delay or Totalizer time	0	RW	Upper 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count Mode 7 and 8 = Don't Care
40205	Pin 4 Delay Timer 2 Lower	0..65535	Pin 4 Off Delay or Totalizer time	0	RW	Lower 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count Mode 7 and 8 = Don't Care
40206	Pin 4 Mirroring Enable	0..1	0 = Disabled, 1 = Enabled	0	RW	—
40207	Pin 4 Mirroring Selection	0..1	0 = Pin 4, 1 = Pin 2	0	RW	—
40208	Pin 4 Mirroring Inversion	0..1	0 = Not Inverted, 1 = Inverted	0	RW	—
40209	Pin 4 PWM Base Frequency	200..4000	PWM base frequency	500	RW	PWM base frequency = 200 (Hz).. 4000 (Hz)
40210	Pin 4 PWM Percentage	0..100	PWM percentage	100	RW	PWM % = 0..100 If PWM % > 100, = 100
40211	Pin 4 PFM Frequency	50..50000	PFM frequency	50000	RW	PFM 50 (Hz)..50K (Hz)

Table 4: Pin 2 Port Configuration

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40300	Pin 2 IO Selection	0..5	0 = NPN input 1 = PNP input 2 = NPN output with pull up 3 = PNP output with pull down 4 = NPN output push/pull 5 = PNP output push/pull	0	RW	—
40301	Pin 2 Mode	0..6	0 = Disabled 1 = On Off Delay 2 = On One-shot 3 = Off One-shot 4 = On Pulse-stretcher 5 = Off Pulse-stretcher 6 = Totalizer	0	RW	—
40302	Pin 2 Delay Timer 1 Upper	0..65535	Pin 2 On Delay, One-shot, Pulse-stretcher time, or Totalizer Count	0	RW	Upper 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count
40303	Pin 2 Delay Timer 1 Lower	0..65535	Pin 2 On Delay, One-shot, Pulse-stretcher time, or Totalizer Count	0	RW	Lower 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count
40304	Pin 2 Delay Timer 2 Upper	0..65535	Pin 2 Off Delay or Totalizer time	0	RW	Upper 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count
40305	Pin 2 Delay Timer 2 Lower	0..65535	Pin 2 Off Delay or Totalizer time	0	RW	Lower 16 of 32 Bits: Mode 1, 2, 3, 4, 5 = Milliseconds Mode 6 = Count
40306	Mirroring Enable	0..1	0 = Disabled, 1 = Enabled	0	RW	—
40307	Pin 2 Mirroring Selection	0..1	0 = Pin 4, 1 = Pin 2	0	RW	—
40308	Pin 2 Mirroring Inversion	0..1	0 = Not Inverted, 1 = Inverted	0	RW	—

Table 5: Active Configurations

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40400	Pin 4 Output	0..1	0 = Inactive, 1 = Active	0	RW	If mirroring is disabled and IO selection is output, then Output is set to inactive/active
40401	Pin 2 Output	0..1	0 = Inactive, 1 = Active	0	RW	

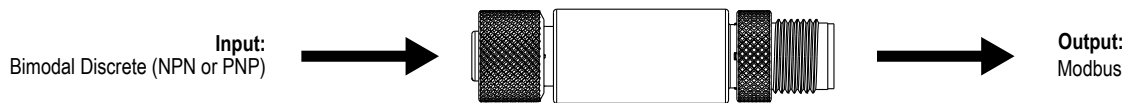
Table 6: Discrete Host Out Mirroring (Gray - Male)

Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
40500	Host Mirroring Enable	0..1	0 = Disable, 1 = Enable	0	RW	—
40501	Host Mirror Channel Selection	0..1	0 = Pin 4, 1 = Pin 2	0	RW	—
40502	Host Mirroring Inversion	0..1	0 = Not Inverted, 1 = Inverted	0	RW	—
40503	Host Mirroring Polarity	0..1	0 = NPN Output, 1 = PNP Output	1	RW	—
40504	Host Mirroring Output Type	0..2	0 = Output with Internal Pull Up/Down 1 = Output Open Collector 2 = Output Push Pull	0	RW	—

Table 7: Modbus Configuration

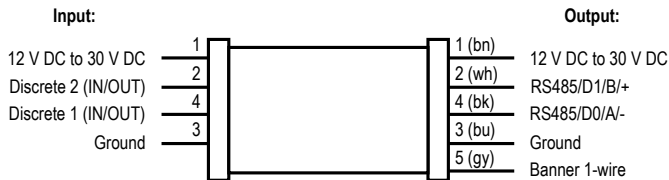
Modbus Register Address	Description	I/O Range	Comments	Default	Access	Notes
46101	Baud Rate	0 = 9.6k 1 = 19.2k 2 = 38.4k	0 = 9600 1 = 19,200 2 = 38,400	1	RW	—
46102	Parity	0 = None 1 = Odd 2 = Even	0 = None 1 = Odd 2 = Even	0	RW	—
46103	Slave Address	1..247	1 to 247	1	RW	—

Wiring Diagrams



Male	Female	Pin	Wire Color
		1	Brown
		2	White
		3	Blue
		4	Black
		5 (male only)	Gray (male only)

Connecting Devices with Discrete Inputs/Outputs



Status Indicators

Power LED Indicator (Green)

- Solid Green = Power On
- Off = Power Off

Modbus Communication LED Indicator (Amber)

- Flashing Amber (4 Hz) = Modbus communications are active
- Solid Amber for 2 Seconds to Off = Modbus communications are lost after connection
- Solid Amber for 2 Seconds to Flashing Amber (4 Hz) = Modbus communications momentarily lost, but communication reestablished
- Solid Amber = Modbus communications are intermittent, or communications error occurs more frequently than once every 2 seconds
- Off = Modbus communications are not present

Specifications

Supply Voltage

12 V DC to 30 V DC at 50 mA maximum

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Leakage Current Immunity

400 µA

Discrete Output Ratings

OFF-state leakage current:

NPN: 300 µA

PNP: 10 µA

ON-state saturation voltage:

NPN: 2 V at 50 mA

PNP: 2 V at 50 mA

Indicators

Green: Power

Amber: Modbus communications

Connections

Integral male/female 4-pin M12 quick disconnect

Construction

Coupling Material: Nickel-plated brass

Connector Body: PVC translucent black

Vibration and Mechanical Shock

Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 0.5 mm amplitude, 5 minutes sweep, 30 minutes dwell)

Meets IEC 60068-2-27 requirements (Shock: 15G 11 ms duration, half sine wave)

Certifications



Environmental Rating

IP65, IP67, IP68

NEMA/UL Type 1

Operating Conditions

Temperature: -40 °C to +70 °C (-40 °F to +158 °F)

90% at +70 °C maximum relative humidity (non-condensing)

Storage Temperature: -40 °C to +80 °C (-40 °F to +176 °F)

Required Overcurrent Protection



WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

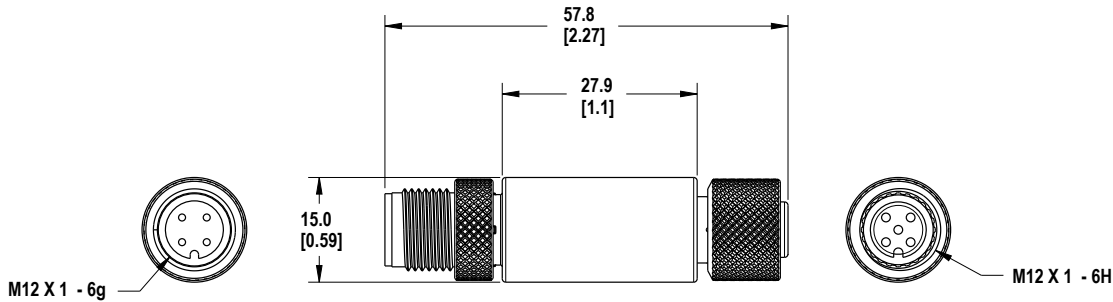
Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise.



Accessories

Cordsets

4-Pin Threaded M12 Cordsets—Double Ended				
Model	Length	Style	Dimensions	Pinout
MQDEC-401SS	0.31 m (1 ft)	Male Straight/Female Straight		Female
MQDEC-403SS	0.91 m (2.99 ft)			
MQDEC-406SS	1.83 m (6 ft)			
MQDEC-412SS	3.66 m (12 ft)			
MQDEC-420SS	6.10 m (20 ft)			
MQDEC-430SS	9.14 m (30.2 ft)			
MQDEC-450SS	15.2 m (49.9 ft)			<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>

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FCC Part 15

This device complies with Part 15 of the FCC Rules. 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 is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

This device complies with CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(B). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.