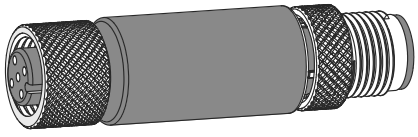
# S15CM Modbus® to PWM and PFM Converter

## S15CM Features

- Compact converter that connects to a Modbus® device and outputs the value as a pulsed signal, either PFM or PWM
- Modbus registers are used to define PWM and PFM setting
- Outputs can be independently configured as NPN or PNP
- Rugged overmolded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use



## S15CM Models

| Housing | Function | - | Female Port | - | Male Port | Connector |
|---|---|---|---|---|---|---|
| S15 | CM | - | PP | - | M | Q |
| | CM=Converter Male Input | | PP=PFM and PWM | | M=Modbus | Q=Integral M12 quick disconnect |

## Configuration Instructions

## Sensor Configuration Software

The Sensor Configuration Software offers an easy way to manage converter Modbus settings, retrieve data, and visually show converter data. The Sensor Configuration Software runs on any Windows machine and uses an adapter cable (BWA-UCT-900, p/n 19970) to connect the converter to the computer.

Download the most recent version of the Sensor Configuration Software from the Banner Engineering website: https://info.bannerengineering.com/cs/groups/public/documents/software/b_3128586.exe.

## Modbus Configuration

*Pin 4 Port Configuration*

| Modbus Register Address | Description | I/O Range | Comments | Default | Access | Notes |
|---|---|---|---|---|---|---|
| 40200 | Pin 4 IO Selection | 4..5 | 4 = NPN output push/pull<br>5 = PNP output push/pull | 4 | RW | — |
| 40201 | Pin 4 Mode | 0, 7, 8 | 0 = Disabled<br>7 = PWM<br>8 = PFM | 7 | RW | PFM 50% duty cycle |
| 40202 | Pin 4 PWM Base Freq | 50..50,000 | PWM Base Frequency (Hz) | 500 | RW | PWM base freq = 50 (Hz)..50K (Hz) |
| 40203 | Pin 4 Percentage | 0..100 | PWM Percentage | 100 | RW | PWM % = 0..100<br>If PWM % > 100, = 100 |
| 40204 | Pin 4 PFM Frequency | 50..50,000 | PFM Frequency | 50,000 | RW | PFM 50 (Hz)..50K (Hz) |

*Pin 2 Port Configuration*

| Modbus Register Address | Description | I/O Range | Comments | Default | Access | Notes |
|---|---|---|---|---|---|---|
| 40300 | Pin 2 IO Selection | 4..5 | 4 = NPN output push/pull<br>5 = PNP output push/pull | 5 | RW | — |
| 40301 | Pin 2 Mode | 0, 7, 8 | 0 = Disabled<br>7 = PWM<br>8 = PFM | 8 | RW | PFM 50% duty cycle |
| 40302 | Pin 2 PWM Base Freq | 200..4000 | PWM Base Frequency (Hz) | 500 | RW | PWM base freq = 50 (Hz)..50K (Hz) |
| 40303 | Pin 2 Percentage | 0..100 | PWM Percentage | 100 | RW | PWM % = 0..100<br>If PWM % > 100, = 100 |
| 40304 | Pin 2 PFM Frequency | 50..50,000 | PFM Frequency | 50,000 | RW | PFM 50 (Hz)..50K (Hz) |

*Modbus Configuration*

| Modbus Register Address | Description | I/O Range | Comments | Default | Access |
|---|---|---|---|---|---|
| 40601 | Baud Rate | 0 = 9.6k<br>1 = 19.2k<br>2 = 38.4k | 0 = 9600<br>1 = 19200<br>2 = 38400 | 1 | RW |

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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

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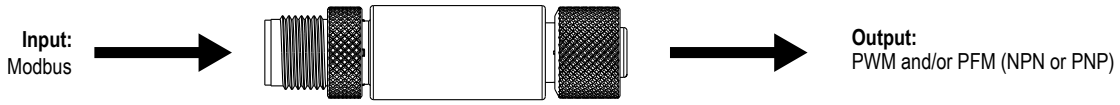
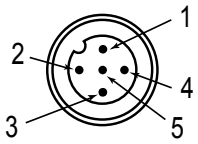
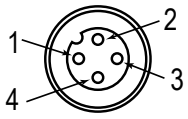
| Modbus Register Address | Description | I/O Range | Comments | Default | Access |
|---|---|---|---|---|---|
| 40602 | Parity | 0 = None<br>1 = Odd<br>2 = Even | 0 = None<br>1 = Odd<br>2 = Even | 0 | RW |
| 40603 | Address | 1-254 | - | 1 | RW |
| 40604 | Reserved (cannot be read or written) | None | - | - | RW |
| 40605 | Restore Factory Configuration | 0 = No Operation, 1 = Restore | - | - | WO |

*Device Information*

| Modbus Register Address[1] | Description | I/O Range | Comments | Default | Access | Notes |
|---|---|---|---|---|---|---|
| 40606-40615 | Banner Name | 0..65535 | - | Banner Engineering | RO | (9 words/18 characters) |
| 40616-40631 | Product Name | 0..65535 | - | S15CM-PP-MQ | RO | (16 words/32 characters) |
| 40632 | Item H | 0..65535 | 812607 split into two 16-bit registers | 12 | RO | Banner Item Number |
| 40633 | Item L | 0..65535 | | 26175 | RO | - |
| 40634 | Serial Number H | 0..65535 | - | - | RO | Serial Number is split into four 16-bit registers |
| 40635 | Serial Number | 0..65535 | - | - | RO | |
| 40636 | Serial Number | 0..65535 | - | - | RO | |
| 40637 | Serial Number L | 0..65535 | - | - | RO | |
| 40644-40659 | User Define Tag | 0..65535 | User writable space | More Sensors. More Solutions. | RW | (16 words/32 characters) |

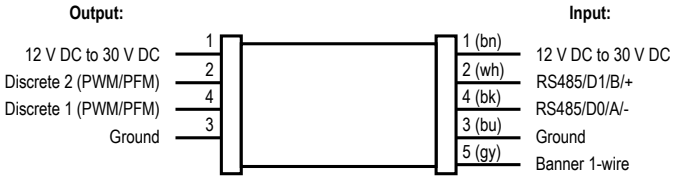
# S15CM Wiring Diagrams




| 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




# S15CM 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

[1] Registers are big endian.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- Off = Modbus communications are not present

# S15CM Specifications

**Supply Voltage**
12 V DC to 30 V DC at 50 mA maximum

**Power Pass-Through Current**
4 A maximum

**Supply Protection Circuitry**
Protected against reverse polarity and transient voltages

**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

**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 (A) | Supply Wiring (AWG) | Required Overcurrent Protection (A) |
|---|---|---|---|
| 20 | 5.0 | 26 | 1.0 |

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**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)

**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)

**Advanced Capabilities**
PULSE® PRO I/O

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| Supply Wiring (AWG) | Required Overcurrent Protection (A) | Supply Wiring (AWG) | Required Overcurrent Protection (A) |
|---|---|---|---|
| 22 | 3.0 | 28 | 0.8 |
| 24 | 1.0 | 30 | 0.5 |

**Certifications**

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1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

c UL us LISTED
PROGRAMMABLE CONTROLLER
E316212

# FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

# Industry Canada Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.


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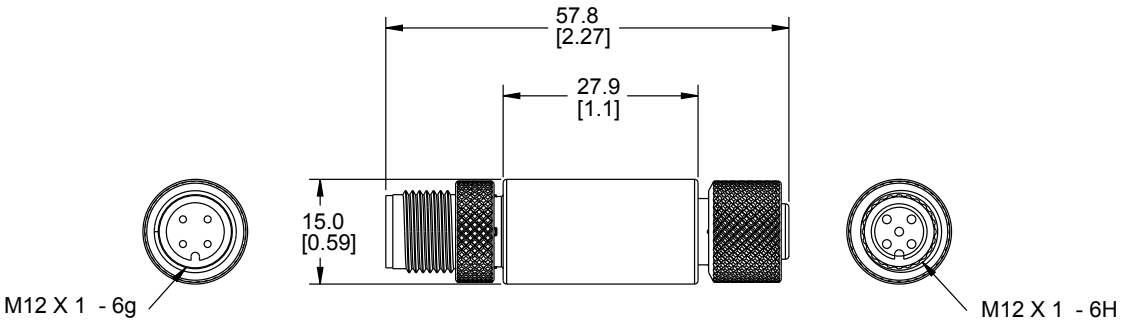
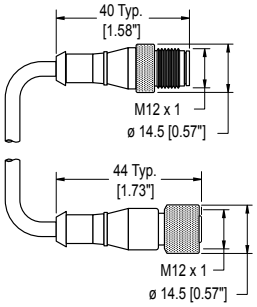
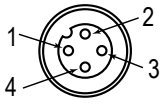
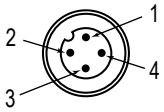
# Dimensions

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  Male  1 = Brown 2 = White 3 = Blue 4 = Black |
| **MQDEC-403SS** | 0.91 m (2.99 ft) | | | |
| **MQDEC-406SS** | 1.83 m (6 ft) | | | |
| **MQDEC-412SS** | 3.66 m (12 ft) | | | |
| **MQDEC-415SS** | 4.58 m (15 ft) | | | |
| **MQDEC-420SS** | 6.10 m (20 ft) | | | |
| **MQDEC-430SS** | 9.14 m (30.2 ft) | | | |
| **MQDEC-450SS** | 15.2 m (49.9 ft) | | | |





# Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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