# SENCON

## 11S-491-66
## END COUNT SENSOR

## DESCRIPTION

The Sencon 11S-491-66 End Count Sensor is a replacement for 11S-391-66 sensor for which key components are no longer available. Following a review of the sensor's design, it was concluded that a number of improvements can be implemented. This version of the sensor automates the setup process and enables counting of bright and dull ends. A number of other improvements are in development.

The Sencon 11S-491-66 End Count Sensor is a high accuracy non-contacting sensor for counting beverage or food container ends that are being conveyed in "stick" form. A special feature of the sensor is its ability to compensate for the backup, jiggle, surging and other velocity changes that occur as ends pass the sensor. The 11S-491-66 also provides the added circuitry necessary to control the action of an automated end splitter for precise bagging of ends.

A remote divide-by feature allows the number of counts to be divided by either 1, 2, or 10, making it possible to slow the count to an acceptable speed/frequency for use with low resolution counters.

A push-pull output circuit provides compatibility with both NPN and PNP devices, and provides an active pull-up and pull-down of the output signal for transmission down long cable runs. Traditional source/sink outputs have a passive "off" state which limits the distance over which high-speed signals can be sent.

A quick disconnect cable is used with the sensor to simplify installation and change-out in the unlikely event that a malfunction should occur.

Output divider
A divide-by selection feature is provided with this sensor. By connecting the black wire from the power and signal cable to the appropriate voltage, the output count can be divided by either 1, 2, or 10.

| Black Wire Connection | Sensor Output |
| --- | --- |
| NO CONNECTION | DIVIDE BY 1 |
| CONNECT TO 0 VDC | DIVIDE BY 2 |
| CONNECT TO + VDC | DIVIDE BY 10 |

Note:
1. The divide-by 1 output makes a high/low/high transition as an end passes by the counter in the forward direction. A minimum pulse time of 1ms, high or low, is enforced on the sensor. If a burst of ends is traveling faster than the minimum pulse time, the sensor will cache the pulses and "catch up" when the end speed slows down again.

2. The divide-by-2 output makes a high/low transition as the first end passes by the counter in the forward direction and a low/high transition as the second end passes the counter in the forward direction. The duty cycle is a function of the stick velocity.
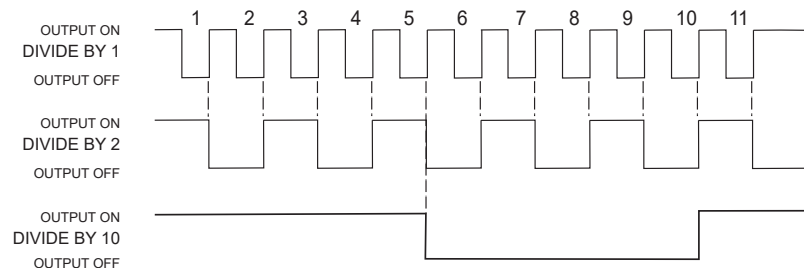


### Installation

Mount the sensor above the ends to be counted as shown in the diagram. It is important that the sensor be set to the correct height for best operation. Mount the sensor so that it is centered above the stick of ends to be counted with the gap between the sensor and the ends set by the 4.5 mm metal spacer supplied.
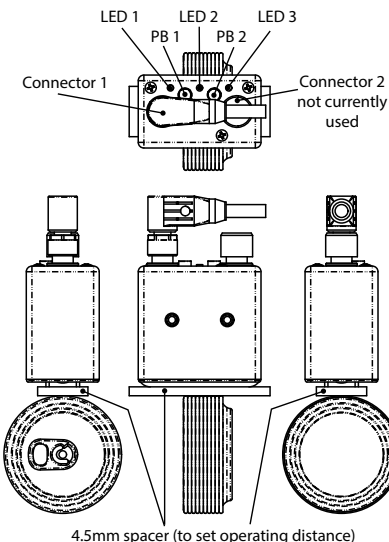
Look at the sensor face before beginning. There is a rectangular black plastic window in the sensor face. Orient the sensor as shown in the diagram so that the long axis of the sensor is parallel to end travel and the black window is toward the consumer side of the ends as they travel past the sensor.

Wire the sensor into your counting device as shown on the wiring diagram. Slow speed counters having a maximum counting rate of less than 500 counts per second will require using the "divide-by-control" option provided by the sensor to be certain that each count pulse is recognized. Look at the minimum pulse width specification for your counter (provided by the manufacturer) to determine if the divide-by-2 or divide-by-10 option should be selected based on the transit velocity of ends past the sensor. NOTE: Maximum end velocity will be more than the rated machine speed due to surging that occurs in all end manufacturing operations.



4.5mm spacer (to set operating distance)

### SETUP and OPERATION
The 11S-491-66 sensor requires optimization to accurately count ends. This process is automated.

**To enable optimization mode,** press and hold both push buttons for at least 3 seconds. When the buttons are released, LED 2 will start blinking green. LED1 and LED 3 will stay off. Ends must pass under the sensor for optimization to complete, this process may take several seconds. Ends do not need to continuously pass under the sensor during optimization. If the sensor stops detecting ends, the optimization will pause and wait until ends are detected again. When finished, LED 2 will turn solid green. After optimization is complete, it is recommended to slide a known quantity of ends under the sensor one or more times to confirm the counts are correct.

For best results (but not required): Optimization should be started either with no ends under the sensor or with ends already moving under the sensor. Ends should be moving with the customer side facing as shown in the diagram above. Ends should be moving faster than 60 ends per minute.

**To cancel optimization in progress**, press and hold both push buttons for at least 3 seconds. LED2 will turn solid green and the sensor will revert back to the previous settings.

**The counting direction** can be set by pressing either of the push buttons; PB1 for ends moving right to left and PB2 for ends moving left to right. LED1 or LED3, respectively, will turn green to indicate the direction selected. As ends are counted in the forward direction, this LED blinks bright/dim green. If ends are detected in the backwards direction, the opposite LED will blink red. The forward LED will not start blinking again until the backup count is cleared. The sensor saves the direction setting and will restore it on power up.

## ORDERING INFORMATION
For more detailed specifications, price quotes, or applications information, contact your SENCON sales office listed below:
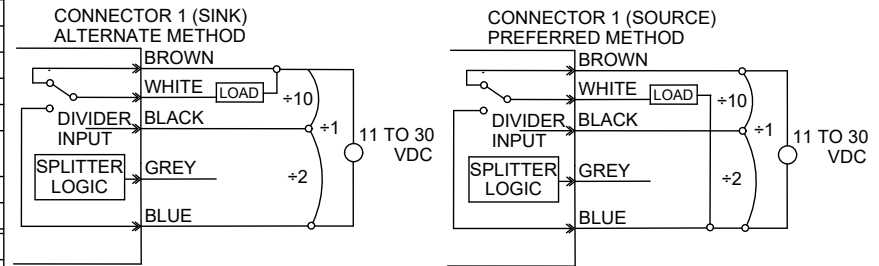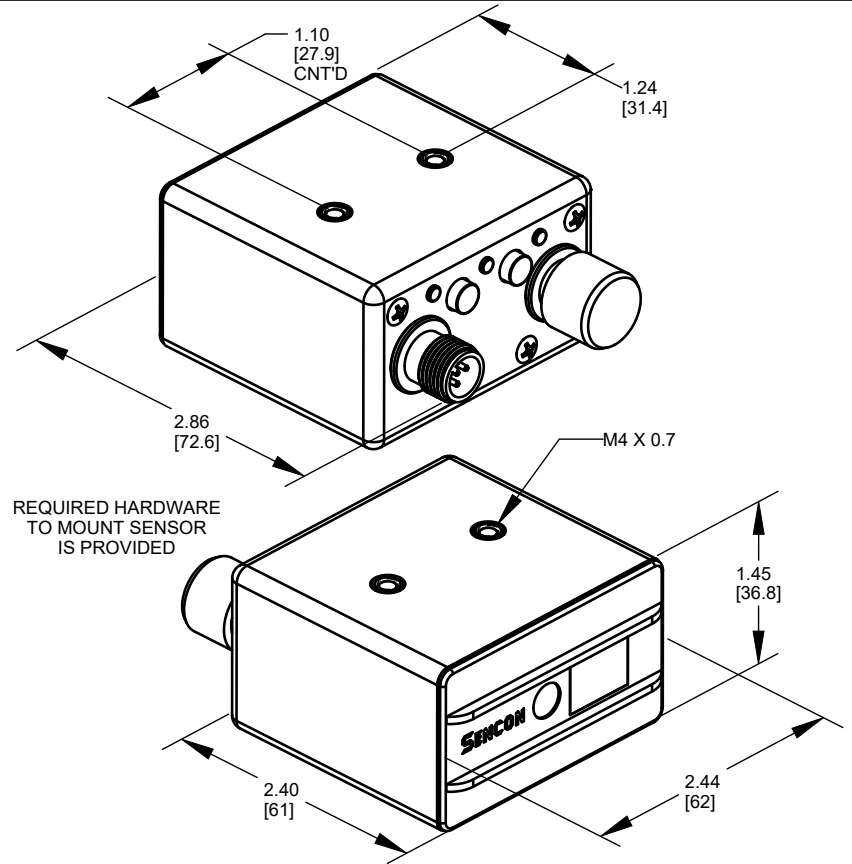
**NORTH, CENTRAL & SOUTH AMERICA**
Sencon Incorporated
6385 W.74th Street
Bedford Park, IL 60638
USA
Tel: +1 708 496 3100
Fax: +1 708 496 3105
sales@sencon.com

**EUROPE - MIDDLE EAST - ASIA**
Sencon (UK) Ltd
Stonebridge Cross Business Park
Droitwich WR9 0LW
UK
Tel: +44 1905 827800
Fax: +44 1905 795876
sales@sencon.co.uk

www.sencon.com

## SPECIFICATIONS

| | |
|---|---|
| OPERATING INPUT VOLTAGE | 11 VDC TO 30 VDC |
| INPUT CURRENT | <1W OVER OPERATING VOLTAGE, PLUS LOAD CURRENT |
| REVERSE POLARITY | PROTECTED |
| EMI | PROTECTED |
| CASE ISOLATION | 200 VDC |
| COUNT RATE | 0 TO GREATER THAN 40000 ENDS/MIN |
| STORAGE TEMPERATURE | -40ºF TO 176ºF  [-40ºC TO 80ºC] |
| OPERATING TEMPERATURE | 32ºF TO 122ºF  [0ºC TO 50ºC] |
| ENVIRONMENTAL PROTECTION | ENVIRONMENTALLY SEALED TO IP50 PROTECTED AGAINST THE EFFECTS OF DUST NOT PROTECTED AGAINST THE INGRESS OF LIQUID |
| WEIGHT | 9 oz [250 g] |
| CASE MATERIAL | STAINLESS STEEL / PBT |
| TERMINATION | M12 MICRO (5 PIN) |
| LED FUNCTION | LED1, LED3 - DIRECTION AND OUTPUT TOGGLE. TOGGLES "ON" AND "OFF" AS ENDS PASS SENSOR IN THE INDICATED DIRECTION. LED2 - STATUS:  GREEN - RUNNING; BLINKING GREEN - CALIBRATING; BLINKING RED - INTERNAL FAULT; OFF - SENSOR UNPOWERED |

## ACTUATION CHARACTERISTICS (AT 75ºF [24ºC])

| | |
|---|---|
| OPERATING RANGE | ENDS MUST BE NESTED IN STICK FORM. WITH THE AID OF THE SUPPLIED SETTING GAUGE, POSITION SENSOR 0.177 ±0.020" [4.5±0.51 MM] AWAY FROM THE EDGES OF THE STICK. MISCOUNTS WILL OCCUR IF ADJACENT ENDS ARE MORE THAN 0.020" [0.51 MM] OUT OF ALIGNMENT |
| TARGET | BEVERAGE ENDS CONVEYED IN STICK FORM / MOST FOOD ENDS CONVEYED IN STICK FORM |
| TARGET SIZE | TESTED WITH 200 [50MM] TO 600 [150MM] DIAMETER ROUND ENDS. CONSULT FACTORY FOR ODD SIZES OR SHAPES |
| ACCURACY | 99.998% |
| BACK UP LOGIC | NO MISCOUNT DUE TO JIGGLING, SURGING, OR BACKED-UP ENDS |
| DIVIDER | DIVIDE BY 1, 2, OR 10 DETERMINED BY WIRE CONNECTION |

## DC COUNTER OUTPUT CHARACTERISTICS (CONNECTOR 1)

| | |
|---|---|
| OUTPUT CONFIGURATION | PUSH/PULL |
| LOAD RATING | 20 mA RESISTIVE |
| VOLTAGE DROP @ 20 mA | <2 V @ 20 mA WIRED CURRENT SINK OR SOURCE |
| NOMINAL LOAD IMPEDENCE | 1MΩ  PULL DOWN |
| LEAKAGE CURRENT | <100 uA FOR <30 ms ON POWER UP |
| OUTPUT STATE | HIGH WHEN IDLE, TOGGLES AS ENDS ARE DETECTED (SEE WAVEFORM) |
| SHORT CIRCUIT PROTECTION | CONTINUOUS |

## END SPLITTER OUTPUT CHARACTERISTICS

| | |
|---|---|
| OUTPUT CONFIGURATION | OPEN COLLECTOR |
| LOAD RATING | 20 mA RESISTIVE |
| VOLTAGE DROP @ 20 mA | 2 V @ 20 mA |
| LEAKAGE CURRENT | <100 uA |
| OUTPUT STATE | ARRANGEMENT FOR USE WITH SENCON END SPLITTER |

CONNECTOR 2 - RESERVED FOR SENCON USE

1.10 [27.9] CNT'D

1.24 [31.4]

2.86 [72.6]

M4 X 0.7

REQUIRED HARDWARE TO MOUNT SENSOR IS PROVIDED

1.45 [36.8]

2.40 [61]

2.44 [62]

**CONNECTOR 1 (SINK) ALTERNATE METHOD**

BROWN
WHITE — LOAD — ÷10
DIVIDER INPUT — BLACK — ÷1 — 11 TO 30 VDC
SPLITTER LOGIC — GREY — ÷2
BLUE

**CONNECTOR 1 (SOURCE) PREFERRED METHOD**

BROWN
WHITE — LOAD — ÷10
DIVIDER INPUT — BLACK — ÷1 — 11 TO 30 VDC
SPLITTER LOGIC — GREY — ÷2
BLUE

| Drawn By | Appd. By | Date | Rev | Drawing Number |
|---|---|---|---|---|
| AC | BEC/BMS | 8-JUN-20 | 1 | TDS11-491 |

Title

### 11-491 SENSOR

# SENCON

**PB Lockout**

Push button lockout mode is a mode where the sensor will ignore input from the push buttons, but will otherwise continue to operate normally.

To enable PB lockout mode, press and hold both push buttons until all three LEDs quickly blink red two times (about ten seconds).  The mode is disabled the same way it is enabled.

If a push button is pressed while PB lockout is enabled, the sensor will indicate it is in lockout mode by quickly blinking all three LEDs red two times.