SUPERPROX®
Ultrasonic Counting Sensor

CE

- **Compatible with most types of external counters and PLC's**

- **Counts accurately**

- **Counts a wide range of container sizes**

- **Counts irregular shaped containers**

- **Counts glass, metal, plastic, and composite containers**

- **Counts accurately at line speeds up to 2000 containers per minute**

- **CE certified**

Now there's accurate counting of containers over a wide range of sizes, even in the presence of "dither" or jiggling back and forth

Accurate counting of containers on single-file conveying systems has challenged the container manufacturing, food processing and packaging, beer/beverage, and pharmaceutical industries for many years. The Model CT1000A series is an ultrasonic sensor designed especially for achieving accurate container counting.

The Model CT1000A ultrasonic counting sensor counts separated containers as well as those moving back-to-back at line speeds up to 2000 containers per minute. The accuracy is maintained in the presence of line stoppages, reversals, and container jiggling in front of the sensor. The sensor provides a setting for large versus small container sizes, and regular versus irregular container shapes.

The Model CT1000A sensor is capable of counting various size containers with a single setting of the sensor as long as the proper spacing between the rails and containers is maintained and the distance from the sensor to the containers is not changed. This feature eliminates the need to stop the conveyor line and readjust the sensor each time there is a change in the container size or material.

Made of tough ULTEM®, the sensor measures 139.7 mm (5.50") long x 66.5 mm (2.62") wide x 78.7 mm (3.10") high. With protection ratings of IP67 and NEMA 4X (indoor use only), the sensor resists most acids and bases, including most food products. It is sealed to withstand dusty, noisy, noncondensing-humidity, high-pressure, wash-down environments typically associated with beverage-filling operations. The transducer face of the sensor is made of silicone rubber.

Operation

The Model CT1000A counting sensor must be mounted so the sensing face is parallel to the container or object moving past the sensor, and away from any threads at the top of certain containers. The sensing range, to the inside of the pass-line-rail, is 50.8 mm to 69.8 mm (2.0" to 2.75") for most size containers.

As the Model CT1000A counts a container, its red LED flashes and its output generates a 20 millisecond pulse with which an electronic counter, PLC, or other counting system uses to keep count.

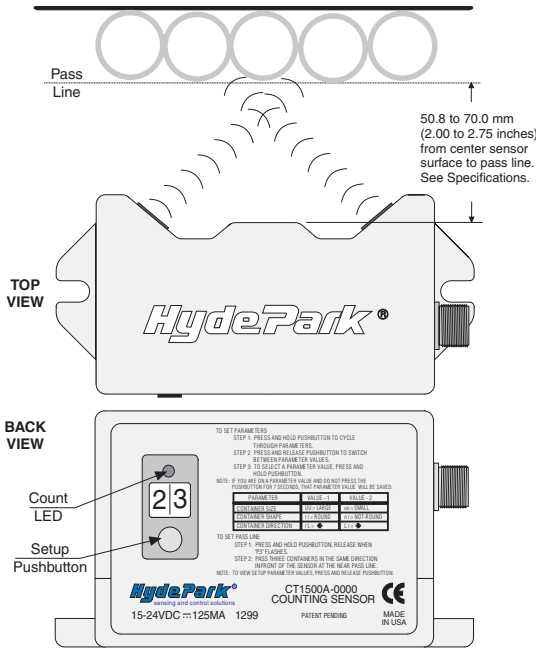The output pulse time becomes variable at line speeds above 1500 containers per minute, and is the time between containers divided by 2.

If containers move past the sensor in the opposite direction, the sensor remembers not to generate pulses until the containers move past the sensor in the correct direction. The sensor remembers up to 32,000 containers moving in the opposite direction.

The setup mode which specifies the container size, container shape, and conveyor direction, is done through the two-digit numeric display and the setup push-button. The setup mode is saved in nonvolatile memory and thus retained when power is removed from the sensor.

The Model CT1500A-1400 counting sensor with jam detection is also available.

CT1500A-0000 Counting Sensor

Pass
Line

TOP
VIEW

HydePark ®

50.8 to 70.0 mm
(2.00 to 2.75 inches)
from center sensor
surface to pass line.
See Specifications.

BACK
VIEW

Count
LED

Setup
Pushbutton

2 3

TO SET PARAMETERS
STEP 1: PRESS AND HOLD PUSHBUTTON TO CYCLE
THROUGH PARAMETERS.
STEP 2: PRESS AND RELEASE PUSHBUTTON TO SWITCH
BETWEEN PARAMETER VALUES.
STEP 3: TO SELECT A PARAMETER VALUE, PRESS AND
HOLD PUSHBUTTON.
NOTE: IF YOU ARE ON A PARAMETER VALUE AND DO NOT PRESS THE
PUSHBUTTON FOR 7 SECONDS, THAT PARAMETER VALUE WILL BE SAVED.

PARAMETER	VALUE -1	VALUE -2
CONTAINER SIZE	LG = LARGE	SM = SMALL
CONTAINER SHAPE	r'd = ROUND	no = NOT-ROUND
CONTAINER DIRECTION	⊡ ◄	⊡ ►

TO SET PASS LINE
STEP 1: PRESS AND HOLD PUSHBUTTON, RELEASE WHEN
"P3" FLASHES.
STEP 2: PASS THREE CONTAINERS IN THE SAME DIRECTION
INFRONT OF THE SENSOR AT THE REAR PASS LINE.
NOTE: TO VIEW SETUP PARAMETER VALUES, PRESS AND RELEASE PUSHBUTTON.

HydePark ®
sensing and control solutions
15-24VDC ⎓ 125MA 1299

CT1500A-0000
COUNTING SENSOR CE
PATENT PENDING MADE
IN USA

How does it work?

During setup and operation, the CT1000A continually and accurately measures the elapsed time of every pulse echo reception between each pulse transmission for each of its transducers. The transmitted pulse begins a clock to register the elapsed times for the received pulse echoes. Given the elapsed time, the CT1000A software calculates the distance traveled out to the container and back to the sensor, using the formula

$$D = \frac{T * Vs}{2}$$

where: D = distance from the sensor to the object; T = elapsed time between pulse transmission and its echo receptions, Vs = velocity of sound, approximately 1100 feet per second.

During operation, the calculated distance (D) is used by the CT1000A to determine the location and direction of each container as it passes by the unit. When each individual container is recognized to have passed by the sensor in the correct direction, the unit increments the digital display and pulses the output.

0.0 mm
[0.0 in]

PULSE
Dwo
ECHO
Dwi
D
OBJECT

SHADED AREA
REPRESENTS THE
SENSING AREA
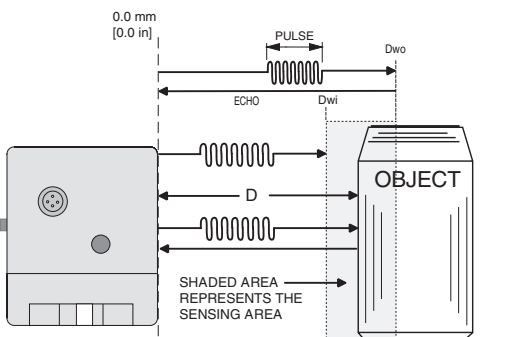
Model Reference Guide - CT1000A Series

Use the guide below to ensure the correct model number is specified for the application. Please note that not all sensor model combinations are available.

EXAMPLE MODEL: **CT1 5 00 A-00 00-**

SUPERPROX® Product Series

Power/Connection Type
0...15 to 24 VDC / cable style
5...15 to 24 VDC / connector style - STANDARD

Sensing Function
00...Standard counting
01...Velocity

Design Level
A...Applies to all models

Operating Mode
0...Standard
1...Counting with jam detection (3 transducer model)

Output Type
Counting with no jam output velocity and print control sensors:
0...Normally open (N.O. - NPN & PNP) - standard
1...Normally closed (N.C. - NPN & PNP)
2...Complimentary NPN outputs
3...Complimentary PNP outputs
Counting with Jam output:
4...Normally open (N.O. - NPN & NPN)
5...Normally closed (N.C. - NPN & NPN)
6...Normally open (N.O. - PNP & PNP)
7...Normally closed (N.C. - PNP & PNP)

Special Functionality
00...Standard
01...Divide by 10
02...Divide by 24
03...Divide by 100
10…Count up / down outputs
20…100ms pulse output

Features and Options
...No letter indicates no features or options
FS...Fluorosilicone transducer face

Housing Types
...No letter indicates standard ULTEM ®* plastic housing.
N...NORYL® * Dairy 3A gray plastic housing

Power Cable Length
...No number indicates standard power cable length

*ULTEM® and NORYL are registered trademarks of The General Electric Company.

Setup

Before using the counting sensor the container size, shape, and direction must be set first and then the pass line must be set. On the back side of the sensor is a 2-digit LED display and a setup push-button. Normally this display shows either a count or fault status. The 2-digit LED display and setup push-button are also used to set the container direction, size, shape, and the pass line for the containers. Momentarily pressing the setup push-button displays the container size, shape, and direction. This action clears the 2-digit LED display container count but does not affect the external counting device.

Container Size, Shape, and Direction

Press and hold the setup push-button until the 2-digit LED display alternates a blank display with the current value for the desired parameter, and then release the setup push-button. (The parameter displayed can be determined from the parameter value as shown in the table below, since the parameter values are all unique. When the setup push-button is first pressed and held for a few seconds, the 2-digit LED display first flashes P3 for pass line setup, and then continues to the setup parameters. To change the parameter to the other value, press and release the setup push-button. To save the current parameter value as the selected value for the parameter, either press and hold to move to the next pa-
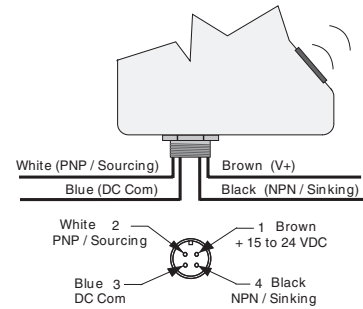
rameter; or wait 7 seconds for the parameter setup to timeout. After the setup push-button is not pressed for 7 seconds, the selected value for each setup parameter is saved in nonvolatile memory, and the display returns to normal operation.
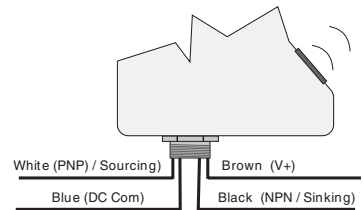
Pass Line Setup

The sensor must be mounted so that the containers pass the sensor at a fixed distance from the sensor. Press and hold the setup push-button until the 2-digit LED display flashes P3 and then release. Next move 3 containers past the sensor at the near edge of the pass line. After each container passes the sensor, the digit following the P is decremented. After the 3rd container passes the sensor, the pass line is set, and the 2-digit LED display returns to displaying a container count. If you wish to abort the pass line setup, press and release the setup push-button. If you press and hold, the sensor switches to container size, shape, and direction setup mode.

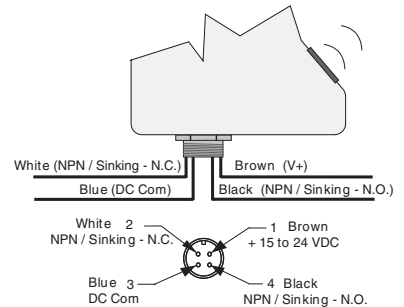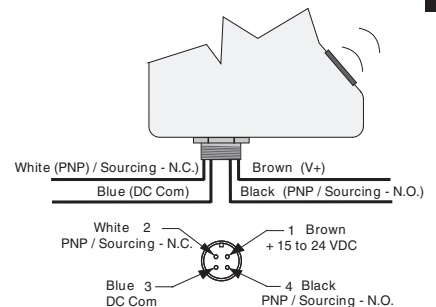| Parameter	Value 1	Value 2
Container Size	UU = large (2.0" - 12.0" approx.)	uu = small (1.5" - 2.0" approx.)
Container Shape	rr = round	nr = not round
Container Direction	rL = → (right/left)	Lr = ← (left/right)

Electrical Wiring

Count – NPN/PNP

White (PNP / Sourcing) Brown (V+)
Blue (DC Com) Black (NPN / Sinking)

White 2 PNP / Sourcing
1 Brown + 15 to 24 VDC
Blue 3 DC Com
4 Black NPN / Sinking

Count – NPN/PNP

White (PNP) / Sourcing Brown (V+)
Blue (DC Com) Black (NPN / Sinking)

Count – NPN

White (NPN / Sinking - N.C.) Brown (V+)
Blue (DC Com) Black (NPN / Sinking - N.O.)

White 2 NPN / Sinking - N.C.
1 Brown + 15 to 24 VDC
Blue 3 DC Com
4 Black NPN / Sinking - N.O.

Count – PNP

White (PNP) / Sourcing - N.C. Brown (V+)
Blue (DC Com) Black (PNP / Sourcing - N.O.)

White 2 PNP / Sourcing - N.C.
1 Brown + 15 to 24 VDC
Blue 3 DC Com
4 Black PNP / Sourcing - N.O.

Electrical Wiring

Count/Jam – NPN/NPN

White (Jam Detect) Brown (V+)
(NPN / Sinking)
Black (Count)
(NPN / Sinking)
Blue (DC Com)

White - Jam 2   1 Brown
NPN / Sinking   + 15 to 24 VDC

Blue 3   4 Black-Count
DC Com   NPN / Sinking

Count/Jam – PNP/PNP

White (Jam Detect) Brown (V+)
(PNP / Sourcing)
Black (Count)
(PNP / Sourcing)
Blue (DC Com)

White - Jam 2   1 Brown
NPN / Sinking   + 15 to 24 VDC

Blue 3   4 Black-Count
DC Com   NPN / Sinking

INTERNAL | EXTERNAL

BROWN
LOAD   DC (+)
BLACK
NPN
Current Limit
BLUE   DC Com

INTERNAL | EXTERNAL

BROWN
DC (+)
Current Limit
PNP
WHITE
LOAD
BLUE   DC Com

Dimensions

66.5 mm [2.620]

9.4 mm [.37]

HydePark

Use 1/4 Cap Screws

124.5 mm [4.90]

113.0 mm [4.450]

78.7 mm [3.100]

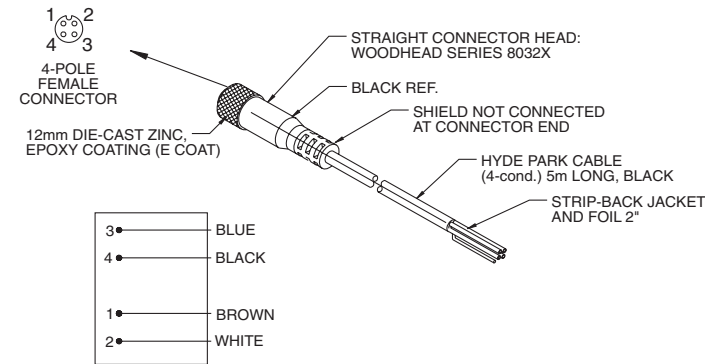22.9 mm [.900]

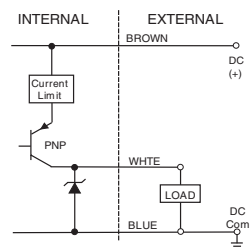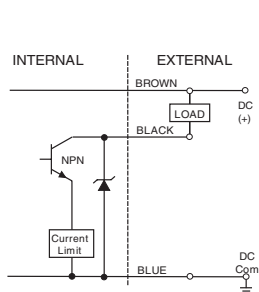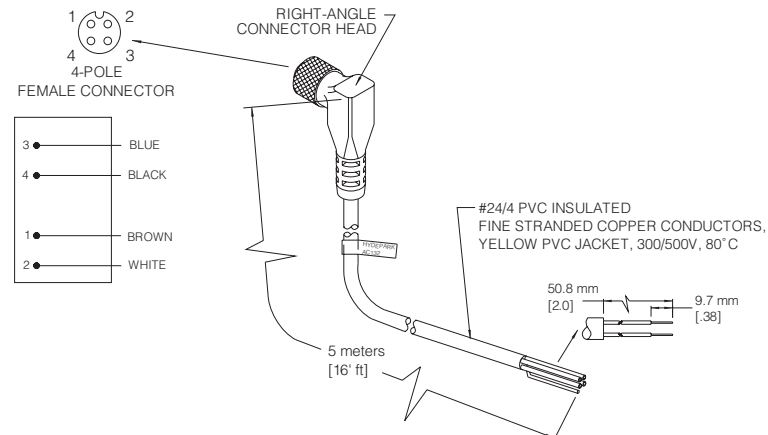CL Of Sensors on Far Side

9.5 mm [.375]

139.7 mm [5.50] REF.

Accessories

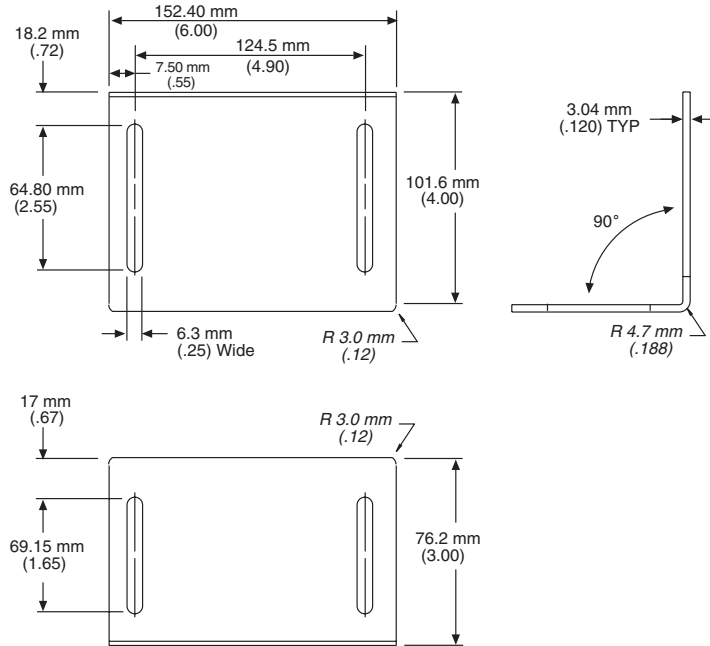**AC130** Straight, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for 30 mm, barrel-style sensors

1 2
4 3
4-POLE FEMALE CONNECTOR

STRAIGHT CONNECTOR HEAD: WOODHEAD SERIES 8032X

BLACK REF.

SHIELD NOT CONNECTED AT CONNECTOR END

12mm DIE-CAST ZINC, EPOXY COATING (E COAT)

HYDE PARK CABLE (4-cond.) 5m LONG, BLACK

STRIP-BACK JACKET AND FOIL 2"

3 BLUE
4 BLACK
1 BROWN
2 WHITE

AC132 Right-angle, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for 30 mm, barrel-style sensors

1 2
4 3
4-POLE FEMALE CONNECTOR

RIGHT-ANGLE CONNECTOR HEAD

3 BLUE
4 BLACK
1 BROWN
2 WHITE

#24/4 PVC INSULATED FINE STRANDED COPPER CONDUCTORS, YELLOW PVC JACKET, 300/500V, 80°C

50.8 mm [2.0]

9.7 mm [.38]

5 meters [16' ft]

Accessories, con't.
Mounting bracket

152.40 mm
(6.00)

18.2 mm
(.72)

7.50 mm
(.55)

124.5 mm
(4.90)

3.04 mm
(.120) TYP

64.80 mm
(2.55)

101.6 mm
(4.00)

90°

6.3 mm
(.25) Wide

R 3.0 mm
(.12)

R 4.7 mm
(.188)

17 mm
(.67)

R 3.0 mm
(.12)

69.15 mm
(1.65)

76.2 mm
(3.00)

General Specifications

Power Supply

Supply Voltage: +15 to 24 VDC ±10% regulated supply
Current: 125 mA max. (excluding load)
Protection: ESD and reverse-polarity

Maximum on-state voltage @ 100mA: 0.37 V
Maximum load current: 100 mA
Maximum applied voltage: 30 VDC
Protection: ESD and over-current

Maximum on-state voltage drop @ 100mA: 0.50 V
Maximum load current: 100 mA
Maximum output voltage: Equal to supply voltage
Protection: ESD and over-current

Operating Temperature: 0°C to 50°C (32°F to 122°F), @ 100% relative humidity
Storage Temperature: -40°C to 100°C (-40°F to 212°F)

Container diameter plus 6.3mm (0.25")

Small containers 38.1mm (1.5") to 50.8mm (2.0") dia. 50.8 mm to 63.5 mm (2.00" to 2.50")
Large containers 50.8mm (2.0") to 305mm (12.0") dia. 50.8 mm to 69.8 mm (2.00" to 2.75")

2000 containers per minute

500kHz

W= 66.5 mm, L= 139.7 mm, H= 78.7mm
(W= 2.62 in, L= 5.50 in, H= 3.10 in.)

4 pin connector Use either AC130 or AC132 sensor cable (Must be purchased separately)

Housing: Epoxy filled to resist shock and vibration
Case: ULTEM®* (FDA Approved)
Face: FDA approved silicone rubber
Optional Cable: Non-toxic PVC jacket
2-digit LED Window: LEXAN*

NEMA 1, 3, 4x (indoor use only), 12, 13, and IP67
CE mark compliant

*ULTEM® and LEXAN® are registered trademarks of The General Electric Company.

Accessories

Model AC130, Straight, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for connector-style sensors

Model AC132, Right-angle, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for connector-style sensors

Model AC234, Counting sensor bracket

SUPERPROX® PROXIMITY SENSORS