VERSATEC® Versatile Tension Control

- Unwind
- Rewind
- Dancer
- Free Loop
- Ranger

VTC-E US-2 VTC

c UL us LISTED

The VERSATEC Versatile Tension Control is a multi-function automatic tension or process controller. It uses the US-2 Ultrasonic Sensor to measure distance and roll diameter, and has selectable operating modes for Unwind, Rewind, Dancer, Free Loop, or Ranger applications. This flexibility eliminates the need to learn the operation of different controls for different tension zones.

The multi-line alphanumeric menu driven display simplifies setup and operation. Any selected parameter and its value are displayed simultaneously, and can be changed at the touch of a finger. From the keypad and display, you can control all operating parameters for any operating mode; including tension, distance, dancer position, loop position, alarm setpoints, security, language and units, and setup selection.

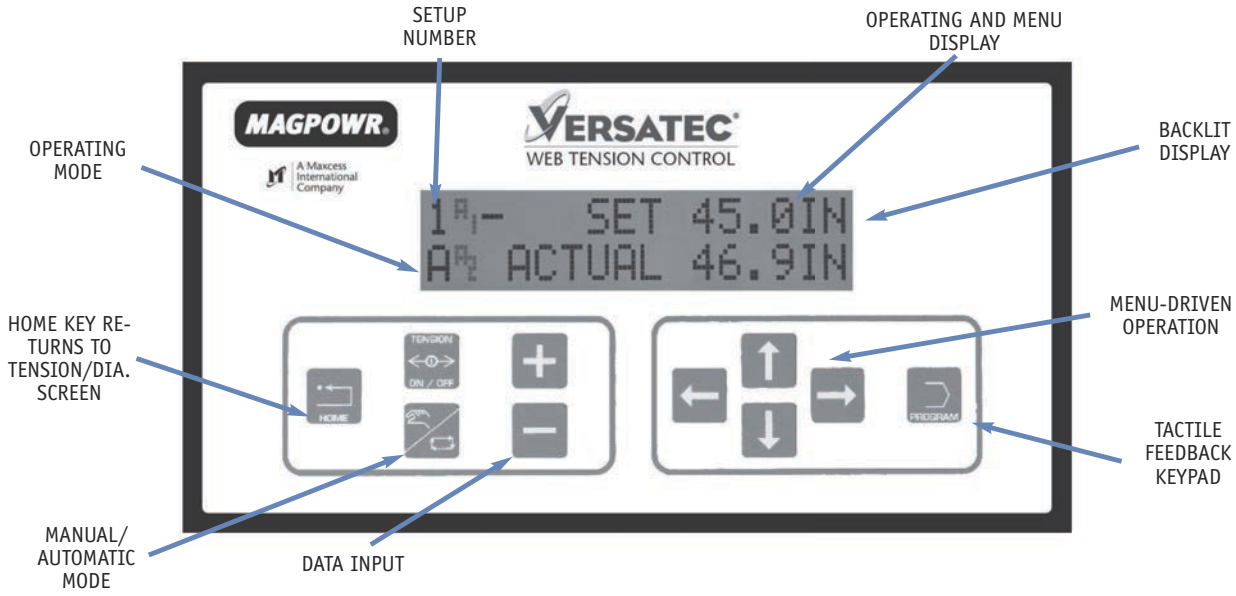
Standard control outputs interface with AC & DC drives, and with air brakes and clutches through a current-to-pressure transducer. An optional power amplifier is used to control magnetic particle brakes and clutches, and mounts inside either enclosure model. The PA-2 will operate either 24 or 90 VDC brakes and clutches, and the PA-90 will operate 90 VDC brakes and clutches. The VERSATEC accepts remote inputs from a PLC or remotely mounted push buttons to adjust the tension setpoint or change the operating setup.

For international installations the VERSATEC provides selectable operating languages of English, French, German, Italian or Spanish, and inch or metric operating units. The desired language and operating units can be selected from the keypad.

Features

- Versatile, automatic, and easy to use control system
- Unwind, Rewind, Dancer, Free Loop, and Ranger Control all in one package
- Multi-line alphanumeric display simplifies setup and operation by displaying real words and values
- Backlit display for viewing in any light condition
- Stores four setups for quick, precise changeovers
- Program security prevents unauthorized changes
- Language selectable in English, French, German, Italian or Spanish
- Selectable inch or metric units of measure
- 4 to 20 mADC, 0 to 10 VDC, -10 to +10 VDC outputs all standard
- Interfaces directly to a PLC for remote operation
- Piezoelectric sensor and control enclosure are IP65 splash proof protected
- VERSATEC and US-2 are UL listed and CE compliant for safety and electrical noise immunity

VERSATEC® Keypad and Display



Environmentally sealed, electrostatically protected touch keypad for setting tension and inputting data

The VERSATEC keypad and display provide an intuitive, user friendly operator interface in any operating mode. The control is versatile and powerful, yet very easy to set up and operate. All setup and operating screens are indicated directly on the multi-line display in real words, not codes, with the corresponding value or status indicated. The screens are accessible from easy to follow scroll-through menus. Changing screens and the displayed information is as easy as pushing a button. It does not get any easier than this.

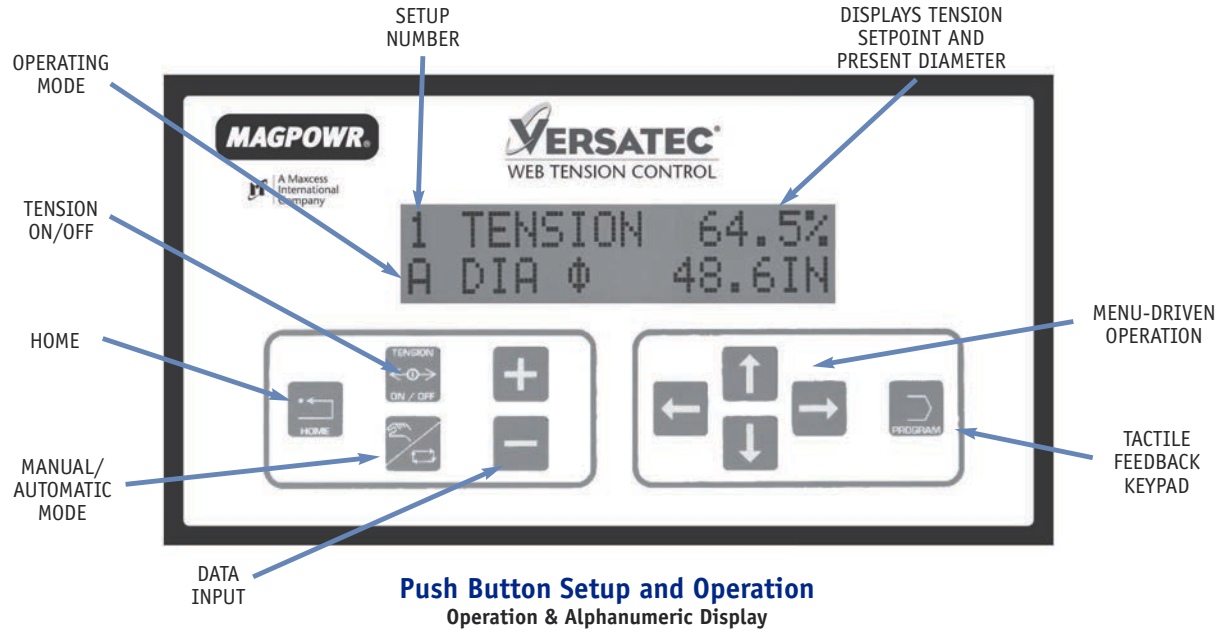
The control needs only minimal setup information to start. For example, in Tension Control mode you need to enter only the full roll and core diameters, distance to roll centerline, input a desired tension level, and the control is ready to use. Setup in the other operating modes is just as easy.

Accessible operator adjustments are minimal and require very little system knowledge. For example, in Tension Control mode the operator may adjust the desired level of tension by pushing the + and - keys. The control does the rest. The VERSATEC is truly automatic.

Parts and Ordering Information

VTC	DIN Model (0 to 10 VDC, 4 to 20 mADC, -10 to +10 VDC)
VTC-E	Enclosure Model (0 to 10 VDC, 4 to 20 mADC, -10 to +10 VDC)
US-2	Ultrasonic Sensor for use with VERSATEC
PA-90	90 VDC Power Amplifier
PA-2	24 or 90 VDC Power Amplifier
RAA	Right Angle Adapter, optional for US-2 right angle operation

VERSATEC® Ultrasonic Tension Control Mode



Push Button Setup and Operation

Operation & Alphanumeric Display
Menu driven operation and setup with online help

System Status

```
1 TENSION  64.5%
A DIA Φ    48.6IN
```

Home screen displays present diameter and tension setpoint. Adjust Tension using +/- keys

Display Actual Output

```
1 OUTPUT LEVEL
A          53.4 %
```

Displayed as percent of maximum

Adjustable Taper Tension

```
TAPER PERCENT
          24.0 %
```

Direct input of desired rewind taper

Add Stopping Torque

```
STOP MULTIPLIER
        2.50
```

Helps stop unwind rolls

Manual Operation

```
MANUAL LEVEL
          46.8 %
```

Output can be controlled manually during roll changes

Select Application

```
SYSTEM
          REWIND
```

Choose unwind or rewind

Easy Setup: Step 1

```
FULL ROLL DIA
          48.0 IN
```

Enter maximum roll diameter

Easy Setup: Step 2

```
CORE DIAMETER
          3.0 IN
```

Enter minimum core diameter

Easy Setup: Step 3

```
DISTANCE TO AXIS
          36.0 IN
```

Enter distance to roll centerline and desired tension, setup is complete

Ignore Spool Flanges

```
ECHO REJECT DIST
          6.0 IN
```

For narrow web spools, enter distance to flanges to be ignored

Select Language

```
LANGUAGE
          DEUTSCH
```

Choose English, French, German, Italian or Spanish

Select Units

```
UNITS
     METRIC (MM)
```

Choose English or metric units

Core and Full Roll Detect

```
MINIMUM DIAMETER
DETECT     3.2 IN
```

Core and full roll alarms flash on the display and trip external indicators

Copy Setups

```
COPY TO SETUP 1
FROM SETUP 4
```

Setup information can be copied between four setups

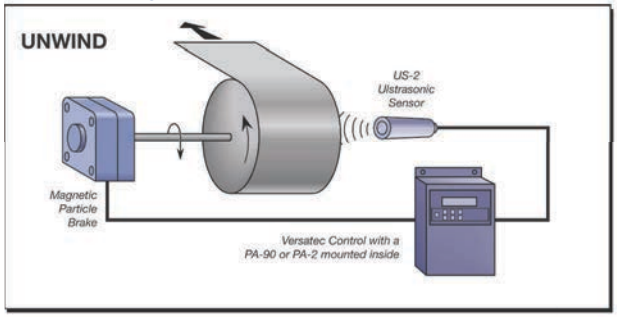
Program Security

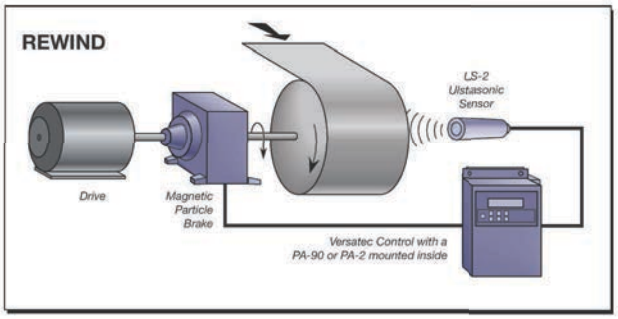
```
ENTER CODE TO
LOCK        ****
```

Personalized code prevents unauthorized changes to setup parameters

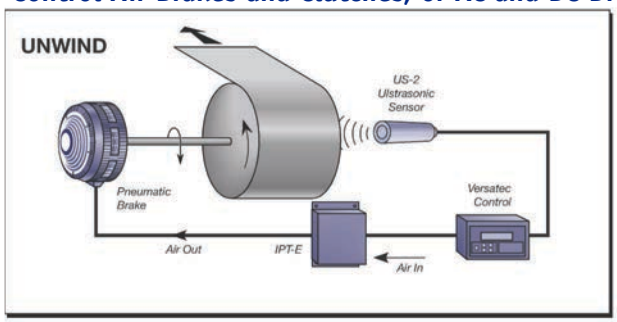
VERSATEC® Ultrasonic Tension Control Applications

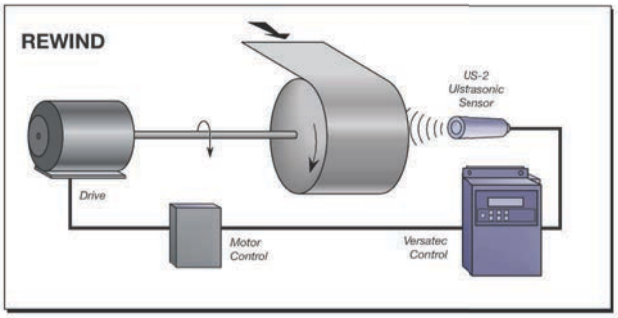
Control Magnetic Particle Clutches and Brakes





Control Air Brakes and Clutches, or AC and DC Drives





The VERSATEC is a fully automatic ultrasonic tension control for unwind and rewind applications. It offers simple setup and operation at the touch of a finger, and conveniently displays operating and setup information on a multi-line alphanumeric backlit display.

By simply entering the core diameter, the full roll diameter, the distance to the roll centerline, and the desired tension from the front keypad, the VERSATEC is ready to use. It then measures the roll diameter, and commands the required torque to control tension. Tension adjustments and setup selections may be made from the keypad, from remotely mounted push buttons, or through a PLC.

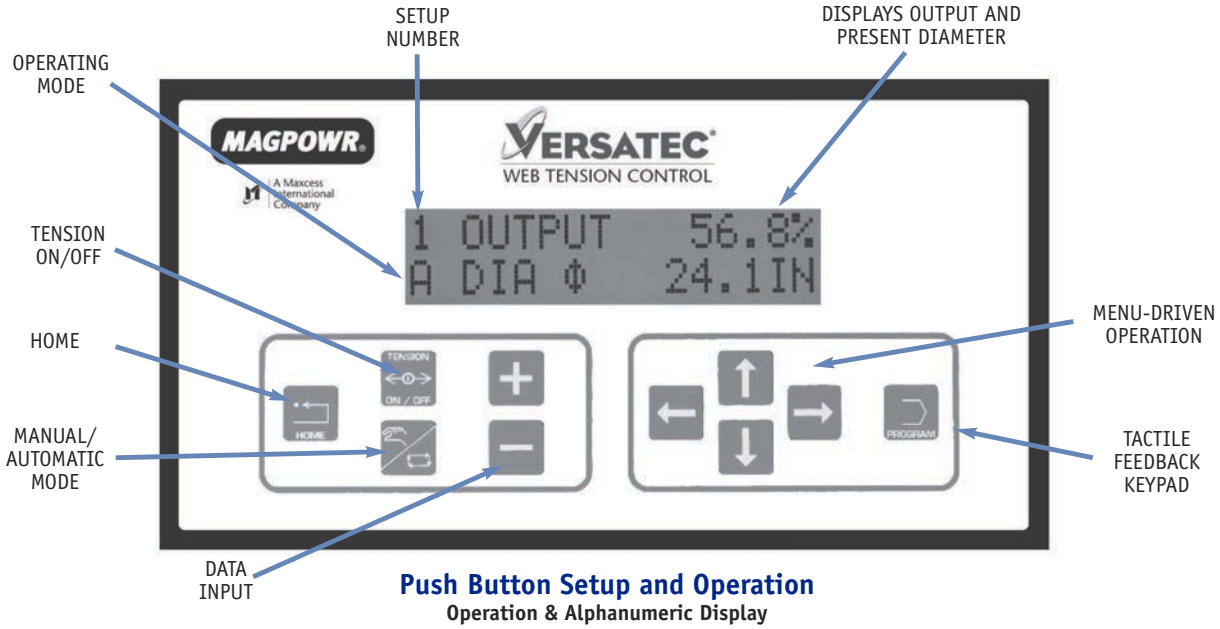
In unwind applications the Stop Multiplier feature can be used to increase torque during machine stops to provide smooth stops and prevent slack webs. In rewind applications Taper Tension prevents telescoping rolls and insures good roll edges by reducing tension as the roll diameter increases. Core and Full Roll alarms can be adjusted to give the operator a signal before reaching the end of the roll. This signal appears on the display and can also be connected to an external indicator.

The Inverse Diameter Output is provided to reduce the speed of the rewind clutch input motor or the differential shaft overspeed as the roll diameter increases, thus reducing the slip rpm and extending the life of the clutch or the differential shaft.

Features

- **Fully automatic unwind or rewind tension control improves process quality**
- **Multi-line alphanumeric display simplifies setup and operation**
- **Simultaneously displays tension setpoint and roll diameter so operator can monitor progress**
- **Ultrasonic non-contact sensor never touches the web**
- **Control electric or pneumatic brakes and clutches, or AC and DC drives**
- **Inverse Diameter Output reduces clutch slip for longer life**
- **Adjustable Taper Tension for winding optimum rolls**
- **Inertia Compensation for stopping large rolls**
- **Core and Full Roll Alarms alert operator for roll changes**
- **Local or remote tension adjustment and setup selection**

VERSATEC® Dancer Control Mode



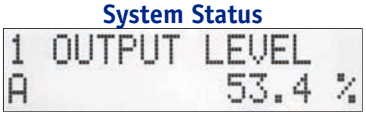
Push Button Setup and Operation

Operation & Alphanumeric Display
Menu driven operation and setup with online help

System Status

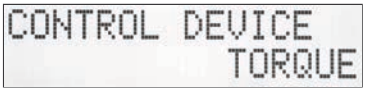
Home screen displays output, diameter (when US-2 sensor is used), setup number, and operating mode simultaneously

System Status



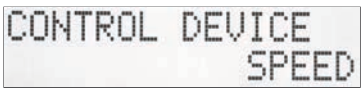
Home screen displays output, setup number and operating mode simultaneously (without diameter sensor)

Select Control Method



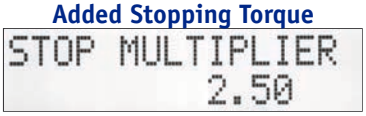
Optimized method for control of brake, clutch or drive in torque mode

Select Control Method



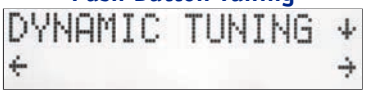
Optimized method for control of drive in speed mode

Added Stopping Torque



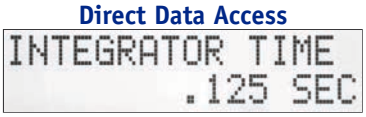
Helps stop unwind rolls with additional torque at machine stop

Push Button Tuning



Two-step dynamic tuning of system response

Direct Data Access

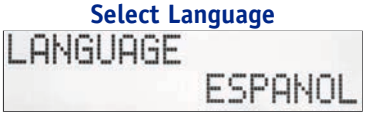


Results of dynamic tuning can be accessed and recorded

Direct Data Input

Parameters can be accessed and input directly

Select Language

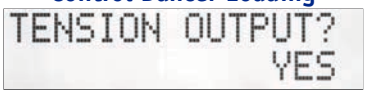


Choose English, French, German, Italian or Spanish

Select Units

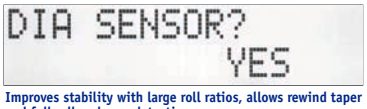
Choose English or metric units

Control Dancer Loading



Tension Output sets Dancer loading for remote adjustment

Use US-2 Ultrasonic Sensor

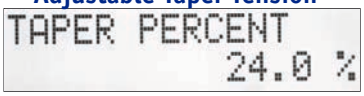


Improves stability with large roll ratios, allows rewind taper and full roll and core detection

Push Button Data Entry

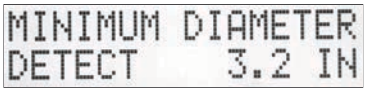
Input minimum and maximum diameter and distance to axis

Adjustable Taper Tension



Input desired rewind taper when using Tension Output and diameter sensor

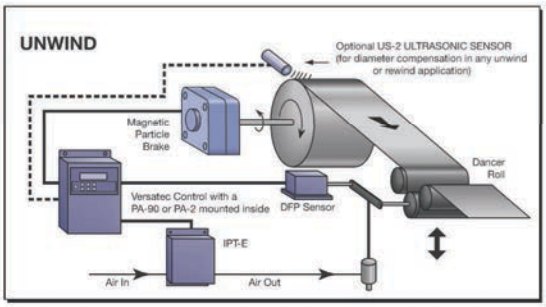
Core and Full Roll Detect

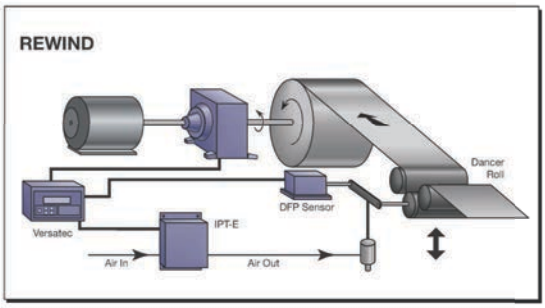


Core and full roll alarms flash on the display and trip external indicators when diameter sensor is used

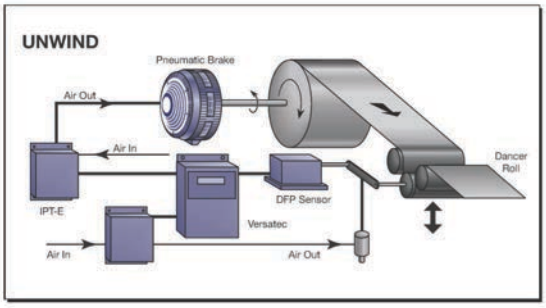
VERSATEC® Dancer Control Applications

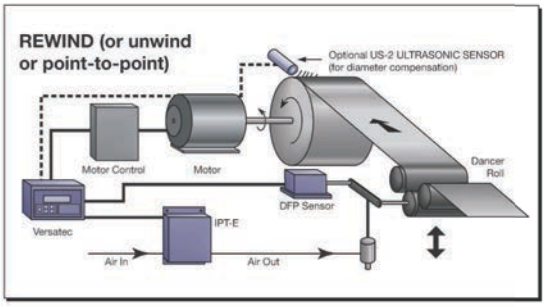
Control Magnetic Particle Clutches and Brakes





Control Air Brakes and Clutches, or AC and DC Drives





The VERSATEC provides closed loop tension control of a moving web in any dancer application. It measures the position of the dancer arm using a MAGPOWR DFP or DFP-2 Position Sensor, and commands the required output adjustment to achieve and maintain the desired position. It offers simple setup and operation at the touch of a finger, and conveniently displays operating and setup information on a multi-line alphanumeric display.

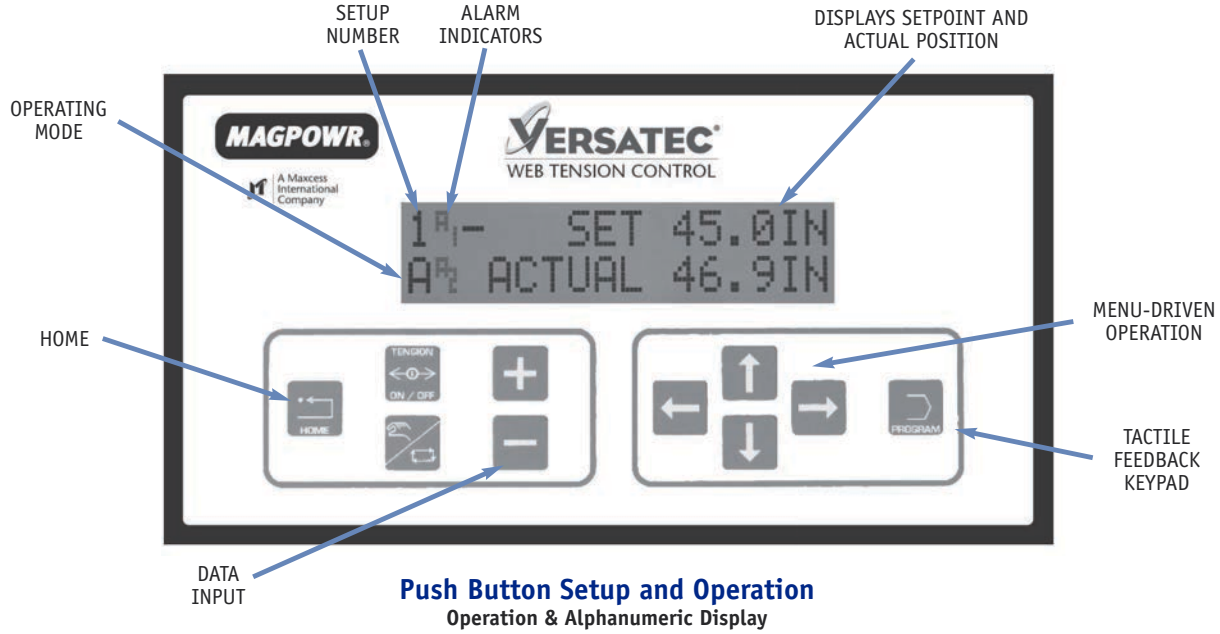
The VERSATEC program is optimized for torque or speed control applications, and will control a brake, clutch, AC or DC drive, or servo to maintain the dancer position. A simplified two-step tuning method provides stable operation through the entire roll. Use of the optional US-2 Ultrasonic Sensor allows diameter compensation for optimum control response through the entire roll, even with large roll ratios. This is an important new feature, since controllability changes dramatically with roll diameter changes. This feature is not available in other dancer controls.

Dancer position adjustments may be made through the VERSATEC keypad, through remotely mounted buttons, or through a PLC. Automatic centering maintains the desired dancer arm position automatically through the entire roll. Stop Multiplier and Inertia Compensation provide additional stopping torque during machine stops to prevent slack webs. And, the Tension Output can be used to adjust dancer loading, allowing taper tension in rewind dancer applications and automatic tension changes as you change setups.

Features

- Provides closed loop control of tension in any dancer application
- Optimized for torque or speed control operation
- Simple two-step tuning provides stable operation through the entire roll
- Automatic centering maintains dancer arm position through the entire roll
- Optional ultrasonic sensor allows diameter compensation for optimum response even with large roll ratios
- Multi-line display indicates actual output level and diameter simultaneously
- Inertia Compensation stops large unwind rolls
- Tension Output provides remote control of dancer loading
- Provides adjustable taper tension in rewind applications

VERSATEC® Free Loop Control Mode



Push Button Setup and Operation

Operation & Alphanumeric Display
Menu driven operation and setup with online help

System Status

```
1A1-   SET 45.0IN
A2 ACTUAL 46.9IN
```

Home screen displays loop setpoint, actual position, setup number and operating mode

Display Actual Output

```
1 OUTPUT LEVEL
A          53.4 %
```

Displayed as percent of maximum

Push Button Adjustment

```
LOOP DISTANCES
←              →
```

Input loop position and limits

Easy Setup

```
DIST FOR MAX
OUTPUT   60.0 IN
```

Enter desired distance for maximum output

Easy Setup

```
DIST FOR MIN
OUTPUT    6.0 IN
```

Enter desired distance for minimum output

Push Button Tuning

```
DYNAMIC TUNING
←              →
```

Easy tuning of system response

Direct Data Access

```
INTEGRATOR TIME
          .125 SEC
```

Results of dynamic tuning can be accessed and recorded

Direct Data Input

```
PROPORTIONAL
GAIN          1.49
```

Parameters can be accessed and input directly

Two Limit Switch Alarms

```
ALARM 1 ON DIST
          60.0 IN
```

On-screen indicator and output for external indicator

Two Limit Switch Alarms

```
ALARM 2 ON DIST
           6.0 IN
```

On-screen indicator and output for external indicator

Select Language

```
LANGUAGE
        FRANCAIS
```

Choose English, French, German, Italian or Spanish

Select Units

```
UNITS
   METRIC (MM)
```

Choose English or metric units

Setup Assistance

```
ECHO DETECT
        46.9 IN
```

On-screen sensor alignment indicator

Copy Setups

```
COPY TO SETUP 1
FROM SETUP 4
```

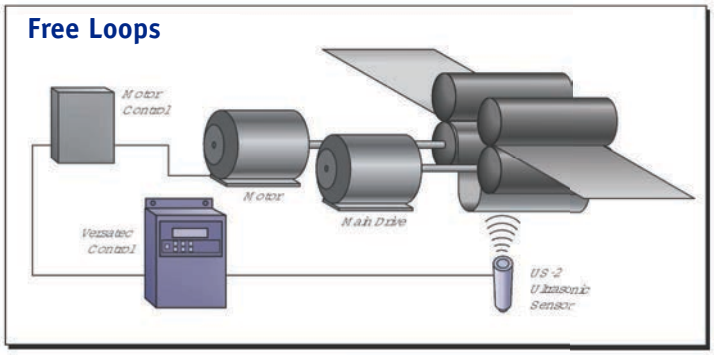
Setup information can be copied between four setups

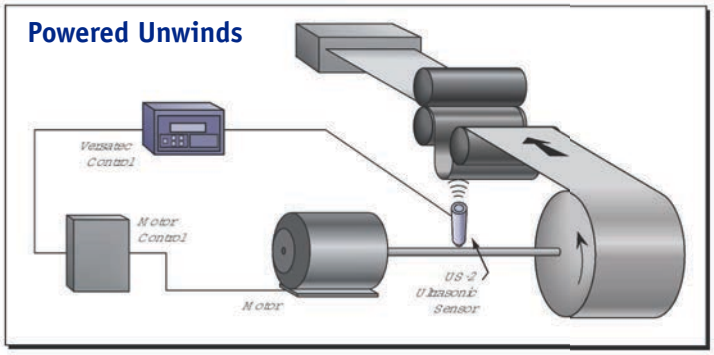
Program Security

```
ENTER CODE TO
LOCK        ****
```

Personalized code prevents unauthorized changes to setup parameters

VERSATEC® Free Loop Applications





The VERSATEC is a fully automatic non-contact Free Loop control. The machine operator simply enters the desired distance for the minimum and maximum outputs and the desired loop position using the keypad. The VERSATEC then controls the loop position by ultrasonically measuring the actual position and commanding the necessary output to achieve and maintain the desired position.

The VERSATEC program is optimized for speed control applications, and will control an AC or DC drive or servo to maintain the loop position. The multi-line display indicates the setpoint and actual position simultaneously, and simplifies setup and operation.

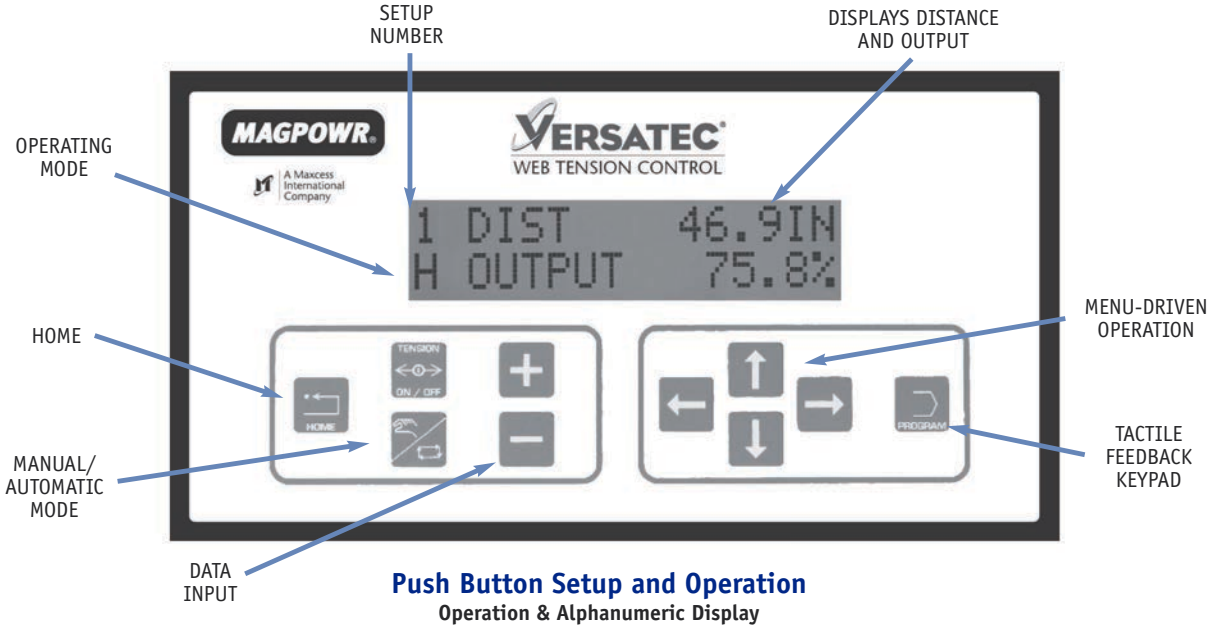
Position adjustments may be made from the VERSATEC keypad, through remotely mounted push buttons, or through a PLC. Its responsiveness to position changes is easily optimized for any system. Two alarm outputs can be adjusted to alert the operator before an out of range condition occurs, and an adjustable hysteresis feature prevents the alarms from chattering due to small changes in loop position.

Standard opto-isolated control inputs and outputs allow the VERSATEC to interface with PLCs, and AC & DC drives.

Features

- **Provides closed loop control of Free Loops for tension isolation**
- **Optimized for speed control applications**
- **Controls an AC or DC drive or servo to maintain loop position**
- **Multi-line display indicates setpoint and actual loop position simultaneously**
- **Loop position is controlled to an adjustable setpoint**
- **Ultrasonic sensor never touches the web**
- **Two alarm setpoints alert the operator when the loop reaches preset limits**

VERSATEC® Ranger Mode



Push Button Setup and Operation

Operation & Alphanumeric Display
Menu driven operation and setup with online help

System Status

```
1 DIST      46.9IN
H OUTPUT    75.8%
```

Home screen displays measured distance, output, setup number and operating mode

Easy Setup

```
TARGET DIST      ↓
←                →
```

Input distances and output is automatically scaled

Easy Setup: 1

```
DIST FOR MAX
OUTPUT   60.0 IN
```

Enter distance for maximum output

Easy Setup: 2

```
DIST FOR MIN
OUTPUT    6.0 IN
```

Enter distance for minimum output, setup is complete

Ignore Close Objects

```
ECHO REJECT DIST
          6.0 IN
```

Ignore stationary objects between sensor and target

Two Adjustable Alarms

```
ALARM 1 ON DIST
        60.0 IN
```

On-screen indicator and output for external indicator

Two Adjustable Alarms

```
ALARM 1 OFF DIST
        59.5 IN
```

Adjustable alarm off distance

Two Adjustable Alarms

```
ALARM 2 ON DIST
         6.0 IN
```

On-screen indicator and output for external indicator

Two Adjustable Alarms

```
ALARM 2 OFF DIST
         6.5 IN
```

Adjustable alarm off distance

Setup Assistance

```
ECHO DETECT
        46.9 IN
```

On-screen sensor alignment indicator

Select Language

```
LANGUAGE
       ITALIANO
```

Choose English, French, German, Italian or Spanish

Select Units

```
UNITS
   METRIC (MM)
```

Choose English or metric units

Select Units

```
UNITS
   ENGLISH (IN)
```

Choose English or metric units

Copy Setups

```
COPY TO SETUP 1
FROM SETUP 4
```

Setup information can be copied between setups

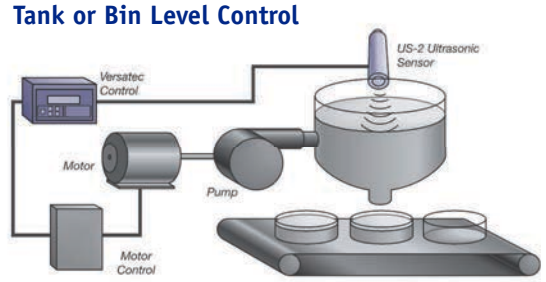
Program Security

```
ENTER CODE TO
LOCK        ****
```

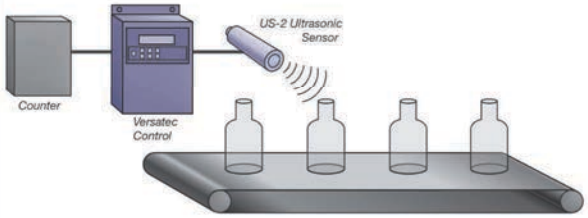
Personalized code prevents unauthorized changes to setup parameters

VERSATEC® Ranger Applications

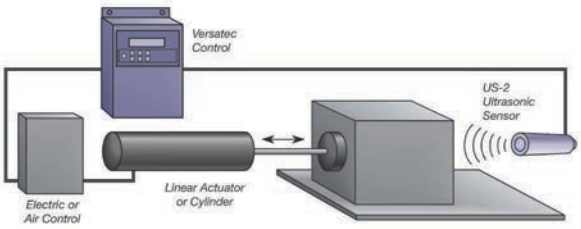
Tank or Bin Level Control



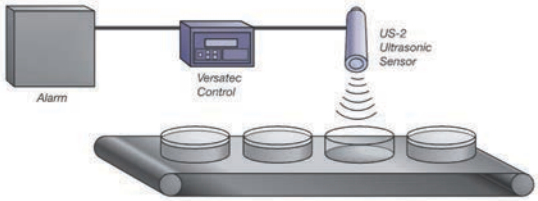
Transparent Object Counting



Actuator Control or Position Monitoring



Quality Control Presence Detection



The VERSATEC is an accurate ultrasonic ranging control and proximity detector featuring ease of operation in a wide range of applications. When used with the US-2 Ultrasonic Sensor, the VERSATEC provides an output proportional to the distance of an object from the sensor. The VERSATEC ranging control can be used anywhere proportional control, setpoint control, on-off control, or one or two level proximity switch control is needed. All of these operating modes are available and set from the keypad. The multi-line display provides easy setup and operation by displaying any parameter and its value simultaneously.

Two common modes of operation are: the Ranger mode, where the control output is proportional to distance, and the Bang-Bang mode, where the control operates like two proximity or limit switches. In all modes a proportional voltage or current, and two alarm outputs are available. Adjustable hysteresis prevents chatter of relays at the setpoint.

The control output is automatically scaled when the distance for minimum output and distance for maximum output are entered. The opto-isolated inputs and outputs can be connected directly to a PLC, AC or DC drive, computer system, pump control, or a MAGPOWR current-to-pressure transducer.

Features

- **Fully automatic control for a variety of process applications**
- **Selectable and reversible outputs control many types of equipment**
- **Control output is automatically ranged for easy setup**
- **Multi-line display indicates actual distance and output simultaneously**
- **Ultrasonic sensor never touches the object being sensed**
- **Minimum and maximum alarms signal when preset limits are reached**

VERSATEC® Specifications

Inputs

Power	115/230 VAC +/- 10%, 50/60 Hz, switch selectable, 24 VA
Ultrasonic Sensor	MAGPOWR US-2 Ultrasonic Sensor Sensor range: 6 inches to 60 inches (152 mm to 1524 mm)
Beam Spread	±10˚
Dancer Position Sensor	1-10 kΩ Potentiometer Sensor MAGPOWR DFP or DFP-2 Sensor 0 to 5 VDC Signal
Run/Stop, Tension On/Off, Remote Setup Select, Reset Hold	Switch closure, or 5 or 24 VDC

Outputs

Control	0 to 10 VDC, 1 mA max 4 to 20 mA, 500 Ω max -10 to +10 VDC, 1 mA max
Tension Reference	4 to 20 mA, 500 Ω max
Inverse Diameter	0 to 10 VDC, 1 mA max
Meter	0 to 1 mA, 500 Ω max
Alarm 1 & 2	DC solid state relay; 100 mA, 30 VDC max
Tension On/Off	DC solid state relay; 100 mA, 30 VDC max

Weight

VTC	3.2 kg (7 lb)
VTC-E	5 kg (11 lb)

Temperature

E-Operating	0 to 40˚ C (0-60˚ C for US-2)
Storage	-30 to 80˚ C

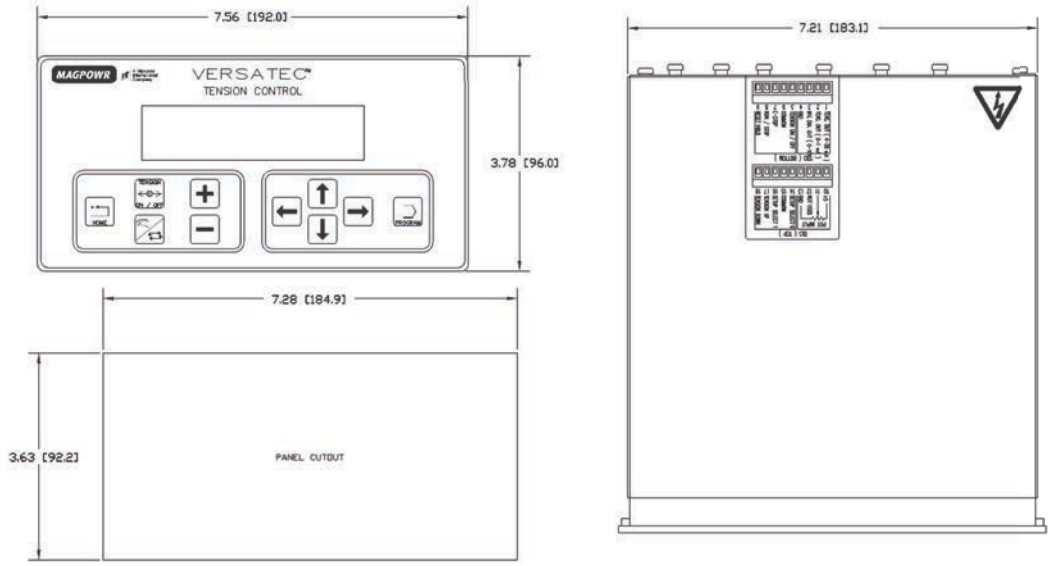
Enclosure

VTC Front Panel Enclosure	IP65 (IEC529), IP20 (IEC529)
VTC-E & US-2	IP65 (IEC529)

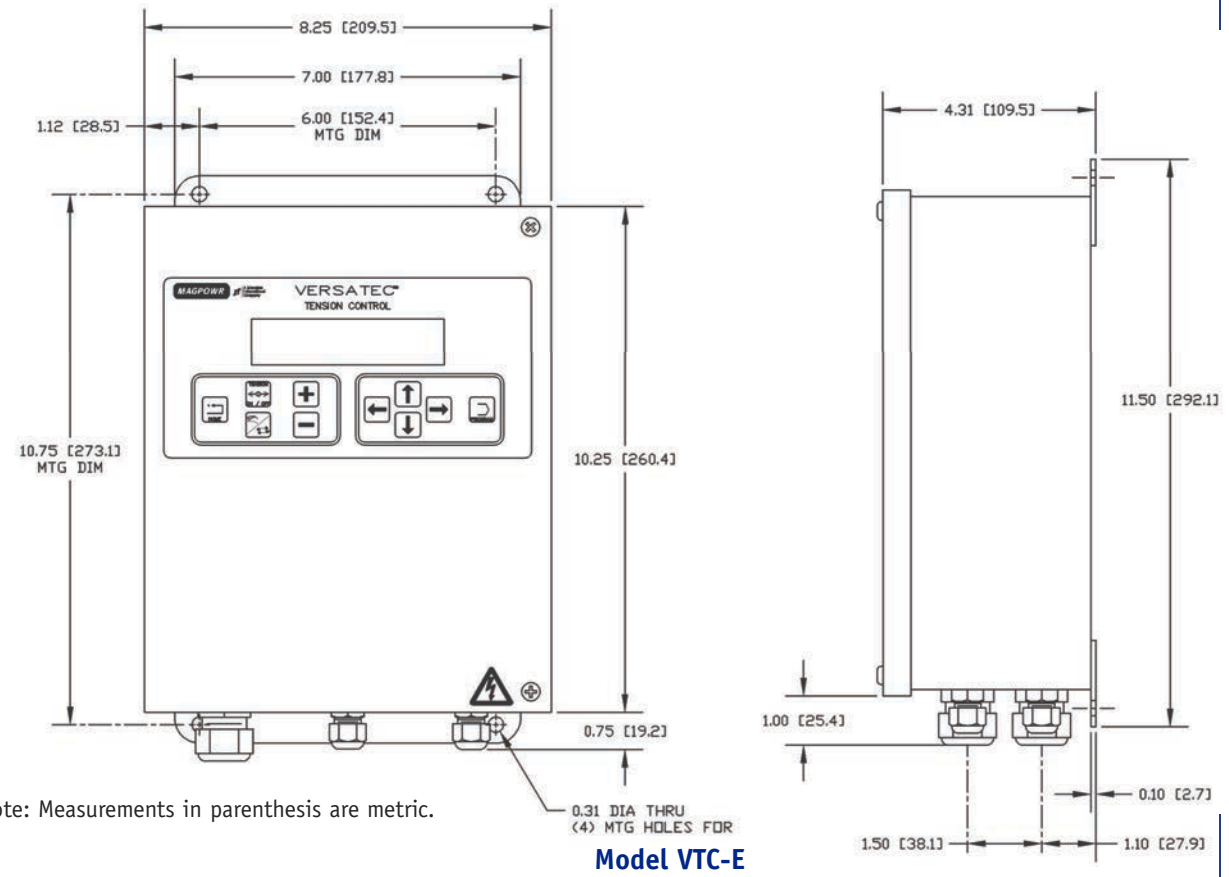
Certifications

UL 508C Listed

VERSATEC® Dimensions



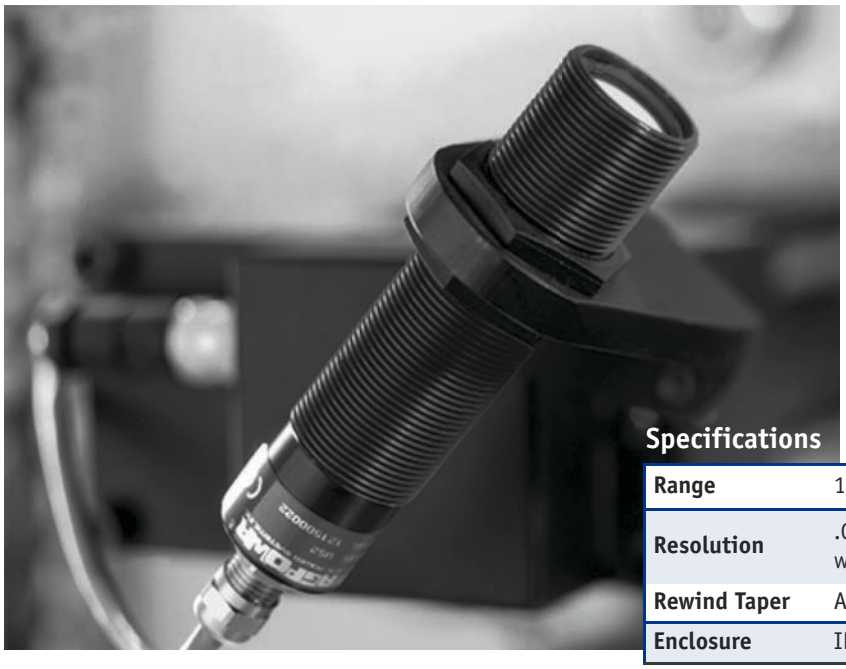
Model VTC



Note: Measurements in parenthesis are metric.

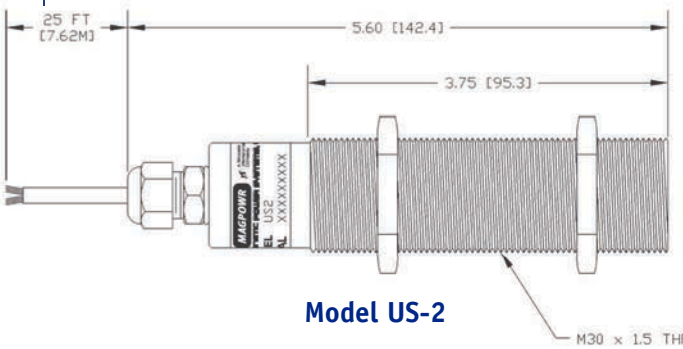
Model VTC-E

US2 Ultrasonic Sensor

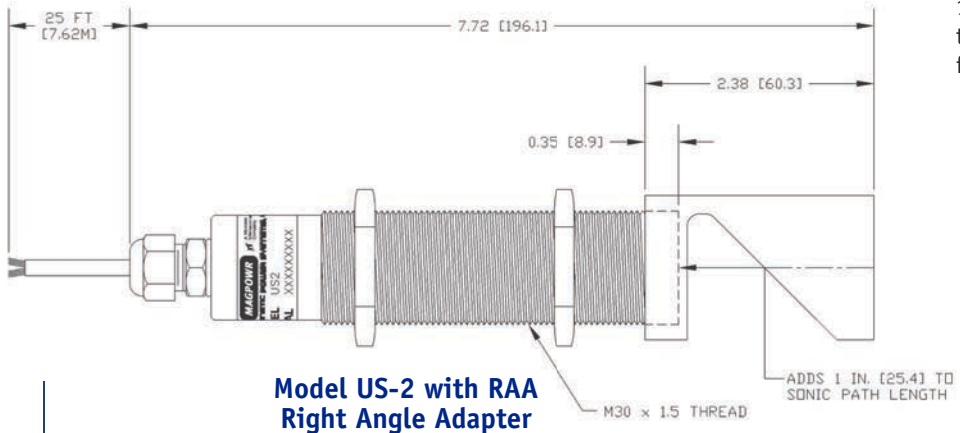


Specifications

Range	152 to 1,524 mm
Resolution	.025% of span, or 0.18 mm (0.007 inch) whichever is larger
Rewind Taper	Adjustable from 0 to 100%
Enclosure	IP65



Model US-2

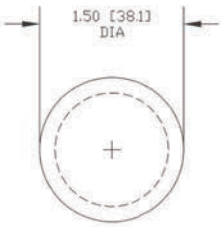


Model US-2 with RAA Right Angle Adapter

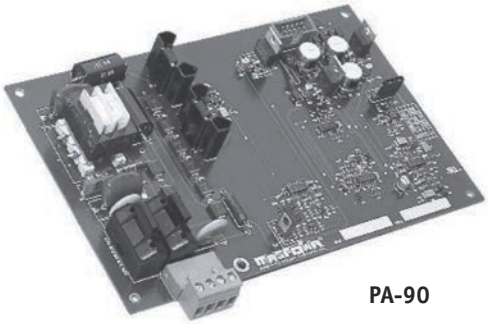
Notes:

Measurements in parenthesis are metric.

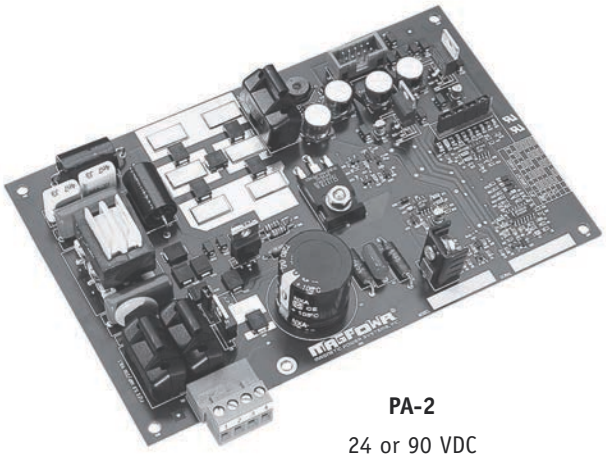
Face of roll cannot be closer than 152.4 mm (6 inches) or further than 1.524 m (60 inches) away from the face of sensor.



PA-90 & PA-2 Current Regulated Power Amplifiers For Versatec



PA-90
90 VDC



PA-2
24 or 90 VDC

The PA-2 and PA-90 Power Amplifiers are designed to be used with the VERSATEC to control magnetic particle brakes and clutches in tension control applications. Either model can be mounted inside any VERSATEC enclosure, and receives its control signals directly from the tension control.

The PA-90 is used to control 90 VDC brakes and clutches only, while the PA-2 can be used to control either 24 or 90 VDC units. With 115 VAC input, either power amplifier will provide a -3.6 to 90 VDC, current regulated output to accurately control a 90 VDC brake or clutch. With a 24 VDC input, the PA-2 will provide a -1.2 to 24 VDC, current regulated output to accurately control a 24 VDC unit.

Features

- Control any size magnetic particle brake or clutch
- Output is current regulated for better system response
- Selectable operating current ranges for optimum controllability
- Mounts inside either VERSATEC enclosure
- Reverse current to extend torque range is standard

Specifications

PA-2 (24 VDC Brakes and Clutches)

Input	24 VDC ±10%
Output	-1.2 to 24 VDC, with selectable current ranges 1/8, 1/4, 1/2, 1, 2 amp max

PA-2 (90 VDC Brakes and Clutches)

Input	115 VAC ±10%, 50/60 Hz
Output	-3.6 to 90 VDC, with selectable current ranges 1/8, 1/4, 1/2 amp max

PA-90

Input	115 VAC ±10%, 50/60 Hz
Output	-3.6 to 90 VDC, with selectable current ranges 1/8, 1/4, 1/2 amp max

Certifications

UL 508C Listed