

## TENSION TRANSDUCERS CANTILEVERED

### *Tensi-Master® CR*



Cantilevered Load Cells for Measurement and Control of Tension In Wire, Fiber & Ribbon Applications

#### Performance Benefits

Cleveland Motion Controls specializes in the design and application of web tension control product solutions. Included is the family of Cleveland-Kidder® Tensi-Master® CR Tension Transducers, providing measurement and control of tension in wire, fiber and ribbons.

Tensi-Master® CR Tension Transducers are designed for supporting a customer supplied pulley assembly in applications such as printing, coating, cutting, plating, laminating, and embossing; and in the processing of tire cord, textiles, wire, tape, extensible film, thread and yarn, paper, foil, cellophane, and many other products.

Tensi-Master® CR Tension Transducers are easily applied, provide consistent quality, and are highly responsive for enhanced system performance. With heavy duty construction and a low maintenance design, they minimize downtime.

#### Design Features

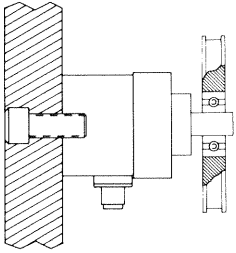
Tensi-Master® CR Tension Transducers utilize a cantilevered “twin beam” to render greater sensitivity and response without sacrificing protection from overload and transients common to industrial process machinery.

Semiconductor strain gauges are bonded to the beam assembly, and provide a linear output signal as the beam assembly is deflected by the force acting on the pulley or roll.

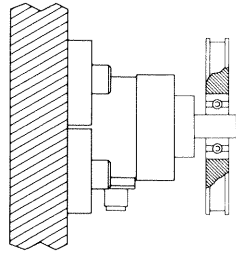
Tensi-Master® CR Tension Transducers are available in eight different load ratings, providing tension sensing of wire, fiber and ribbons over an extremely wide range. With a versatile transducer orientation capability, they easily accommodate tension forces applied in any direction. Flexibility of installation is accomplished by adding mounting hardware to a basic module to complete the body style.

- Negligible displacement of “twin beam” design resulting in high level linear output signal, high frequency response and overall system stability.
- Easily oriented at any angle to accommodate all web paths.
- Accommodates customer-mounted pulley.
- Heavy duty construction with corrosion resistant finish and dust seal.
- Incorporates a built-in overload stop.
- Accommodates “MS type connectors.
- Wide range of Maximum Force ratings.
- Wide operating temperature range.
- Corrosion-resistant finish and dust seal.

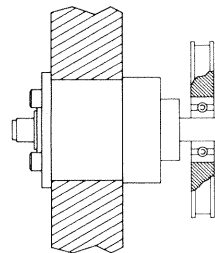
## METHODS OF INSTALLATION



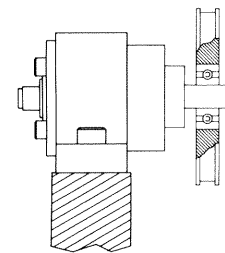
**TYPE "S"**  
Stud Mounted



**TYPE "FL"**  
Flange Mounted



**TYPE "BR"**  
Bearing Replacement



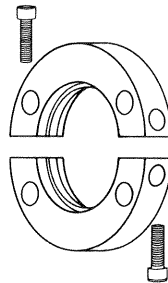
**TYPE "PB"**  
Pillow Block

## Tensi-Master CR CONFIGURATION GUIDE

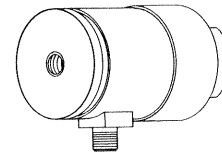
This diagram illustrates the various configurations provided by the Tensi-Master modular design.

Note: Tensi-Master CR transducers are designed for use with a cantilevered roller only.

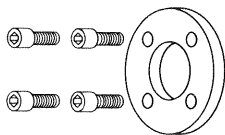
See operating parameters.



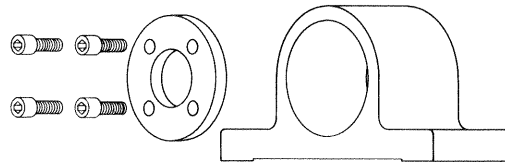
**TYPE FL MOUNTING KIT**  
FL SIZE 1 (MO-04493)



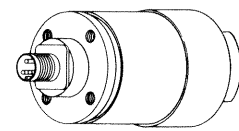
**TRANSDUCER CARTRIDGE**  
TNSC-1T (MO-08282-X)



**TYPE BR MOUNTING KIT**  
BR SIZE 1 (MO-04495)



**TYPE PB MOUNTING KIT**  
PB SIZE 1 (MO-04494)



**TRANSDUCER CARTRIDGE**  
TNEC-1T (MO-08283-X)

## HOW TO ORDER

### CARTRIDGES

TYPE	SIZE	CATALOG NO.	MWF RATING (lbs.)								
			5	10	15	25	50	75	100	150	
TNSC	1T	MO-08282-									
TNEC	1T	MO-08283-	0	1	2	3	4	5	6	7	

### MATING CONNECTORS

TYPE	CATALOG NO.	DESCRIPTION
Standard Connector	X43-07218	MS-3106A-10SL-3S
90° Connector	X43-08093	MS-3018A-10SL-3S
Clamp and Bushing	X43-07248	97-3057-1004-1

### MOUNTING KITS

TYPE	SIZE 1
FL	MO-04493
BR	MO-04495
PB	MO-04494

### SELECT:

- Maximum Working Force (MWF) rating, based upon the value determined by using the equation provided in the calculation section.
- Transducer Cartridge Type and Size:  
TNSC-1T for Type S and FL installations.  
TNEC-1T for Type BR and PB installations.
- Required Mounting Kit for Type FL, BR and PB installations.
- Standard length (17 ft. or 23 ft.) or custom length (up to 150 ft.). Transducer Cables, or Mating Connectors. (specify mating electronic equipment when ordering Transducer Cables.)

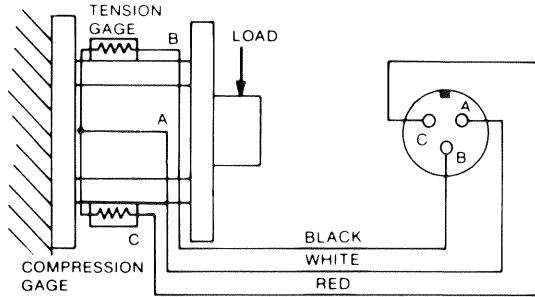
### EXAMPLE:

An TNEC-1T Transducer Cartridge with a 75 lb. MWF rating is No. MO-08283-5. For a Type PB installation use Mounting Kit No. MO-04494.

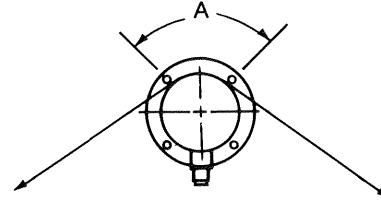


## PRINCIPLE OF OPERATION

### DIAGRAM OF "TWIN BEAM" TRANSDUCER GAGING AND WIRING



## CALCULATION



Determine the M.W.F. required using the following equation:

$$M.W.F. = 2T \times K \times \sin \frac{A}{2}$$

M.W.F. = Maximum Working Force (lbs.)  
 T = Maximum Total Tension (lbs.)  
 K = Transient Tension Overload Factor  
 (normally between 1.4 and 2.0)  
 A = Wrap Angle

## SPECIFICATIONS

Gage Resistance:	Each transducer contains half a bridge having a nominal resistance of 120 ohms per gage, wired as shown above.
Gage Factor:	100 nominal
Excitation Voltage:	5.6 VDC or VAC (rms) maximum
Output Signal @ Rated M.W.F. (Maximum Working Force):	250 mV nominal
Operating Temperature Range:	0°F. to 150°F. (Consult factory if operating temp. is greater than 150°F.)
Sensitivity Change with Temperature:	Less than 0.02%/°F. of rated output typical
Humidity:	95% R.H.
Combined Non-linearity and Hysteresis:	±0.5% maximum of rated output

Repeatability:	±0.2% maximum of rated output
Non-destructive Overload Rating:	150% of M.W.F.
Ultimate Overload Rating:	300% of M.W.F. typical
"MS" Connectors:	MS-3102A-10SL-3P (3 Pin Connector)
Input Impedance Required: (Transducer Signal Amplifier if not CMC supplied)	5K Ohm per transducer.
Output Impedance:	820 Ohms (nominal)
Weight:	
Transducer Cartridge	1.7 lbs.
With Type "FL" Mounting Kit	2.6 lbs.
With Type "BR" Mounting Kit	2.0 lbs.
With Type "PB" Mounting Kit	4.4 lbs.

## OTHER PRODUCTS

### CLEVELAND-KIDDER™ WEB TENSION CONTROL PRODUCTS

- PRECISION TENSION TRANSDUCERS
  - Type TMR for rotating shaft installations
  - Type TMT for non-rotating shaft installations
  - Type UPB for use with pillow block bearings
  - Type CFL for narrow webs
  - Type TSN for wire and filament
- TENSION INDICATORS AND MONITORS
  - TENSI-MASTER® modular tension indicators
  - Type TIX intrinsically safe tension amplifier
- TENSION CONTROLLERS
  - Type UCM for electro-magnetic clutches and brakes
  - Type UCP for pneumatic clutches and brakes
  - Type TCD for electric drives

### ELECTRIC DRIVES TO 500 HORSEPOWER

- DC DRIVES
  - Pacemaster® 1 & 2 ..... Non-Regenerative
  - Pacemaster® 4 & 5 ..... Regenerative
  - Pacemaster® 3 ..... 3 Pulse Non-Regenerative
  - Pacemaster® 6 ..... 6 Pulse Non-Regenerative
  - Pacemaster® 7 ..... Battery Operated DC Servo Drives
  - Pacemaster® 12 ..... 6 Pulse Regenerative
  - Digimaster® 12 ..... Microprocessor-based, 6 Pulse Regenerative
- AC DRIVES
  - Digivec™ ..... Flux Vector
- MULTIMOTOR INDUSTRIAL DRIVE SYSTEMS

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

REPRESENTED BY:

### INDUSTRIAL PRODUCTS DIVISION

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