

## TENSION TRANSDUCERS

### CARTRIDGE-STYLE

### *Tensi-Master®*

Modular Force  
Transducers (Load  
Cells) Combining  
Highly Responsive Web  
Tension Measurement  
& Control With  
Installation Flexibility



#### 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® Tension Transducers (Load Cells), providing measurement and control of web tension in continuous process machinery applications such as printing, embossing, slitting, coating, cutting, punching, laminating and folding; and in the production of paper, cellophane, cardboard, rubber, textiles, linoleum, foil, and extensible and photo film.

Tensi-Master® Tension Transducers are force transducers that are easily applied, provide consistent product quality, and are highly responsive for enhanced system performance. Negligible motion maintains proper roll alignment.

Tensi-Master® Tension Transducers are modular in design, providing the greatest degree of installation and application flexibility. With heavy duty construction and a low maintenance design, they reduce the necessity of machine modifications while minimizing downtime.

#### Design Features

Cleveland-Kidder Tensi-Master 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.

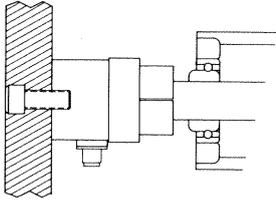
Semiconductor strain gauges are bonded to the beam assembly, and provide a linear output signal as the beams are deflected by the force acting on the transducer roll.

Tensi-Master Tension Transducer flexibility of installation is accomplished by adding mounting hardware to a basic module to complete the body style. Two basic module types are offered in two sizes each, with each size available in five different load ratings. This allows sensing of web tension over an extremely wide range. With an infinite transducer orientation capability, they easily accommodate tension forces applied in any direction.

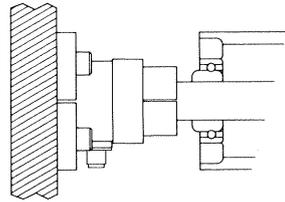
Tensi-Master Tension Transducers are designed to accommodate shaft expansion and shaft misalignment up to one degree. They incorporate a temperature compensated bridge circuit, a split coupling mount, built-in overload stop, “MS” type connectors, and a corrosion resistant finish and dust seal.

- 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.
- Available in two basic module types and two different sizes—with each size available in 5 different load ratings.
- Wide range of Maximum Working Force ratings In each type & size.
- Wide operating temperature range.
- Built-in overload stop.
- Accommodates “MS” type connectors.
- Corrosion-resistant finish and dust seal.
- Accommodates shaft expansion & shaft misalignment up to 1°.

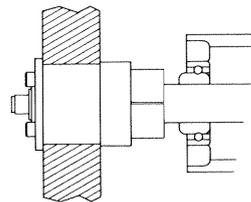
## METHODS OF INSTALLATION



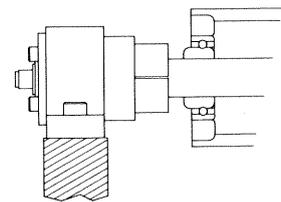
**TYPE "S"**  
Stud Mounted



**TYPE "FL"**  
Flange Mounted



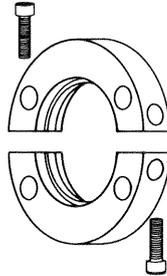
**TYPE "BR"**  
Bearing Replacement



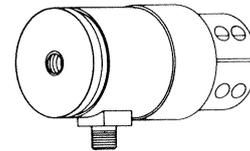
**TYPE "PB"**  
Pillow Block

## Tensi-Master CONFIGURATION GUIDE

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

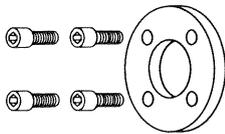


**TYPE FL MOUNTING KIT**  
FL SIZE 1 (MO-4493)  
FL SIZE 2 & 3 (MO-04498)

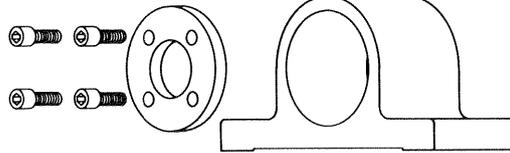


**TRANSDUCER CARTRIDGE**

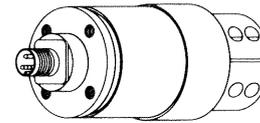
SC-1T(1.25), MO-04491-XY  
SC-1T(1.50), MO-11738-XY  
SC-2T(1.25), MO-04496-XY  
SC-2T(1.50), MO-11740-XY  
SC-3T(1.94), MO-09868-XY



**TYPE BR MOUNTING KIT**  
BR SIZE 1 (MO-04495)  
BR SIZE 2 & 3 (MO-04500)



**TYPE PB MOUNTING KIT**  
PB SIZE 1 (MO-04494)  
PB SIZE 2 & 3 (MO-04499)



**TRANSDUCER CARTRIDGE**

EC-1T(1.25), MO-04492-XY  
EC-1T(1.50), MO-11737-XY  
EC-2T(1.25), MO-04497-XY  
EC-2T(1.50), MO-11739-XY  
EC 3T(1.94), MO-09869-XY

## HOW TO ORDER

**SELECT:**

1. Maximum Working Force (MWF) rating, based upon calculations using the Cleveland-Kidder Tension Equipment Application Data Sheet.
2. Transducer Cartridge Type and Size:  
(Bore size - 1.25 or 1.50 inches)  
SC-1T or SC-2T for Type S and FL installations.  
EC-1T or EC-2T for Type BR and PB installations.  
(Bore size - 1.94 inches)  
SC-3T for Type S and FL installations  
EC-3T for Type BR and PB installations
3. Required Mounting Kit for Type FL, BR and PB installations.
4. Transducer Bushing, if bore reduction is required.
5. Options and Accessories as required  
(specify mating electronic equipment when ordering Transducer Cables).

**EXAMPLE:**

An EC-1T (1.25) Transducer Cartridge with a 75 lb. MWF rating is No. MO-04492-20. For a Type PB installation use Mounting Kit No. MO-04494. If a 1" bore is required use Transducer Bushing No. MO-0988-3.

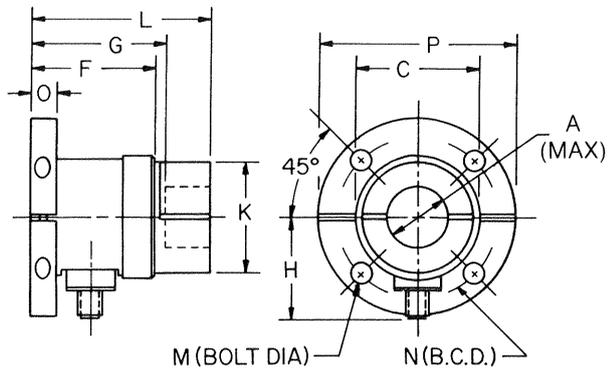
**CARTRIDGES**

			MWF (lbs.)				
Shaft-in.	Type	Size 1T	25	50	75	100	150
1.25	SC EC	MO-04491- MO-04492-	00	10	20	30	40
1.50	EC SC	MO-11737- MO-11738-	00	10	20	30	40
Shaft-in.	Type	Size 2T	150	250	400	600	1000
1.25	SC EC	MO-04496- MO-04497-	00	10	20	30	40
1.50	EC SC	MO-11739- MO-11740-	00	10	20	30	40
Shaft-in.	Type	Size 3T	150	250	400	600	1000
1.938	SC EC	MO-09868- MO-09869-	00	10	20	30	40

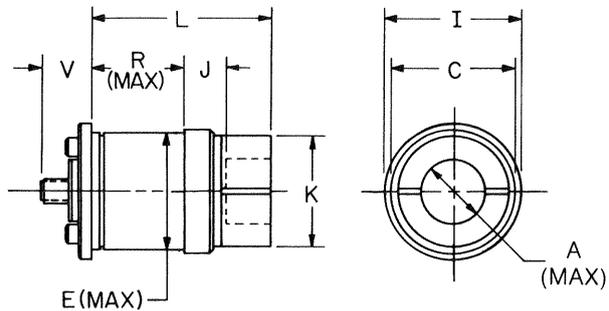
**MOUNTING KITS**

TYPE	SIZE 1	SIZE 2 & 3
FL	MO-04493	MO-04498
BR	MO-04495	MO-04500
PB	MO-04494	MO-04499

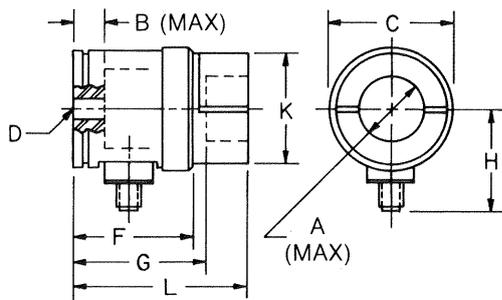
## DIMENSIONS



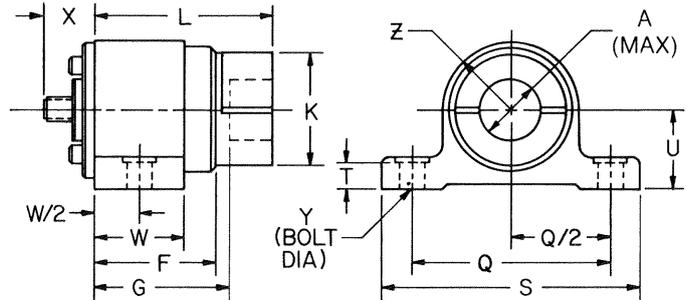
**TYPE SC CARTRIDGE with FL MOUNTING KIT**



**TYPE EC CARTRIDGE with BR MOUNTING KIT**



**TYPE SC CARTRIDGE**



**TYPE EC CARTRIDGE with PB MOUNTING KIT**

DIMENSIONS IN INCHES - ALLOW 2.5 IN. CLEARANCE FOR CONNECTOR													
SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M
1T(1.25)	1.25	0.55	2.50	1/2-13	2.375	2.44	2.60	2.10	2.75	0.87	2.25	3.63	3/8
2T(1.25)		0.60	2.75	5/8-11	2.625	2.85	2.98	2.23	3.00	1.11		4.04	1/2
1T(1.50)	1.50	0.55	2.50	1/2-13	2.375	2.44	2.60	2.10	2.75	0.87	2.50	3.63	3/8
2T(1.50)		0.60	2.75	5/8-11	2.625	2.85	2.98	2.23	3.00	1.11		4.04	1/2
3T(1.94)	1.938	0.60	2.75	5/8-11	2.625	2.85	2.98	2.23	3.00	1.61	2.95	4.54	1/2
	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1T(1.25, 1.50)	3.25	0.50	4.00	4.00	1.74	5.38	0.58	1.63	1.02	1.75	1.02	1/2	1.50
2T(1.25, 1.50)	3.50	0.62	4.50	5.00	1.87	6.12	0.68	1.94	1.02	1.88	1.02	1/2	1.70
3T(1.94)	3.50	0.62	4.50	5.00	1.87	6.12	0.68	1.94	1.02	1.88	1.02	1/2	1.70

Shaft length to be:

"Between Frames Width" less than twice G for type "S" and "FL" installations.

"Between Frames Width" less than twice J for type "BR" installations.

Certified Mounting Dimensions Supplied Upon Request.

## OPTIONS AND ACCESSORIES

- Transducer Bushings to Reduce Standard Bore Size.  
(Note: Standard Bushing O.D. is 1.25 inches)

TRANS. BUSHING	Finished Bore Size						
	CATALOG NO.	5/8"	3/4"	7/8"	1"	1-1/8"	1-3/16"
MO-0988-	0	1	2	3	4	5	

- Air Purging Connectors for Hazardous Locations.  
(not available for Type BR)

- Standard Transducer Cables ..... 1 @ 20 ft. & 1 @ 25 ft.

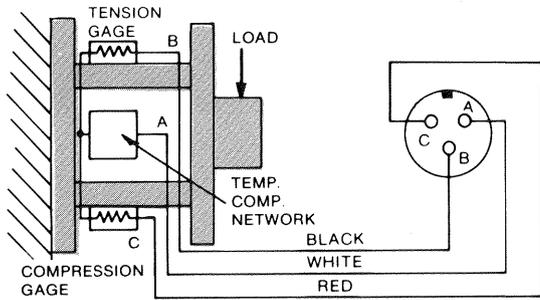
- Special Transducer Cables ..... Lengths as specified

- Mating "MS" Connector, Boot and Clamp Set

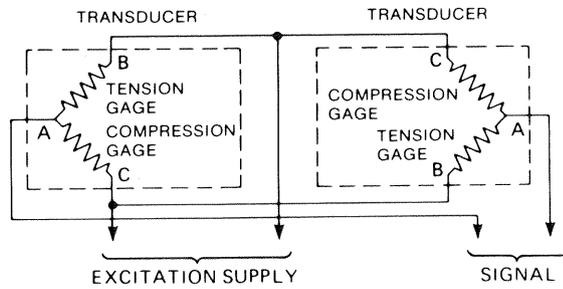
- Low Pressure Air Regulator (MO-02673) ..... For use with air purged applications

# PRINCIPLE OF OPERATION

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



## BASIC WIRING DIAGRAM TO FORM A COMPLETE BRIDGE



# 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.:	250 mV nominal/transducer (Maximum Working Force) 500 mV nominal/pair
Operating Temperature Range:	0° F. to +200° F. (Consult factory if operating temp. is greater than 200° 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:	5K Ohm per transducer. (10K/pair) (Transducer Signal Amplifier if not CMC supplied)
Output Impedance:	820 Ohms (nom.) per transducer or 1640 Ohms (nom.) per pair at 25°C.

WEIGHT (lbs. each)			
DESCRIPTION	SIZE		
	1T	2T	3T
TRANSDUCER CARTRIDGE	3.3	4.4	5.5
With Type "FL" MOUNTING KIT	4.2	6.0	7.1
With Type "BR" MOUNTING KIT	3.6	4.9	6.0
With Type "PB" MOUNTING KIT	6.0	8.5	9.6

# OTHER PRODUCTS

## CLEVELAND-KIDDER™ WEB TENSION CONTROL PRODUCTS

- PRECISION TENSION TRANSDUCERS
  - Type TMR for 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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