

# INSTRUCTION MANUAL

# CLEVELAND-KIDDER<sup>®</sup> TENSION INDICATOR SERIES

AO-70308



REVISION  
**AA**

**REVISION HISTORY**

<i>Rev</i>	<i>ECO</i>	<i>Author</i>	<i>Date</i>	<i>Description of Change</i>
AA	- - -	CAD	07/28/2005	As Released

**INTENDED USERS**

This Instruction Manual is to be made available to all persons who are required to configure, install or service the equipment described in this manual or any other related activity.

**FURTHER INFORMATION**

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# 1 INSTRUCTION MANUAL

## 1.1 PRODUCT LINE OVERVIEW

The table below is a cross reference between the Model Description and the Model Number of the products covered by this manual.

Model No.	Model Description
MWI-13491-1	Tension Indicator, Ultra Series Amplifier, Analog Display, Non-Isolated Outputs
MWI-13491-2	Tension Indicator, Ultra Series Amplifier, Analog Display, Isolated Outputs
MWI-13491-3	Tension Indicator, Ultra Series Amplifier, Digital Display, Non-Isolated Outputs
MWI-13491-4	Tension Indicator, Ultra Series Amplifier, Digital Display, Isolated Outputs
MWI-13491-5	Dual Tension Indicator, Ultra Series Amplifier, Digital Display, Isolated Outputs
MWI-13491-6	Dual Tension Indicator, Ultra Series Amplifier, Digital Display, Isolated Outputs w/ Safety Features
MWI-13654-1	Tension Indicator, Classic Series Amplifier, Analog Display, Non-Isolated Outputs
MWI-13654-2	Tension Indicator, Classic Series Amplifier, Analog Display, Isolated Outputs
MWI-13654-3	Tension Indicator, Classic Series Amplifier, Digital Display, Non-Isolated Outputs
MWI-13654-4	Tension Indicator, Classic Series Amplifier, Digital Display, Isolated Outputs
MWI-13654-5	Dual Tension Indicator, Classic Series Amplifier, Digital Display, Isolated Outputs
MWI-13654-6	Tension Indicator, Classic Series Amplifier, Large Digital Display, Non-Isolated Outputs
MWI-13654-9	Tension Indicator, Classic Series Amplifier, Digital Display, Isolated Outputs, w/ Offset Potentiometer

## 1.2 GENERAL DESCRIPTION

The Tension Indicator is based upon the Cleveland-Kidder DIN Rail Amplifier. Refer to the appropriate amplifier manual listed below for detailed setup and calibration information.

Document	Description of Amplifier
MAN-13261	Ultra Line DIN Rail Amplifier, Isolated Outputs
MAN-13262	Ultra Line DIN Rail Amplifier, Non-Isolated Outputs
MAN-13467	Classic Line DIN Rail Amplifier, Isolated Outputs
MAN-13466	Classic Line DIN Rail Amplifier, Non-Isolated Outputs

The tension indicator enclosure houses the amplifier, fuses, 24 VDC supply, and either analog meter or digital meter to provide a human readable indication of tension.

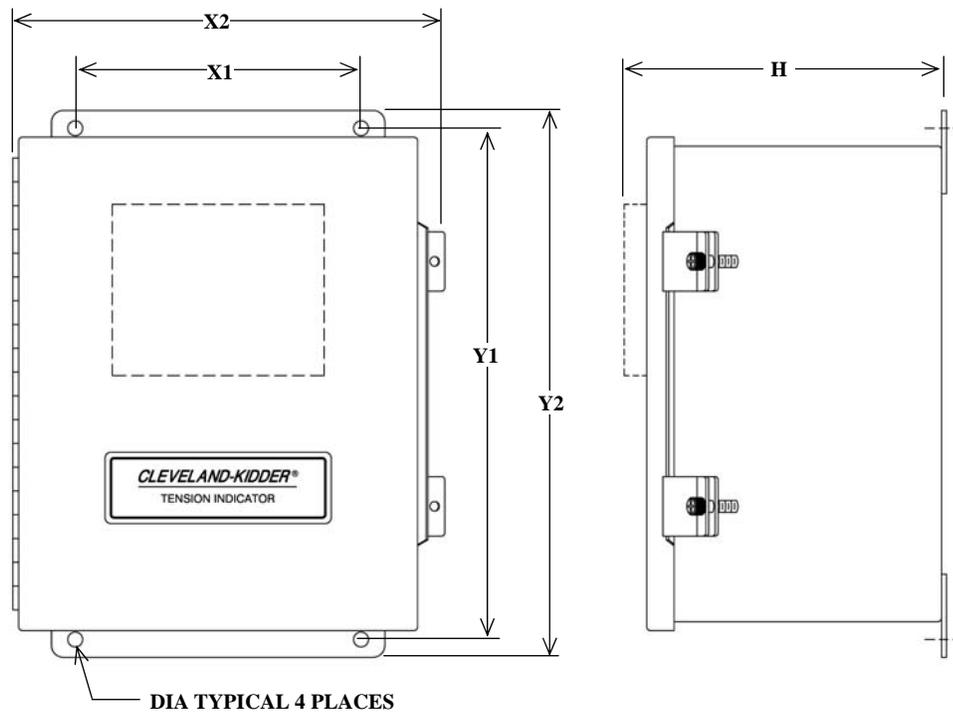
The 24 VDC power supply has a wide range “universal input” which accepts 86 to 264 VAC. No switches or jumpers need to be changed for operation at 120 or 240 VAC. The 24V output has been factory adjusted for a nominal 24 VDC, but minor changes can be invoked by adjusting the small potentiometer on the front of the supply. A green LED on the front of the supply module indicates that the 24 VDC output is active.

The left-most DIN mounted fuse holder ( FU101 ) protects the 24 VDC power network. It has a 0.3A 250V 5x20mm fuse installed. Opening the holder will remove 24V power from the amplifier’s supply and disable the entire unit.

The right-most DIN mounted fuse holder ( FU102 ) fuses the AC line input. It accepts a 1A 250V fuse. For optimum protection, it can be replaced with a 0.25A fuse when operated at 240 VAC.

The bottom of the enclosure has a #10-32 stud and nuts for making the necessary chassis-to-earth ground connection. Toothed lock-washers are provided. Do not use the #10-32 stud on the door to make the field ground connection.

**1.3 DIMENSIONS**



DIM	Models:	
	MWI-13491-[1-4] MWI-13654-[1-4, 9]	MWI-13491-[5,6] MWI-13654-[5,6]
X1	6.00" (152mm)	10.00" (254mm)
X2	9.07" (231mm)	13.07" (332mm)
Y1	10.75" (273mm)	12.75" (324mm)
Y2	11.5" (293mm)	13.5" (343mm)
H*	7.00" (178mm)	7.00" (178mm)
DIA	0.31" (8mm) Diameter	0.31" (8mm) Diameter

\* max dimension shown, meter faceplate thickness varies with model type

## 1.4 DISPLAYS

Both analog and digital displays are offered. Each display affords a scaling mechanism so that the meter can be scaled independently of the amplifier's main +/-10V ( or 4-20 mA ) output. Always calibrate the amplifier first for the desired control ( un-damped ) output. Then adjust the display to report the desired value.

It is important that the meter be wired into the correct terminals to avoid over-driving the movement. Also note that the amplifier can afford two different levels of damping. Damping is useful in reducing any fluctuations in the tension signal so that the average value is easier to read.

Inside the amplifier, there are two jumper switches that affect the meter output. Refer to the appropriate amplifier manual for details.

For reference:

Jumper J1 on the output card configures meter circuit for 1 mA analog meter,

J1 ( 2-3 ) or 2V digital panel meter J1 ( 1-2 ).

J2 affects damping. J2 ( 1-2 ) position  $F_c = 0.3$  Hz, J2 ( 2-3 ) is  $F_c = 3.7$  Hz

### 1.4.1 ANALOG DISPLAY

The analog display uses a 1 mA D'Arsonval style meter, based upon a taut-band movement for resistance against the affects of mechanical shock.

A scaling board is affixed to the meter terminals to allow user scaling. The maximum sensitivity ( multi-turn pot fully clockwise ) is sufficient to allow a 40% F.S. signal ( referenced to the 10V output ) to be scaled to "100" F.S. on the analog meter. Adjusting the multi-turn scaling pot fully counter-clockwise will allow nearly complete attenuation ( i.e. the analog meter can display less than 10% for a F.S. signal reported on the 10V output ).

### 1.4.2 DIGITAL DISPLAY

The digital display employs a 3 ½ digit, LED based meter. It is powered from the low voltage 24 VDC supply, and therefore needs no selection for AC line supply.

Behind the RED lens are pots for SCALING ( on the right ) and a ZEROING ( on the left ). To remove the lens, carefully use two screwdrivers. The first one is used on the center-bottom of the lens to depress and hold the red plastic latch which secures the lens to the black plastic case. The second screwdriver should be held at right angles to the first and is used to lift the lens away from the case.

A jumper in the upper right hand corner of the panel meter allows "placing" of the decimal point position. The meter normally has full scale equal to 1.999 VDC. Adjusting the span pot clockwise will boost the sensitivity such that a F.S output of only 39% on the amplifiers 10V output can be displayed as "100.0" ( i.e. 1.00V, with the decimal point placed so as to read as 0 to 100% ).

The unit has been factory set so that + 10.0 VDC signal on the +/-10V output will appear as "100.0"

### 1.5 FIELD WIRING

AC Line power may be wired through the supplied strain relief gland on the bottom left-hand side of the enclosure. Using a standard 3-strand power cable, connect each wire to the appropriate DIN mounted terminal block. Refer to the table below for connection information.

Wire Description	Wire Color	Terminal Block
Line	Black or Red	L
Neutral	White	N
Ground	Green	G

The bottom connection plate can be removed to facilitate punching the desired holes for cable glands. The typical cables would be left transducer, right transducer and an output cable to report the tension signal to a controller. Refer to the appropriate amplifier manual for detailed wiring diagrams.

### 1.6 SIGNAL GROUNDING

A default signal-grounding configuration has been provided that is suitable for many applications. This configuration should be reviewed by a qualified technician prior to installation. Proper grounding is necessary for reducing noise pickup, and for extending the working life of the system. Refer to the amplifier manual for more information.

## 2 REPLACEMENT PARTS

The following tables provide a listing of replacement parts for every model in the Cleveland-Kidder® Tension Indicator Series. Locate the model number for your system using the serial tag located on the inside of the enclosure door, in the upper left-hand corner.

<i>Common to All Systems</i>	
Part Number	Description
X21-00898	FUSE, 1A, 250V, TIME DELAY
X21-34342	FUSE, 0.3A, 250V, TIME DELAY
X44-34143	POWER SUPPLY, 24VDC, 1 AMP, DIN RAIL, 85-264 VAC

<i>Model Number: MWI-13491-1</i>	
Part Number	Description
MWI-13262	LOAD CELL AMP, ULTRA SERIES, FULL BRIDGE, DIN RAIL, NON-ISOLATED
B28-34125	METER, ANALOG, 0-1 mADC, 4.5" RECT, METER FACE TO READ 0.100 TENSION
C41-27904	PCB, TACH ASSY W/METER

<i>Model Number: MWI-13491-2</i>	
Part Number	Description
MWI-13261	LOAD CELL AMP, ULTRA SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
B28-34125	METER, ANALOG, 0-1 mADC, 4.5" RECT, METER FACE TO READ 0.100 TENSION
C41-27904	PCB, TACH ASSY W/METER

<i>Model Number: MWI-13491-3</i>	
Part Number	Description
MWI-13262	LOAD CELL AMP, ULTRA SERIES, FULL BRIDGE, DIN RAIL, NON-ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT

<i>Model Number: MWI-13491-4 MWI-13491-5</i>	
Part Number	Description
MWI-13261	LOAD CELL AMP, ULTRA SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT

<i>Model Number: MWI-13491-6</i>	
Part Number	Description
MWI-13261	LOAD CELL AMP, ULTRA SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT
X16-33078	SELECTOR SWITCH, 2 POSITION, MAINTAINED, CHROME BEZEL, 22mm, WITH 1 N.O. CONTACT

<i>Model Number: MWI-13654-1</i>	
Part Number	Description
MWI-13466	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, NON-ISOLATED
B28-34125	METER, ANALOG, 0-1 mADC, 4.5" RECT, METER FACE TO READ 0.100 TENSION
C41-27904	PCB, TACH ASSY W/METER

**Model Number: MWI-13654-2**

Part Number	Description
MWI-13467	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
B28-34125	METER, ANALOG, 0-1 mADC, 4.5" RECT, METER FACE TO READ 0.100 TENSION
C41-27904	PCB, TACH ASSY W/METER

**Model Number: MWI-13654-3**

Part Number	Description
MWI-13466	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, NON-ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT

**Model Number: MWI-13654-4****MWI-13654-5**

Part Number	Description
MWI-13467	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT

**Model Number: MWI-13654-6**

Part Number	Description
MWI-13467	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
X28-34607	METER, 5 DIGIT DIGITAL DISPLAY, 11-36VDC OR 24VAC POWER, 0-20MA OR 0-10VDC INPUT

**Model Number: MWI-13654-9**

Part Number	Description
MWI-13467	LOAD CELL AMP, CLASSIC SERIES, FULL BRIDGE, DIN RAIL, ISOLATED
X28-34211	PANEL METER, NEMA STYLE, 3.5 DIGIT, 2V/20V, 9-36VDC SUPPLY, WITH OFFSET POT
X23-05435	POTENTIOMETER, 10 TURN, 1KOHM

### 3 DRAWING INDEX

The following table provides a listing of drawings, referenced to each model in the Cleveland-Kidder® Tension Indicator Series. Locate the model number for your system using the serial tag located on the inside of the enclosure door, in the upper left-hand corner.

<b>Model Number:</b>	<b>Drawing Number:</b>	<b>Description:</b>
MWI-13491-1	D800-31241	Wiring Diagram
MWI-13491-2	D800-31236	Wiring Diagram
MWI-13491-3	D800-31237	Wiring Diagram
MWI-13491-4	D800-31238	Wiring Diagram
MWI-13491-5	D800-31216	Wiring Diagram
MWI-13491-6	D800-31220	Wiring Diagram
MWI-13654-1	D800-31231	Wiring Diagram
MWI-13654-2	D800-31235	Wiring Diagram
MWI-13654-3	D800-31233	Wiring Diagram
MWI-13654-4	D800-31234	Wiring Diagram
MWI-13654-5	D800-31242	Wiring Diagram
MWI-13654-6	D800-31228	Wiring Diagram
MWI-13654-9	D800-31245	Wiring Diagram

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# DIGITAL TENSION INDICATOR ASSEMBLY CLASSIC AMPLIFIER, NON-ISOLATED OUTPUTS

MWI-13654-3,8

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FA						<b>TOLERANCES</b> (EXCEPT AS NOTED) DECIMAL X.X ± 0.30 X.XX ± 0.15 X.XXX ± 0.05 ANGULAR ± 0.5° <small>DO NOT SCALE DRAWING</small>	 <b>Cleveland Motion Controls</b> <small>An RPMC Company</small>	WIRING DIAGRAM, DIGITAL TENSION INDICATOR, CLASSIC SERIES, NON-ISOLATED OUTPUTS		
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# ANALOG TENSION INDICATOR ASSEMBLY ULTRA AMPLIFIER, NON-ISOLATED OUTPUTS

## MWI-13491-1

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FA						<b>TOLERANCES</b> (EXCEPT AS NOTED) DECIMAL X.X ± 0.30 X.XX ± 0.15 X.XXX ± 0.05 ANGULAR ± 0.5°		WIRING DIAGRAM, ANALOG TENSION INDICATOR, ULTRA SERIES, NON-ISOLATED OUTPUTS				
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