

TIX 2 Indicator

General Description

The TIX2 Digital Web Tension Indicator continuously displays the true web tension either as a percentage of total tension or in real engineering units.

The measurement of actual web tension is made by sensing, with strain gauge transducers, (sometimes referred to as 'load cells'), the force on a sensing roll caused by the tension in the web. The electrical signal from the transducers is a combination of tension force and sensing roller deadweight. The deadweight of the sensing roller is zeroed out electrically, leaving the tension force only to be displayed on the meter.

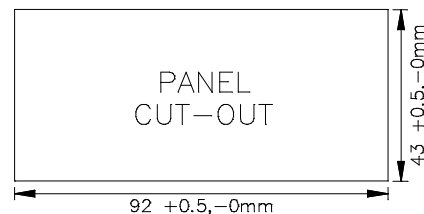


The Indicator uses a high specification instrumentation amplifier, power supply and a 3.5 LED digital display housed in a DIN size case. The Indicator features as standard, transducer excitation of 5V DC or 10V DC, independently scalable digital display, analogue output (0 to +10V at 2 mA maximum or 4-20 mA into 250 ohms) for a remote meter, chart recorder or as the input to a control system.

The Indicator accepts input voltages from 1 mV to 2V for full 3.5 digit 1999 display with internally selectable decimal point position and a fully variable zero offset for both positive and negative sensing roller weights.

Installation

The Indicator must be installed in a dry, non hazardous location. A panel cut out of 92 mm x 43 mm is required. The depth of the Indicator is 141 mm but provision must be allowed for cable connections. The Indicator is retained by two fixing clips, remove the fixing clips, insert the Indicator into the cut out and replace the clips to hold the Indicator in place.



The transducers must be installed in accordance with the installation procedure from the transducer handbook.

For Intrinsically Safe installations the transducers **MUST** be installed in the hazardous area in accordance with the transducer installation procedure from the Transducer Handbook using only the connecting cables supplied with the earth bonding wire. The Zener Barriers **MUST** be installed as specified in the Zener Barrier Handbook to achieve a safe installation.

Access to the Printed Circuit Board (PCB)

Access to the PCB is needed for the selection of alternative mains supply voltage and the Indicator features.

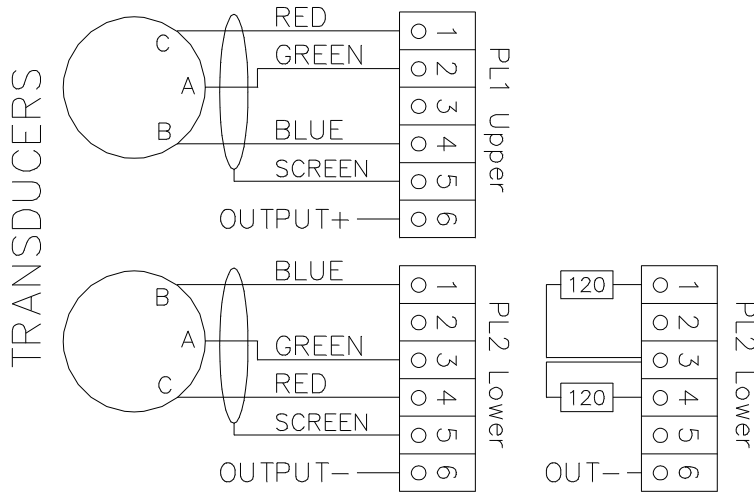
WARNING **Removal of the case may expose hazardous mains electrical voltages.**

Disconnect the mains supply.

Unplug the electrical connectors on the rear panel of the Indicator. Remove the "snap-on" plastic front bezel (**DO NOT OVERSTRAIN**) and lift off the front panel. If removed we advise refitting only after all adjustments have been completed, it is safe to do this. Remove the four rear panel retaining screws. Withdraw the PCB complete with the rear panel from the rear and select the required Indicator features. Replace the PCB, rear panel, and the rear panel retaining screws.

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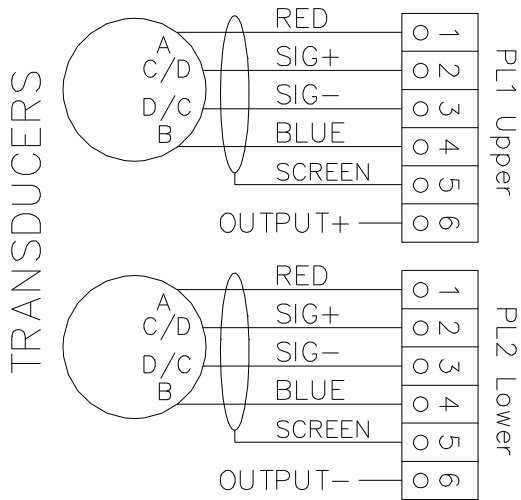
Transducer and Indicator Connections for Safe Area Installations



Connections for Cleveland-Kidder Transducers Link LK2-4 on the PCB MUST be inserted.

For single transducer systems connect the transducer to PL1 and connect the 4431 Dummy Transducer to PL2 as shown.

NOTE. The connectors use the WAGO Cage Clamp system.



Connections for ACDF Transducers Link LK2-4 on the PCB MUST be omitted

See the Transducer Handbook for SIG+ and SIG- wire colours.

For single transducer systems connect the transducer to PL1 as shown. No transducer connections are made to PL2.

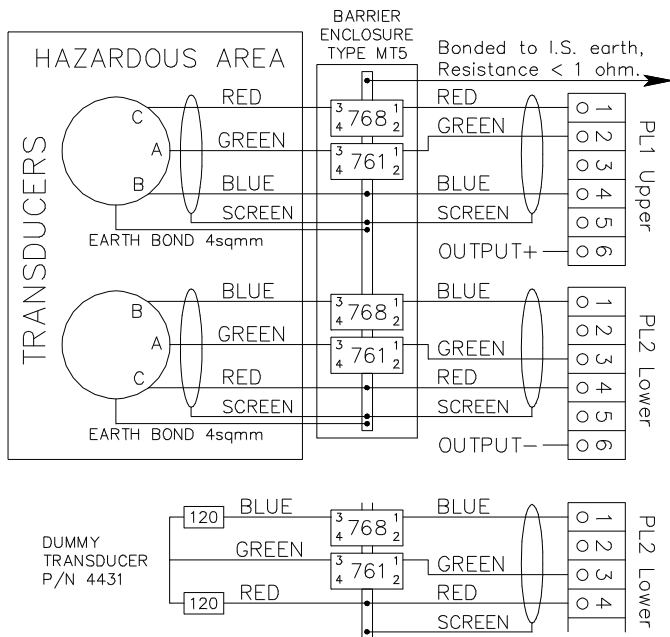
NOTE. The connectors use the WAGO Cage Clamp system.

Colours refer to the cables supplied by CMC Controls Ltd, colours for other transducers may differ. PL1/4, PL1/5, PL2/4, PL2/5 and PL2/6 are all connected together and to the Earth (E) wire.

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Transducer and Indicator Connections for Intrinsically Safe Installations ONLY

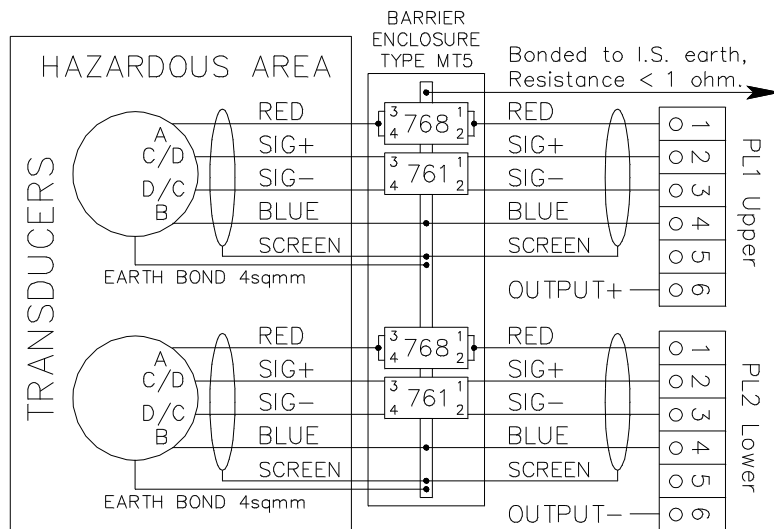
Applicable only to the 4503 Zener Barrier module in the MT5 enclosure supplied by CMC Controls Ltd. It is the responsibility of the user to ensure that all relevant safety regulations are complied with.



Connections for Cleveland-Kidder Transducers Link LK2-4 on the PCB MUST be inserted.

For single transducer systems connect the transducer to PL1 through the Zener Barriers as shown and connect the 4431 Dummy Transducer to PL2 through the Zener Barriers as shown below. The 4431 Dummy Transducer should be located in the safe area.

NOTE. The connectors use the WAGO Cage Clamp system.



Connections for ACDF Transducers Link LK2-4 on the PCB MUST be omitted.

See the Transducer Handbook for SIG+ and SIG- wire colours.

For single transducer systems connect the transducer to PL1 through the Zener Barriers as shown. No transducer connections are made to PL2.

NOTE. The connectors use the WAGO Cage Clamp system.

Colours refer to the cables supplied by CMC Controls Ltd, colours for other transducers may differ. PL1/4, PL1/5, PL2/4, PL2/5 and PL2/6 are all connected together and to the Earth (E) wire.

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Mains Supply Voltage Selection

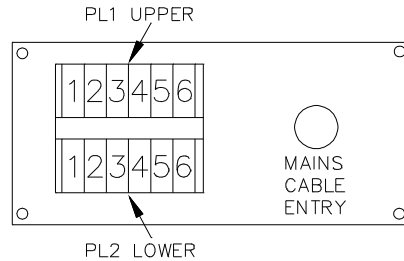
Unless specified otherwise at the time of ordering the Indicator will be despatched wired for 220-240V AC operation.

For use on 110-120V AC supply unsolder the wire link (230) and solder one wire link in each of the (115) positions on the Printed Circuit Board. Please mark the Identification label for future reference. The one metre long sealed in mains lead conforms to standard UK colour coding.

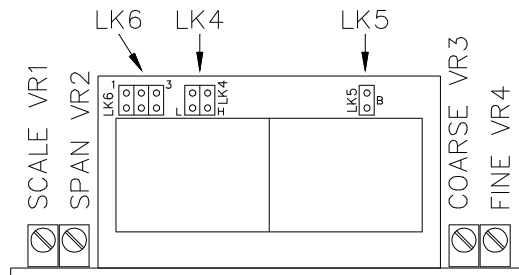
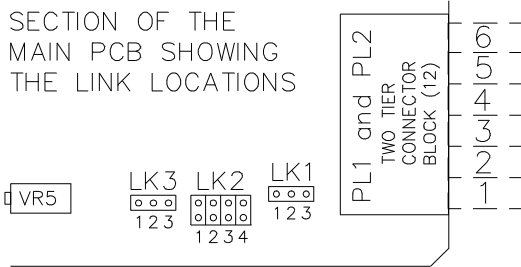
LIVE (L) - BROWN NEUTRAL (N) - BLUE
EARTH (E) - GREEN/YELLOW

Connector Location

Shown alongside is a view of the rear of the Indicator showing the location of the plug-in Cage Clamp terminal connectors. Always use screened cable for connecting the transducers and remote meter. For Intrinsically Safe installations the screens must be connected to earth at the Zener Barrier bus bar only. If the connecting cables are extended the screen must be 'followed through'.



Selection of Indicator Features



The links for the Indicator features are accessed by removing the PCB from the case as described above. The links for the display features are accessed from the front after removal of the bezel and front panel. The potentiometers for Indicator calibration are also accessed from the front.

For use with Cleveland-Kidder Transducers insert links LK1, LK2 and LK3 as follows.

- LK1 - 1 and 2 This gives 5volt transducer excitation between PL1/1 and PL1/4, PL2/1 and PL2/4.
- LK2 - 1 This gives a coarse gain of X10. If higher coarse gain is necessary remove link LK2 - 1 and re-insert in LK2 - 2 for X100 gain.
- LK2 - 4 This is essential for correct operation with Cleveland-Kidder Transducers.
- LK3 - 1 and 2 This gives 0 to +10volt Analogue Output, for 4-20mA see page 4.

For use with ACDF, CCD and other Foil Gauged Transducers insert links LK1, LK2 and LK3 as follows.

- LK1 - 2 and 3 This gives 10volt transducer excitation between PL1/1 and PL1/4, PL2/1 and PL2/4.

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- LK2 - 2 This gives a coarse gain of X100. If higher coarse gain is necessary remove link LK2 - 2 and re-insert in LK2 - 3 for X200 gain.
- LK3 - 1 and 2 This gives 0 to +10volt Analogue Output, for 4-20mA see page 4.

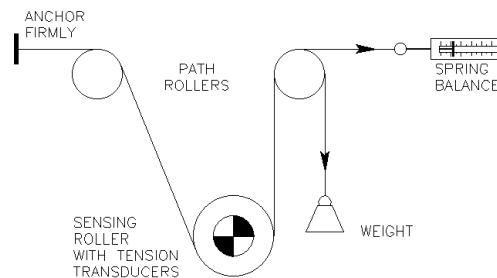
Any unused links should be removed and safely kept for possible use later.

For Intrinsically Safe installations ONLY with Zener Barriers, to increase the excitation voltage from the TIX2 from 5volts to 10volts insert the link in LK1 - 2 and 3. Please note; the series resistance of the Zener Barriers will reduce the excitation voltage at the transducers.

Indicator Calibration

To calibrate the Indicator correctly a spring balance or weights to provide the required tension force and some flat webbing or plastic packaging tape to simulate the web will be found useful.

- 1 Remove the "snap-on" plastic front bezel (**DO NOT OVERSTRAIN**) and lift off the front panel. It may be necessary to loosen the fixing clips. Ensure the links for the indicator features are correctly selected.
- 2 Switch on and allow to thoroughly warm up.
- 3 Do not at this stage adjust SCALE VR1, this has been factory set ready for calibration purposes. Display scaling is adjusted in paragraph [10] below.
- 4 With no material in the machine set SPAN VR2 fully clockwise and FINE ZERO VR4 to mid position.
- 5 Adjust COARSE ZERO VR3 until the display shows 00.0, this removes the sensing roller deadweight, for final adjustment use the FINE ZERO VR4.
- 6 Thread the webbing or tape over the sensing roller following exactly the web path. Anchor one end firmly as shown. Do not thread over a non turning roller, driven roller or machine frame as any sliding friction will cause errors.
- 7 Apply the maximum tension force to the free end of the webbing or tape. If the force is insufficient for the maximum desired value the Indicator may be calibrated proportionally.
- 8 Adjust SPAN VR2 until the display shows 100.0 (100% of maximum tension) or the correct proportional reading.
- 9 Remove the load and check that the display returns to zero, if not repeat [4]-[9] above. On first calibration two or three load applications may be necessary to "seat" the transducers.
- 10 Reapply the maximum tension force as in [8] above until the display again shows 100.0 then adjust SCALE VR1 until the display shows the desired reading, maximum possible display 1999.



Selection of Decimal Point, Last Digit Blanking and Display Damping

The links for the display features are accessed from the front after removal of the bezel and front panel.

Insert a link in LK6/1 for Decimal Point 1 .000
 Insert a link in LK6/2 for Decimal Point 2 0.00
 Insert a link in LK6/3 for Decimal Point 3 00.0

Remove the link from LK5 to blank the least significant digit of the display.

The digital display may be electronically damped to show the average value if the tension is fluctuating. The analogue output signal from PL1/6 is always undamped. There are three damping rates HIGH, LOW, OFF selected by link LK4 above the digital display.

Insert links in both LK4-L and LK4-H for HIGH damping.
 Insert one link in LK4-L for LOW damping.
 Omit both links from LK4 for OFF, no damping.

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Selection of Analogue Output for 4-20mA

Unless specified at the time of ordering the Analogue Output will be set for 0 to 10V DC at 2mA maximum. To set the Analogue Output for 4-20mA into an external resistive load (200 to 300 ohms) proceed as follows. Remove link LK3 1 and 2 and re-insert in LK3 2 and 3. Connect the external load between PL1/6 and PL2/6. With no tension force applied to the roller and zero adjusted and displayed, adjust OUTPUT ZERO VR5 to give 4mA through the external load. VR5 is located behind the COARSE ZERO VR3 and is accessed from the front. With the maximum tension force applied, adjust SPAN VR2 to give 20mA through the external load. SCALE VR1 may need readjustment to achieve the desired display reading.

Troubleshooting

- [1] Is the digital display illuminated when the Indicator is switched on? Check the incoming mains supply and the 315mA fuse F1 located on the PCB.
- [2] Check that the selection links on the PCB are positioned correctly.
- [3] Check the transducer excitation supply voltage between PL1/1 and PL1/4 and also between PL2/1 and PL2/4 is correct for the type of transducer.
- [4] Is the display reading correct when the transducers are loaded? If not check that the connections to the transducers, interconnecting cables and Zener Barriers (if fitted) are correct.
- [5] Zener Barriers contain non repairable fuses which rupture if the current or voltage exceeds the specified value.
- [6] An exchange Indicator is available from CMC Controls Ltd. Contact the service department, notify them of your problem, a spare Indicator can be despatched against your order number and the returned Indicator credited if found faulty under warranty.

