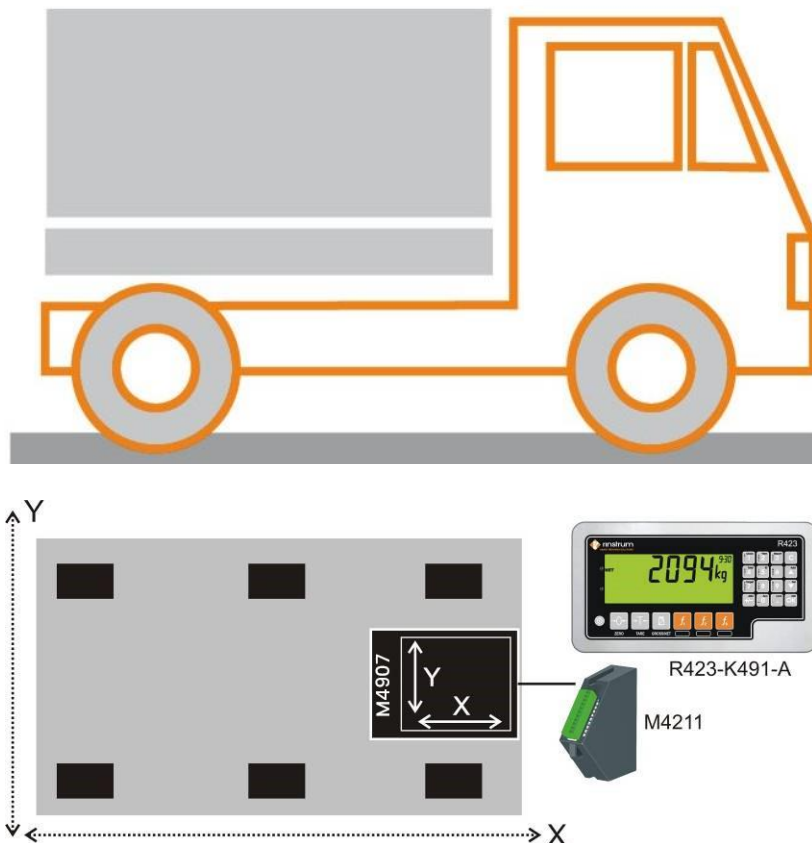


Application Note: R42x-K491 Tilt Compensation Setup and Calibration

Application:



The application is for a truck to have accurate weight readings that can compensate for uneven surfaces where a weight reading might be taken. The installation requires:

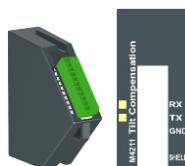
- The symmetrical installation of load cells.
- A tilt sensor to be correctly mounted given the axes that are providing data
- R420-K491-A with a Tilt Module connected to the Tilt Sensor.
- Printing can be done via the R420-K491's built in RS232/RS485.
- The M4907 Rinstrum tilt sensor can use up to +/- 15 degree
- The K491 is compatible with a selection of up to +/-15 degrees.

The three steps of calibration must be followed to ensure a correctly compensated reading.

Components:



**R420-K491-A
Or
R423-K491-A**



**M4211
Tilt Module**



**M4907
Tilt Sensor**



**A10010
Power Supply,
12VDC, 2A DIN
Rail**

Supplied and installed by OEM system integrator in a symmetrical configuration

Load Cells

R400 Tilt Indicator VDC

Note1 Either R420s ABS or R423s flush stainless steel housing could be used.

Calibration Steps

1. Zero Calibration (at 0 angle)

- Performed on level surface
- Tilt sensor is automatically set to 0
- Calibrates out any inaccuracies

2. Span Calibration (at 0 angle)

3. Tilt Calibration

X Axis

- X close to positive max and Y close to 0 (X+ Y0)
- X close to negative max and Y close to 0 (X- Y0)

Y Axis

- Y close to positive max and X close to 0 (X0 Y+)
- Y close to negative max and X close to 0 (X0 Y-)

This generates four tilt parameters that are used to correct the reading.

Example X Positive: “X+ Y0” indicates that the truck must be parked on an incline such that the X angle is greater than 2/3 of the Maximum Tilt SCALE:BUILD:MAX.TLT, and the Y value is as close as possible to zero.

The closer the Y value is to zero, the more accurate the compensation will be.

The maximum allowed Y value for Y0 varies based on the number of divisions the scale has been calibrated to.

If the required conditions are not met, an error will be displayed on the screen.

For Example:

If the scale is calibrated to less than 2300 divisions, the maximum Y angle allowed for Y0 is ± 1.0 Degrees.

If the scale is calibrated to greater than 9200 divisions, the maximum Y angle allowed for Y0 is ± 0.4 Degrees.

If required, the order of the above calibration steps can be changed using the up and down keys. Once a calibration step is completed, it will have “DONE” shown at the top right corner of the display. The indicator will not allow the tilt compensation procedure to commence until all of the 4 points have been captured.

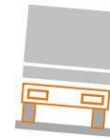
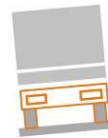
1) Zero - on level ground

2) Span - on level ground

3) Tilt

a) X Positive Angle
b) X Negative Angle

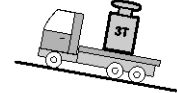
c) Y Positive Angle
d) Y Negative Angle



(1)



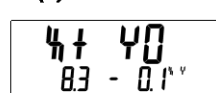
(2)



(11)



(3)



(10)



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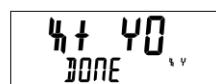
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(9)

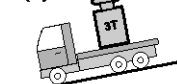


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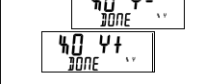


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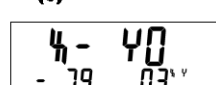
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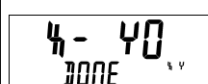
(8)



(6)



(7)



Tilt Related Items in Setup Menus

H.WARE: TILT.HW	
ANGLE	Displays current X and Y angles. Used to test the operation of the tilt sensor. Use the UP and DOWN keys to switch between view options.
FACTOR	Displays the current tilt compensation factor. A factor of 1.000 equates to no compensation.
ZERO	Performs a user zero on the tilt sensor. This does not normally need to be used as the zero calibration procedure automatically does this.
F.ZERO	Restores the factory zero on the tilt sensor. This should be performed when installing a sensor that has already been used.
SCALE:BUILD	
...	
MAX.TLT	Sets the maximum permissible X or Y angle of the system. If the maximum tilt is exceeded in either axis, "TILT.HI" will be displayed. Default 10
SCALE:CAL	
ZERO	Perform a zero calibration, and zeroes the tilt sensor. Must be performed on a level surface.
SPAN	Perform a span calibration. A zero calibration must be completed before doing a span calibration. Must be performed on a level surface.
TILT	Perform a tilt calibration
.....	
TILT A	(Tilt Variables): These are the tilt compensation variables calculated by the tilt calibration process.
TILT B	
TILT C	
TILT D	

Tilt Related Diagnostics

Fault Finding	
Note that during the tilt component of the calibration process where it is necessary to adjust the angle according to that requested by the indicator – for example, X to max positive and Y to 0 - if the necessary conditions are not met then the indicator will show an error.	Tilt High (TILT.HI) The X or Y angle has exceeded the MAX.TLT setting or maximum tilt range of the sensor.
Enhanced diagnostics	
The Tilt Hardware (TILTHW) menu lists additional tilt related items that are useful in system commissioning.	<ul style="list-style-type: none"> • Live angle x/y value can be viewed • Show the current compensation (FACTOR) • If sensor has been used before - the factory ZERO should be restored (F.ZERO)

For more information refer to the Reference Manual for this product