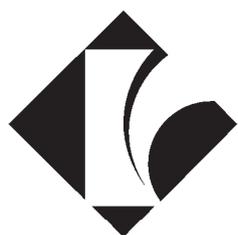


SMART WEIGHING SOLUTIONS



rinstrum

400 Series
(K401, K402, K403, K491)
Digital Indicator
Quick Start Manual

RI00-603-130

Copyright

All Rights Reserved. No part of this document may be copied, reproduced, republished, uploaded, posted, transmitted, distributed, stored in or introduced into a retrieval system in any form, or by any means (electronic, mechanical, photocopying, recording or otherwise) whatsoever without prior written permission of Rinstrum Pty Ltd.

Disclaimer

Rinstrum Pty Ltd reserves the right to make changes to the products contained in this manual in order to improve design,
performance or reliability.

The information in this manual is believed to be accurate in all respects at the time of publication, but is subject to change without notice. Rinstrum Pty Ltd assumes no responsibility for any errors or omissions and disclaims responsibility for any consequences resulting from the use of the information provided herein.

Table of Contents

1. INTRODUCTION	3
1.1. Manuals.....	3
1.2. Shipping Contents	3
2. SPECIFICATIONS	4
3. WARNINGS	5
3.1. General	5
3.2. Configuration Issues.....	5
4. INSTALLATION	6
4.1. Electrical Safety	6
4.2. Panel Mount Template	6
4.3. Function Keys	6
4.4. Optical Communications	7
5. CONNECTIONS	8
5.1. Cable Connections	8
5.2. DC Power (DC PWR +, DC PWR –)	8
5.3. Load Cell Connection	8
5.4. Auxiliary Connections.....	10
5.5. Connecting Shields	12
5.6. Regulatory Sealing Requirements.....	13
6. INSTRUMENT SETUP	14
6.1. Calibration Counter	14
6.2. Access Full Setup	15
6.3. Access Safe Setup.....	15
6.4. Exit Full or Safe Setup.....	15
6.5. Using Menus	15
6.6. Settings (* K402 only).....	16
7. ACCESSORY MODULES	29
7.1. General	29
7.2. Inputs	30
7.3. Outputs	31
7.4. Analog Output	32
7.5. Communications	32
7.6. Ethernet Module	33
8. ERROR MESSAGES	35
8.1. Overview	35
8.2. Weighing Errors	35
8.3. Setup Errors	36
8.4. Calibration Errors	37

8.5. Diagnostic Errors..... 38

1. Introduction

This manual contains information on the installation, calibration and setup of the Indicator.

1.1. Manuals

For more information on the indicator refer to the **Reference Manual** and **Operator Manual**.

1.2. Shipping Contents

The following table identifies the items shipped with indicators. Please check that your packing box contains the specified items.

Standard Indicator	Stainless Steel Indicator
<ul style="list-style-type: none"> • Digital Weighing Indicator • Operator Manual • Quick Start Manual • Trade Label (plastic) • Panel Mount Template • Function Key Overlay Stickers 	<ul style="list-style-type: none"> • Digital weighing Indicator • Operator Manual • Quick Start Manual • Trade Label (plastic) • Function Key Overlay Stickers • Trade Label (metal foil) • M16 Cable Gland Sealing Plug
Other Items (Optional)	
<p>There are many optional accessories for this indicator. These include:</p> <ul style="list-style-type: none"> • Mounting options • Power supply options • Expansion modules (which supply additional comms ports, I/O, analog output, etc) • Opto-link temporary connection • PC based configuration tool 	

2. Specifications

Performance	
Resolution	Up to 100,000 divisions, minimum of 0.25 μ V/division
Zero Cancellation	+/- 2.0mV/V
Span Adjustment	0.1mV/V to 3.0mV/V
Stability/Drift	Zero: < 0.1 μ V/ $^{\circ}$ C (+ 8ppm of deadload max) Span < 8 ppm/ $^{\circ}$ C, Linearity < 20ppm, Noise < 0.2 μ Vp-p
Excitation	7.4 volts for up to 16 x 350 or 32 x 700 ohm load cells (4-wire or 6-wire plus shield) Maximum total load cell resistance: 1,000 ohms
A/D Type	24bit Sigma Delta with \pm 8,388,608 internal counts
Operating Environment	Temperature: -10 to +50 $^{\circ}$ C ambient Humidity: <90% non-condensing Storage: -20 to +50 $^{\circ}$ C ambient IP55 when panel mounted or with rear boot (otherwise IP40)
Case Materials	ABS, Silicon Rubber, Nylon, Acrylic (no halogen used)
Packing Weights	Basic Indicator: 0.6kg
Digital	
Display	LCD with 4 alpha-numeric displays and LED backlighting: <ul style="list-style-type: none"> • Primary display: 6 x 28.4mm high digits with units and annunciators • 2nd display: 9 x 17.6 mm digits with units • 3rd display: 8 x 6.1mm digits • 4th display: 4 x 7.6 mm digits
Setup and Calibration	Full digital with visual prompting in plain messages
Digital Filter	Sliding window average from 0.1 to 30.0 seconds
Zero Range	Adjustable from +/- 2% to +/- 20% of full capacity
Power Input	
Standard Power Input	12 to 24VDC (15 VA max) - ON/OFF key with memory feature
Variants	AC M4101 Input: 110/240VAC 50/60Hz Output: 12VDC 15VA
Features	
Optical Data Communications	Magnetically coupled optical communications support. Optional conversion cable connects directly to a standard USB or RS-232 port.
Correction	10 point linearity correction
Serial Outputs	RS-232 serial port for remote display, network or printer supports. RS-485 transmit only for remote display Transmission rate: 1200, 2400, 4800, 9600, 19200 or 57600 baud
3 assignable function keys	Printing, unit switching, counting, manual hold, peak hold and totalising
Battery Backed Clock Calendar	Battery life 10 years minimum
Approvals	FCC, CE, C-tick Check trade approvals

3. Warnings

3.1. General

- Indicator not to be subject to shock, excessive vibration or extremes of temperature (before or after installation).
- Inputs are protected against electrical interference, but excessive levels of electro-magnetic radiation and RFI may affect the accuracy and stability.
- For full EMC or for RFI immunity, termination of cable shields and correct earthing of the instrument is essential.
- Indicator and load cell cable are sensitive to excessive electrical noise. Install well away from any power or switching circuits.

3.2. Configuration Issues

- Configuration and calibration can be performed from the front panel, using digital setup. When Full Setup is used, all menu items are accessible and care must be taken to ensure no accidental changes are made to calibration and trade settings.
- Enter a passcode to prevent unauthorised or accidental tampering. If the passcode is lost, the manufacturer should be contacted for further advice.

4. Installation

The following steps are required to set up the indicator.

- Inspect indicator to ensure good condition.
- Use connection diagrams to wire up load cell, power and auxiliary cables as required.
- Insert any accessory modules that are being used.
- Use the drilling template provided for hole locations.
- Connect Power to indicator and press **<POWER>** key to turn the instrument ON.
- Refer to the Instrument Setup section page 14 for information on configuring and calibrating the instrument.
- To turn instrument OFF press and hold **<POWER>** key for three seconds (until display blanks).

4.1. Electrical Safety

- For your protection all mains electrical hardware must be rated for environmental conditions of use.
- Pluggable equipment must be installed near an easily accessible power socket outlet.
- To avoid the possibility of electric shock or damage to the instrument, always switch off or isolate the instrument from the power supply before maintenance is carried out.

4.2. Panel Mount Template

The panel mount template is supplied with the instrument. It shows the location of the rectangular cut-out and the four mounting screws.

4.3. Function Keys

- The Indicator has 3 user definable functions keys.
- If any of the special functions are to be used on the indicator it is important that the matching function key overlay sticker (supplied) is applied to the keypad.
- Ensure keypad is clean and dry before affixing sticker.

4.4. Optical Communications

A temporary infrared communications link can be established between the instrument and a PC using an optional cable. This connection can be used to transfer setup and calibration information from a PC or to download software upgrades.



The PC end of the cable is a standard USB or female DB9 RS232 connector. The instrument end of the cable attaches to the left side of the instrument display.

WARNING

The optical coupling head contains a strong magnet and should not be placed near any magnetic storage media (e.g. credit cards, floppy disks etc.)

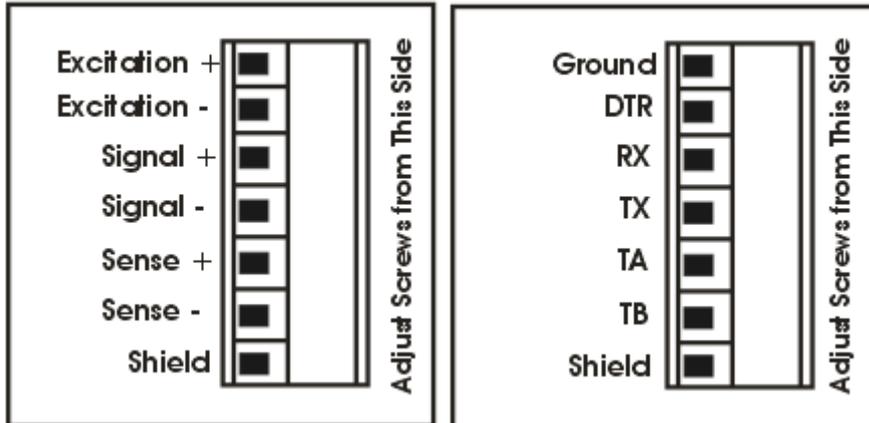
5. Connections

5.1. Cable Connections

All cable connections are made to the rear of the instrument using pluggable screw terminals. It is not necessary to tin the ends of the wires with solder or to add crimp ferrules to the wires, however, these techniques are compatible with the terminals.

LOAD CELL CONNECTIONS

COMMS CONNECTIONS



5.2. DC Power (DC PWR +, DC PWR –)

The DC supply need not be regulated, provided that it is free of excessive electrical noise and sudden transients. The instrument can be operated from a high quality plug-pack as long as there is sufficient capacity to drive both it and the load cells.

5.3. Load Cell Connection

5.3.1. Load Cell Signals

Very low output scale bases may be used but may induce some instability in the weight readings when used with higher resolutions. Generally speaking, the higher the output, or the lower the number of divisions, the greater the display stability and accuracy.

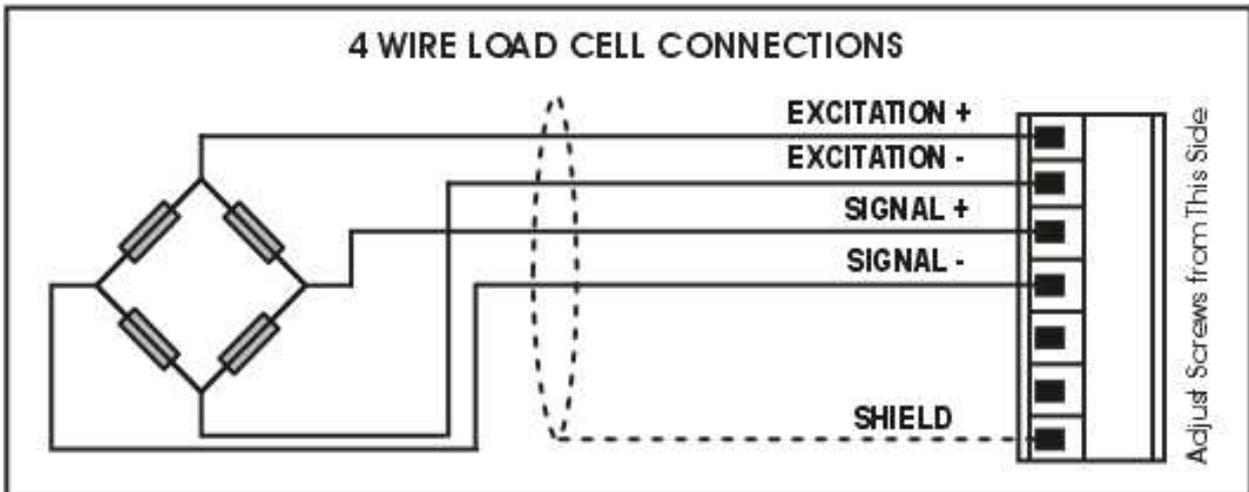
The instrument can display the millivolt-per-volt reading which can be used to check scale base signal output levels. The instrument may be connected for either 4-wire or 6-wire operation. Use 4-wire when external SENSE connections are not available.

5.3.2. 4-Wire Connection

The minimum connectivity requirements are the connection of four wires (i.e. \pm Excitation and \pm Signal). Internally the instrument has a precision analog switch that can be used to connect the Sense+ and Sense- lines directly to the Excitation+ and Excitation- lines.

Any addition to the load cell manufacturer's cable length using 4-wire connection is only recommended for short cable runs. Where long additions to cable lengths are needed, a 6-wire extension is required.

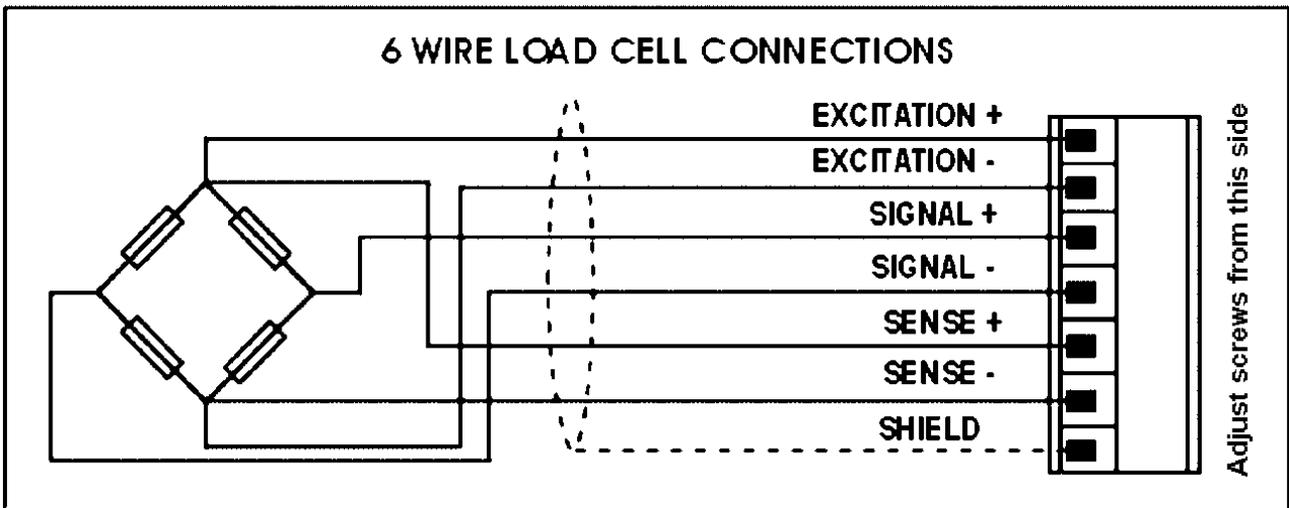
The SCALE:BUILD:CABLE option must be set to **4-WIRE** to allow for 4-wire connection.



5.3.3. 6-Wire Connection

The excitation and signal lines are connected the same as for a 4-wire installation. The extra two wires (Sense + and –) should be connected to the Excitation + and – lines as close as possible to the load cell itself. Typically these connections are made in a load cell termination box.

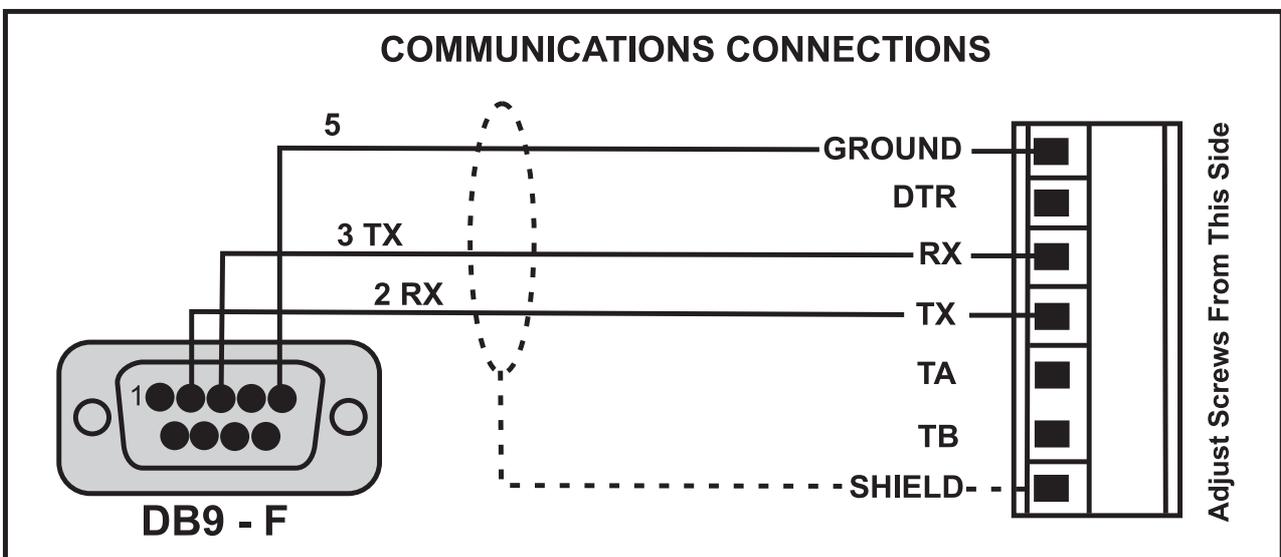
The BUILD:CABLE option must be set to **6-WIRE** to allow for true 6-wire connection.



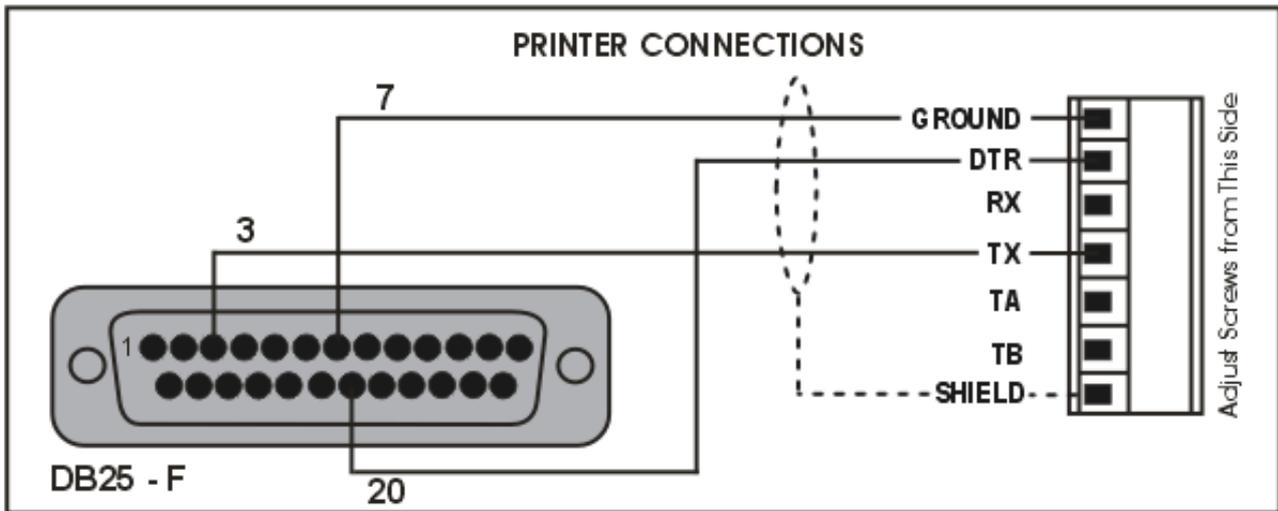
5.4. Auxiliary Connections

This section provides diagrams to illustrate the communication connections.

5.4.1. Direct Personal Computer Link (RX, TX GND)



5.4.2. Printer Connections (RXD/TXD, GND and DTR)



5.4.3. Remote Display using RS232 (TXD, GND)

Refer to documentation supplied with the Remote Display for connection details. Connect RX on the Remote Display with TX on the instrument and connect the RS232 GND signals together.

5.4.4. Remote Display using RS485 (TA, TB)

RS485 is recommended for communicating over distances longer than a few metres. Refer to documentation supplied with the Remote Display for connection details. Connect TA to RA and TB to RB.

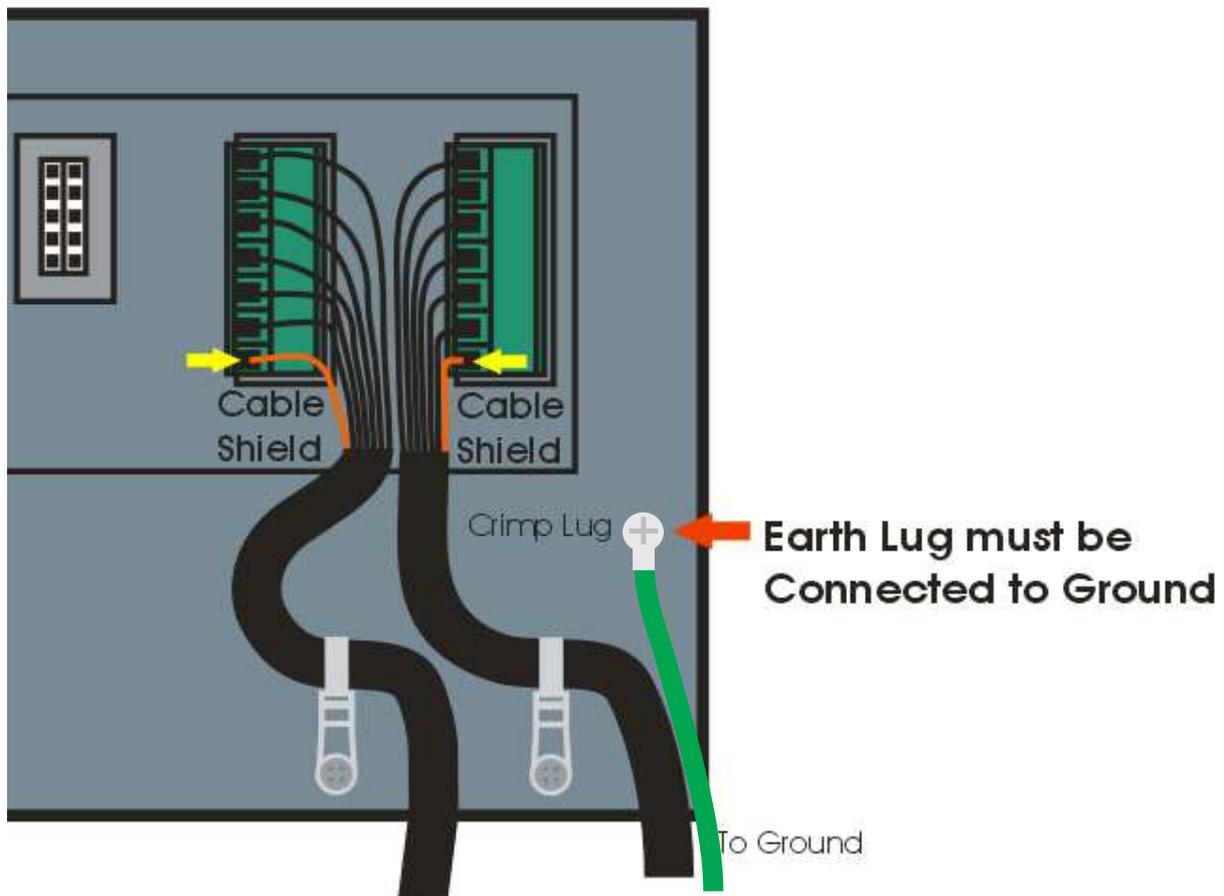
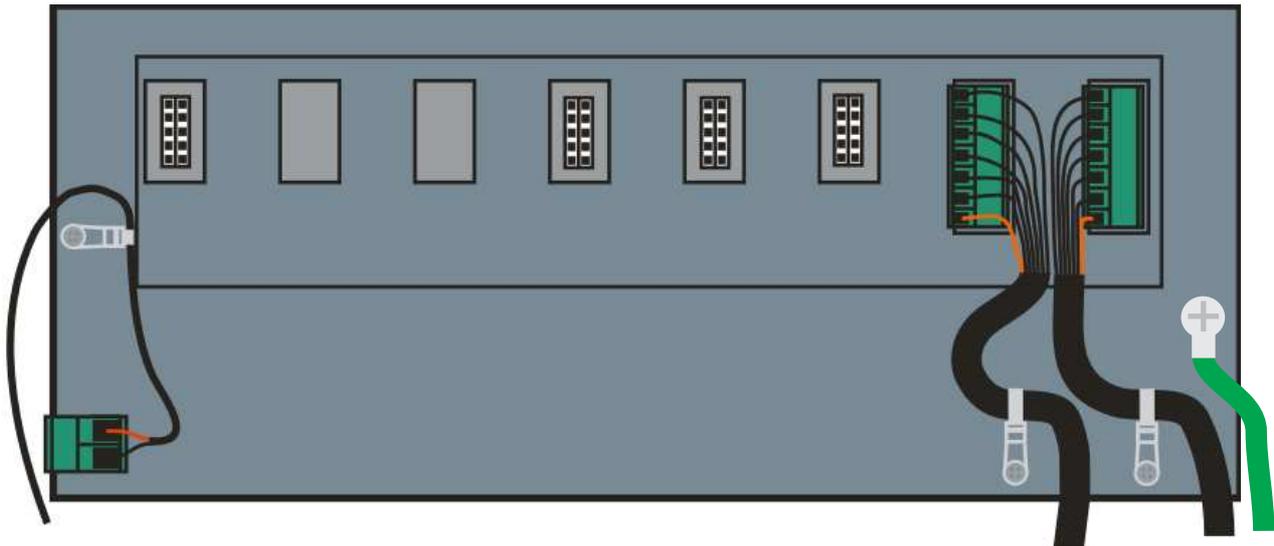
5.4.5. Networks: Multiple Instruments to PC (Modules only)

It is possible to connect multiple instruments in a RS485 multidrop, RS485 ring, RS232 ring or Ethernet network to a PC. Refer to the Reference Manual for wiring diagrams and protocol information.

5.5. Connecting Shields

To obtain full EMC or for RFI immunity, cable shields MUST be connected and the earth lug on the rear of the instrument must be grounded.

This figure illustrates an example of possible connections. Also shown are the connecting cables restrained using cable ties fastened by screws into the rear of the unit.

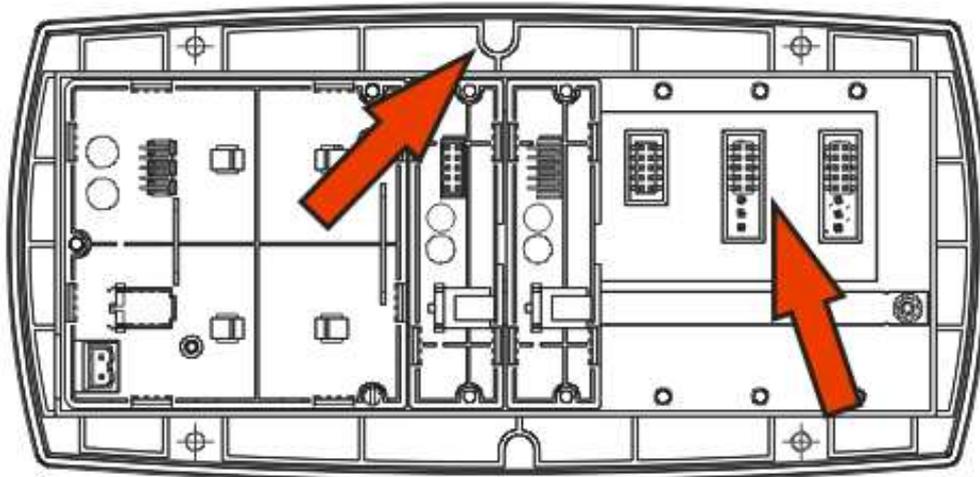


5.5.1. Cable Shield Connection and Earthing

- Care should be taken when connecting shields to maximise EMC or RFI immunity and minimise earth loops and cross-talk (interference) between instruments.
- For full EMC or for RFI immunity, termination of the cable shields at the earth lug is very important. The earth lug of the instrument must be separately connected to ground potential via a reliable link.
- The AC power module directly connects the earth lug to the Earth Pin on the power supply. In installations where earth is available on the power cable, instrument earthing can be done with this connection.
- The instrument should only be connected to earth via a single reliable link to avoid earth loops.
- Where each instrument is separately earthed, interconnecting cable shields should be connected at one end only.
- **Caution:** Some load cells connect the cable shield directly to the load cell (and therefore the scale base). Connection of the load cell cable shield in this situation may be site specific.

5.6. Regulatory Sealing Requirements

To comply with regulatory sealing requirements for each instrument, (i.e. to ensure instruments are not accidentally or deliberately tampered with), it is important that proper sealing procedures be adhered to.



Affix stickers in the locations indicated.

6. Instrument Setup

6.1. Calibration Counter

Within Setup there are a number of critical steps that can affect the calibration and/or legal for trade performance of the instrument. If any of these steps are altered, the trade certification of the scale could be voided.

The instrument provides a built-in calibration counter to monitor the number of times the critical steps are altered. The value of a counter is stored within the instrument and can only be reset at the factory. Each time a critical step is altered, the counter will increase. Whenever the instrument is powered up, or setup mode is entered/exited, the current value in the counter is briefly displayed (e.g. C00010).

The value of the counter is written on the tamperproof trade label on the front of the indicator for trade-certified applications and functions as an electronic seal. If any legal for trade settings are changed on the instrument, the current value of the calibration counter will be different from the recorded value and the seal is broken.

6.1.1. Trade Critical Settings

Trade critical settings can affect calibration and/or legal for trade performance. Each time a trade critical setting is altered, the calibration counter will be incremented by one.

6.2. Access Full Setup

Full Setup provides access to configure and calibrate the instrument. All items in all menus will be enabled in Full Setup.

WARNING: Care should be taken to avoid inadvertently altering the Build or Calibration settings.

Ensure the instrument is on.

- Press and hold the **<POWER>** and end **<F₃>** keys simultaneously for two seconds.

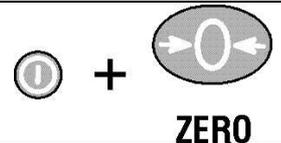


6.3. Access Safe Setup

Safe Setup restricts access to the trade critical settings (marked with ⊗).

Ensure the instrument is on.

- Press and hold the **<POWER>** and **<ZERO>** keys simultaneously for two seconds.



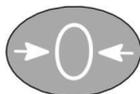
6.4. Exit Full or Safe Setup

To save settings, exit setup and return to the normal weighing mode using one of the following methods:

- Press the **<POWER>** key once.
- Press the **<POWER>** and **<ZERO>** keys together for two seconds.
- Press **<POWER>** and **<F₃>** key together for two seconds

Warning: If the power is interrupted while in setup, unsaved settings will be lost.

6.5. Using Menus



Level 1



Level 2



Level 3



Level 4



Level 5

Example:

GEN.OPT

 L PCODE

 L SAFE.PC

6.6. Settings

MENU	DESCRIPTION	
GEN.OPT	General Options Menu	
└ LANG	Operator language	(<i>ENGLISH, GERMAN, DUTCH, FRENCH, POLISH, ITALIAN, SPANISH</i>)
└ P.T.SCP	Preset Tare Scope	(<i>PROD, GLOBAL</i>)
└ DATE.F	Date Format	(<i>DD.MM.YY, DD.MM.YYYY, MM.DD.YY, MM.DD.YYYY, YY.MM.DD, YYYY.MM.DD</i>)
└ PCODE	Pass Codes	
└ SAFE.PC	Safe setup Passcode	(<i>0 .. 999999</i>)
└ FULL.PC	Full setup Passcode	(<i>0 .. 999999</i>)
└ OP.PC.....	Operator Passcode	(<i>0 .. 999999</i>)
└ KEY.LOC	Key Lock Options	
└ P	Power key lock	(<i>AVAIL, LOCKED</i>)
└ ZERO,.....	Zero Key	(<i>AVAIL, OPER.PC, SAFE.PC, LOCKED</i>)
	TARE,	
	GR_NET,	
	F1, F2, F3,	
	CLOCK,	
	VIEW,	
	REPORT,	
	TOTAL,	
	ID,	

MENU	DESCRIPTION
TARGET, ACC, PR.MOD, PR.SEL, NUM.PAD ALIBI	
L DISP	Display Options
L B.LIGHT	Backlight operation (ON, OFF)
L FREQ.....	Display update frequency (10Hz, 5Hz, 3.3Hz, 2Hz, 1Hz)
L AUX.DSP.....	Auxiliary display function (OFF, TIME, NUM.ITEMS)
L VIEW.....	Default View (PRODUCT, TOP, DUAL)
L ID.NAME	User String Names
L NAME.1 - NAME.5	User ID string names (Maximum 6 characters)
L POWER	Power options
L AUT.OFF	Auto-off (NEVER, 1 min, 5 min, 10 min, 60 min)
L START.....	Pause on Start-Up (OFF, ON)
L STR.EDT.....	String Edit mode (STRING, NUM, AUTO)
L USR.DEF	User defaults (all items except SCALE menu items)
H.WARE	Hardware Menu
L ALLOC.....	Check hardware allocation and use

Quick Start - Software Version 1.x & 2.x

MENU	DESCRIPTION	
└ LC.HW	Loadcell Hardware Menu	
└ MVV	mV/V test	
└ OL.CNT	Overload count	
└ OL.CLR	Clear overload count	
└ SER1.HW, SER 2.HW	Serial Hardware Menus	
└ BAUD	Baud rate	(<u>_1200_</u> , <u>_2400_</u> , <u>_4800_</u> , <u>_9600_</u> , <u>_19200_</u> , <u>_57600_</u>)
└ PARITY.....	Port parity	(<i>NONE</i> , <i>EVEN</i> , <i>ODD</i>)
└ DATA.....	Number of data bits	(<u>_8_</u> , <u>_7_</u>)
└ STOP.....	Number of stop bits	(<u>_1_</u> , <u>_2_</u>)
└ DTR	DTR Enable	(<i>OFF</i> , <i>ON</i>)
└ TERM.....	RS485 Termination Enable	(<i>OFF</i> , <i>ON</i>)
└ RING.....	Ring Network Enable	(<i>OFF</i> , <i>ON</i>) (<i>SER 2 only</i>)
└ ETH.HW	(if fitted)	
└ DHCP	Port parity	(<i>OFF</i> , <i>ON</i>)
└ IP	IP Address	(<i>Ip Address xxx.xxx.xxx.xxx</i>)
└ NET.MSK	Network mask	(<i>Ip Address xxx.xxx.xxx.xxx</i>)
└ G.WAY.....	Default gateway	(<i>Ip Address xxx.xxx.xxx.xxx</i>)
└ DNS.1	Primary Name Server	(<i>Ip Address xxx.xxx.xxx.xxx</i>)
└ DNS.2	Secondary Name Server	(<i>Ip Address xxx.xxx.xxx.xxx</i>)
└ ETH.DEF	Ethernet Module Defaults	(does not affect indicator settings)

MENU	DESCRIPTION
L IO.HW	Input/Output Hardware Menu (if fitted)
L FRC.OUT.....	Force outputs test
L TST.IN	Check inputs test
L DB.1.8 -	
DB.25.32	Input Debounce Menu's
L DBNC.1 -	
DBNC.32....	Settings for inputs test (1..250 ms Default: 50ms)
L ANL.HW	(if fitted)
L TYPE	Voltage or current selection (<i>Current, Volt</i>)
L CLIP.....	Output clip enable (<i>NO, YES</i>)
L FRC.OUT.....	Force analog output test
L ANL.CAL	Analog output calibration
L ADJ.LO	Adjust low output (4mA or 0V)
L ADJ.HI	Adjust high output (20mA or 10V)
L DSD.HW	DSD Hardware Menu (if fitted)
L AUTO.C	Auto clear old records (<i>OFF, ON</i>)
L DSD.STR.....	Custom DSD record string (<i>Maximum 20 characters</i>)
L TILT.HW	K491 only (if fitted)
L ANGLE	Display current X,Y angles
L FACTOR.....	Display current tilt compensation factor
L ZERO.....	Set user zero of tilt sensor
L F.ZERO	Restore factory zero of tilt sensor

MENU	DESCRIPTION
SCALE	Scale menu
L BUILD	Scale Guide menu
L TYPE	Range type <i>(SINGLE, DUAL.I, DUAL.R)</i>
L CABLE	6-WIRE or 4-WIRE <i>(6 WIRE, 4 WIRE)</i>
L DP	Decimal Point position <i>(000000 .. 0.00000)</i>
L CAP1	Scale Capacity - Range/Interval 1 <i>(100 ..999999 Default: 3000)</i>
L E1	Scale Resolution - Range/Interval 1 <i>(1, 2, 5, 10, 20, 50, 100)</i>
L CAP2	Scale Capacity - Range/Interval 2 <i>(100 ..999999 Default: 6000)</i>
L E2	Scale Resolution - Range/Interval 2 <i>(1, 2, 5, 10, 20, 50, 100)</i>
L UNITS.....	Scale Units <i>(None, kg, lb, t, g, Oz, N, ARROW U)</i>
L HI.RES.....	x10 Expanded mode <i>(OFF, ON)</i>
L MAX.TLT	Maximum X or Y angle (K491 only) <i>(0 .. 15 Default 10)</i>
L OPTION	
L USE	Trade Use <i>(INDUST, TRADE)</i>
L FILTER	Averaging <i>(0.01s..30.00s Default: 1.0s)</i>
L MOTION	Motion Detection <i>(OFF, 0.5d – 1.0t .. 5.0d – 0.2t)</i>
L Z.RANGE.....	Range of Zero (%) <i>(-2 .. 2, -1 .. 3,-10 .. 10, -20 .. 20)</i>
L Z.TRACK.....	Zero Tracking <i>(OFF, SLOW, FAST)</i>
L Z.INIT.....	Zero on Startup <i>(OFF, ON)</i>
L Z.BAND	Band of Zero <i>(0 .. fullscale)</i>
L EXT.EX	External excitation <i>(OFF, ON)</i>
L R.ENTRY.....	Rear button menu entry <i>(OFF, ON)</i>
L TOT.OPT	Totalising Option <i>(DISP, GROSS, NET)</i>

MENU	DESCRIPTION
L CAL	
L ZERO.....	Calibrate Zero
L SPAN.....	Calibrate Span
L ED.LIN.....	Set Linearisation
L CLR.LIN	Clear Linearisation
L DIR.ZER	Direct mV/V Zero Calibration
L DIR.SPAN	Direct mV/V Span Calibration
L TILT.A.....	Tilt Compensation Factor A (K491 only)
L TILT.B.....	Tilt Compensation Factor B (K491 only)
L TILT.C.....	Tilt Compensation Factor C (K491 only)
L TILT.D.....	Tilt Compensation Factor D (K491 only)
L DEF.CAL	Default Calibration (also resets all SCALE settings to defaults)
L QA	
L QA.OPT	QA Enable <i>(OFF, ON)</i>
L QA YEAR	QA Expiry Date <i>(2000-01-01 To 2099-12-31)</i>
L QA MONTH	QA Expiry Date <i>(2000-01-01 To 2099-12-31)</i>
L QA DAY	QA Expiry Date <i>(2000-01-01 To 2099-12-31)</i>
FUNC	Function menu
L NUM	Number of special functions <i>(_1_ .. 8_)</i>
L SF1 – SF8	Function menu
L TYPE:	Type <i>PRINT</i>
L KEY	Key selection <i>(NONE, F1 .. F3, IO1 .. IO32)</i>

Quick Start - Software Version 1.x & 2.x

MENU	DESCRIPTION	
L PRT.OUT	Printout	(<i>NONE, PRINT.1, PRINT.2</i>)
L TOTAL	Totalising	(<i>NONE, ADD, UNDO, CKR.ALL, CLR.SESS</i>)
L CLR.ASK	Confirm clear	(<i>NO, YES</i>)
L AUTO	Automatic Print	(<i>NO, YES</i>)
L IL.TYPE	Interlock type	(<i>NONE, MOTION, I.LOCK, RET.Z</i>)
L I.LOCK	Interlock	(<i>0 .. Fullscale</i>)
L TYPE:	Type	<i>SINGLE</i>
L KEY	Key selection	(<i>NONE, F1 .. F3, IO1 .. IO32</i>)
L AUT.OUT	Single: Auto Output	(<i>AUTO.1, AUTO.2</i>)
L TYPE:	Type	<i>TEST, HOLD, PK.HOLD, PRD.SEL (not K401), HI.RES, SC.EXIT, SEMI.P.T</i>
L KEY	Key selection	(<i>NONE, F1 .. F3, IO1 .. IO32</i>)
L TYPE:	Type	<i>COUNT</i>
L KEY	Key selection	(<i>NONE, F1 .. F3, IO1 .. IO32</i>)
L SCOPE	Scope	(<i>GLOBAL, PROD</i>)
L EDT.WGT	Edit Weight	(<i>OFF, WEIGHT, RESAMPLE</i>)
L MAX.ADJ	Maximum weight Adjustment	(<i>0%.. 100% Default: 1%</i>)
L EDT.CNT	Edit Count	(<i>OFF, ON</i>)
L TYPE:	Type	<i>PIECE</i>
L KEY	Key selection	(<i>NONE, F1 .. F3, IO1 .. IO32</i>)
L SCOPE	Scope	(<i>GLOBAL, PROD</i>)
L TYPE:	Type	<i>UNITS</i>

Quick Start - Software Version 1.x & 2.x

MENU	DESCRIPTION	
L KEY	Key selection	(NONE , F1 .. F3, IO1 .. IO32)
L MODE	Mode	(kg/lb , CUSTOM)
L UNIT	Alternative unit	(NONE , N, ARROW U, P, L, ARROW L)
L U.STR	Alternative unit string	(4 character string)
L SCOPE	Scope	(GLOBAL , PROD)
L TYPE:	Type	REM.KEY
L KEY	Key selection	(NONE , F1 .. F3, IO1 .. IO32)
L FUNC	Function to trigger	(NONE , TARE, GR/NET, _0_ .. _9_, +/-, _._, CANCEL, UP, DOWN, OK)
L TYPE:	Type	BLANK
L KEY	Key selection	(NONE , F1 .. F3, IO1 .. IO32)
L BLANK	Blanking function	(DASH , BLANK)
L TYPE:	Type	THUMB (not K401)
L IO.BAND	Thumbwheel Input	(I01-4 .. I029-32)
L TYPE:	Type	REPORT
L KEY	Key selection	(NONE , F1 .. F3, IO1 .. IO32)
L PRT.OUT	Printout	(NONE , PRINT.1, PRINT.2)
L CLR.TOT	Clear totals	(NO , ASK, CLEAR)
L TYPE:	Type	A.TARE
L KEY	Key selection	(NONE , F1 .. F3, IO1 .. IO32)
L THRESH	Threshold	(0 .. Fullscale)
L ZER.DLY	Zero Delay	(0.0s .. 10.0s Default 5.0s)

MENU	DESCRIPTION
SER.NET	Network Menu
└ ADDR.....	Network address (1..31)
└ NUM.....	Number of networks (-1- .. -2-)
└ TYPE:.....	Protocol type <i>PROTOCOL.B</i>
└ SERIAL	Serial port (<i>SER1A, SER2A, SER3A</i>)
└ TYPE:.....	Protocol type <i>SIMPLE</i> (K401, K402 & K491)
└ SERIAL	Serial port (<i>SER1A, SER2A, SER3A</i>)
└ RESP	Simple protocol Response (<i>NONE, OK</i>)
└ TYPE:.....	Protocol type <i>BARCODE</i> (K401, K402 & K491)
└ SERIAL	Serial port (<i>SER1A, SER2A, SER3A</i>)
└ SOURCE	Barcode protocol Source (<i>NAME, B.CODE, ID</i>)
└ TYPE:.....	Protocol type <i>USER.DEF</i> (K403)
└ SERIAL	Serial port (<i>SER1A, SER2A, SER3A</i>)
└ INP.1	User defined input (10 character string)
└ CMD.1	Protocol B translation of INP.1 (Token string)
SER.AUT	Automatic Output Menu
└ NUM.....	Number of Serial outputs (-1- .. -2-)
└ TYPE.....	Type (<i>NONE, SINGLE, AUTO.LO, AUTO.HI, AUT.TRC</i>)
└ SERIAL	Serial port (<i>SER1A, SER1B, SER2A, SER2B, SER3A, SER3B</i>)
└ FORMAT.....	Format (<i>FMT.A, FMT.B, FMT.C, FMT.D, FMT.E, FMT.REG, FMT.TRC, CUSTOM</i>)

MENU	DESCRIPTION
L SOURCE.....	Weight type (<i>GROSS, NET, GR.or.NT</i>)
L EV.AUTO	Custom format string (<i>Token string used with CUSTOM transmissions</i>)
PRINT	Print Menu
L NUM	Number of printouts (<i>_1_ .. _2_</i>)
L HEADER	Header (<i>String</i>)
L FOOTER	Footer (<i>String</i>)
L PAGE	Print Page Options
L WIDTH	Page width (<i>0 .. 250</i>)
L HEIGHT	Page Height (<i>0 .. 250</i>)
L PG.END	Page End String (<i>Token String</i>)
L SPACE	Print Margin Options
L TOP	Blank lines at the top (<i>0 .. 10</i>)
L LEFT	Blank characters on the left (<i>0 .. 10</i>)
L BOTTOM	Blank lines at the bottom (<i>0 .. 10</i>)
L PRINT.1 -	Print Out Menus
PRINT.2	
L TYPE	Printout type (<i>NONE, RECORD, DOCKET, REPORT</i>)
L FORMAT	Format (<i>FMT.A, FMT.B, CUSTOM</i>)
L SERIAL.....	Serial port (<i>SER1A, SER2A, SER3A</i>)
L NAME	Name (<i>6 character string</i>)
L CUSTOM	Custom Print Format Strings
L REC.PRN...	Record: Record printout string
L PRN.KEY ...	Docket: Docket printout string

MENU	DESCRIPTION
L EV.D.NEW .	Docket: New docket string
L EV.D.END ..	Docket: End of docket string
L EV.P.NEW .	Docket: New product string
L EV.P.END ..	Docket: End of product string
L REP.ST	Report: Start of report string
L REP.PR.....	Report: Each product in a report string
L REP.END ...	Report: End of report string
SETP	Setpoint Menu
L NUM	Number of Setpoints (<i>_1_ .. _8_</i>)
L SETP1 – SETP8	Setpoint Menu
L TYPE:	Type of setpoint <i>ON, COZ, NET, MOTION, ERROR, SC.EXIT, BUZZER</i>
L OUTPUT.....	Output <i>(NONE, I01 .. I032)</i>
L LOGIC	Logic control <i>(HIGH, LOW)</i>
L ALARM.....	Setpoint Alarm <i>(NONE, SINGLE, DOUBLE, FLASH)</i>
L NAME	Name of setpoint (6 character string)
L TYPE:	Type of setpoint <i>OVER, UNDER</i>
L OUTPUT.....	Output <i>(NONE, I01 .. I032)</i>
L LOGIC	Logic control <i>(HIGH, LOW)</i>
L ALARM.....	Setpoint Alarm <i>(NONE, SINGLE, DOUBLE, FLASH)</i>
L SOURCE	Weight type <i>(GROSS, NET, GR.or.NT, ALT.GR, ALT.NET, ALT.G.or.N, PIECE, REG)</i>
L SCOPE	Product or global targets <i>(GLOBAL, PROD)</i>

Quick Start - Software Version 1.x & 2.x

MENU	DESCRIPTION
L HYS	Hysteresis (0 .. 999999)
L REG	Register to use (0 .. 65535)
L NAME	Name of setpoint (6 character string)
L TYPE:	Type of setpoint ZERO
L OUTPUT	Output (NONE , I01 .. IO32)
L LOGIC	Logic control (HIGH , LOW)
L ALARM	Setpoint Alarm (NONE , SINGLE , DOUBLE , FLASH)
L SOURCE	Weight type (GROSS , NET , GR.or.NT , ALT.GR , ALT.NET , ALT.G.or.N , PIECE , REG)
L NAME	Name of setpoint (6 character string)
L TYPE:	Type of setpoint LGC.AND, LGC.OR, LGC.XOR
L OUTPUT	Output (NONE , I01 .. IO32)
L LOGIC	Logic control (HIGH , LOW)
L ALARM	Setpoint Alarm (NONE , SINGLE , DOUBLE , FLASH)
L SOURCE	Weight type (IO , STATUS , SETP , REG)
L REG	Register to use (0 .. 65535)
L MASK	Mask for logic setpoints (0 .. 4294967295)
L DLY.ON	Delay for logic setpoints (0.00s .. 600.00s)
L HLD.OFF	Delay for logic setpoints (0.00s .. 600.00s)
L NAME	Name of setpoint (6 character string)
L TYPE:	Type of setpoint SC.REDY
L OUTPUT	Output (NONE , I01 .. IO32)

Quick Start - Software Version 1.x & 2.x

MENU	DESCRIPTION
L LOGIC	Logic control (HIGH, LOW)
L ALARM.....	Setpoint Alarm (NONE, SINGLE, DOUBLE, FLASH)
L RDY.TIM.....	Ready time for scale entry (0.000s .. 60.000s)
L NAME	Name of setpoint (6 character string)
ANL.OUT	Analog Output Menu
L ABS.....	Use absolute weight (NO, YES)
L SOURCE.....	Weight type (GROSS, NET, GR.or.NT)
L RANGE	Weight range (FULLSCALE, CUSTOM)
L WGT.LO.....	Weight at 0V or 4mA (-999999 .. 999999)
L WGT.HI	Weight at 10V or 20mA (-999999 .. 999999)
END	
L END.....	Save and Close

7. Accessory Modules

7.1. General

There are many accessory modules which can be used with the Indicator.

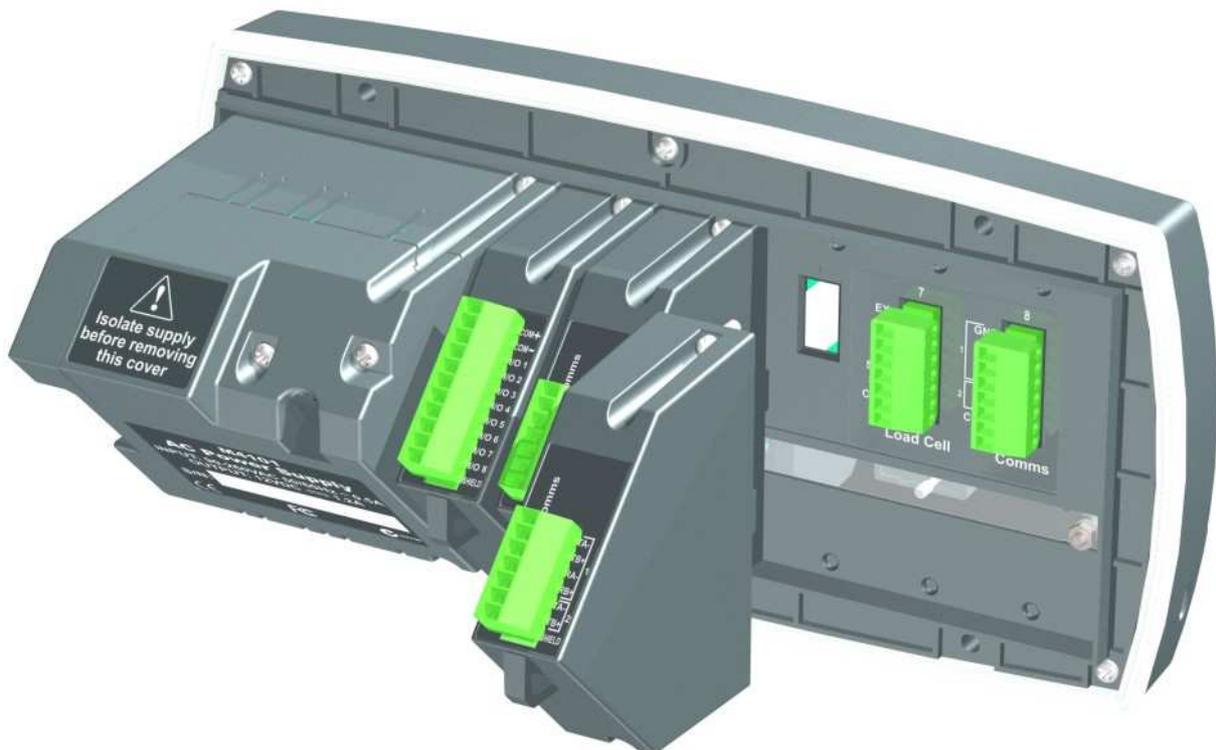
CAUTION

Instrument must be switched off before connecting or disconnecting accessory modules.

Accessory modules provide additional features such as:

- Power supply options
- Additional communications ports
- TCP/IP Communications over Ethernet
- Digital inputs and outputs
- Analog outputs
- Alibi memory

Refer to the specific module manual for wiring details.



7.2. Inputs

There are several accessory modules which provide inputs. Examples are M4301, M4302 and M4401. Some modules provide I/O which can be inputs or outputs depending on configuration.

7.2.1. Configuration

The instrument has up to 8 special functions. The type of each function is chosen from a list of options. The key which triggers each function can be chosen.

1. Ensure module is connected and instrument is switched on.
2. Enter safe setup (or full setup) and go to the FUNC (special function) menu.
3. FUNC:NUM: The instrument can use up to 8 special functions. This option specifies the number of special functions used.
4. FUNC:SFx: Select the special function to configure.
5. FUNC:SFx:TYPE: Select the type of special function from the list. For example, a PRINT or COUNT key could be specified.
6. FUNC:SFx:KEY: Select the input or button. The I/O range for each module is given in the module manual. For example, M4301 is IO1 to IO8 and M4302 is IO17 to IO20.
7. Other options may appear depending on the type of function chosen. See Settings page 16 for details.

7.2.2. Testing and debugging

Test functions are provided in the HD.WARE:IO.HW menu:

1. HD.WARE:IO.HW:TST.IN (Test Inputs) allows the inputs of each module to be tested. Use the **<UP>** and **<DOWN>** keys to move between modules.
2. HD.WARE:ALLOC (Hardware Allocation) checks the configuration of each item of hardware. Use the **<UP>** and **<DOWN>** keys to move between hardware items.

See also the Troubleshooting section in the module manual.

7.3. Outputs

There are several accessory modules which provide outputs. Examples are M4301 and M4401. Some modules provide I/O which can be inputs or outputs depending on configuration.

7.3.1. Configuration

The instrument has up to 8 setpoint outputs. The type of each setpoint is chosen from a list of options. The physical output used for each setpoint can also be chosen.

1. Ensure module is connected and instrument is switched on.
2. Enter safe setup (or full setup) and go to the SETP (Setpoint) menu.
3. SETP:NUM: The instrument can use up to 8 setpoint outputs. This option specifies the number of setpoints used.
4. SETP:SETPx: Select the specific output to configure.
5. SETP:SETPx:TYPE: Select the setpoint type from the list. For example, an OVER or ERROR setpoint could be specified.
6. SETP:SETPx:OUTPUT: Select the physical output. The I/O range for each module is given in the module manual. For example, M4301 is IO1 to IO8 and M4401 is IO1 to IO2.
7. Other options may appear depending on the type of setpoint chosen. See Settings page 16 for details.

7.3.2. Testing and Debugging

Test functions are provided in the HD.WARE:IO.HW menu:

1. HD.WARE:IO.HW :FRC.OUT (Force Outputs) allows outputs to be manually switched on. The **<UP>** and **<DOWN>** keys change the output and the **<+/->** key switches the outputs on and off.
2. HD.WARE:ALLOC (Hardware Allocation) checks the configuration of each item of hardware. Use the **<UP>** and **<DOWN>** keys to move between hardware items.

See also the Troubleshooting section in the module manual.

7.4. Analog Output

Accessory modules provide analog outputs. An example is the M4401.

7.4.1. Configuration

The instrument can only use a single analog output. Voltage or current output must be chosen. Other settings will function without alteration although they may be customised.

1. Ensure module is connected and instrument is switched on.
2. Enter safe setup (or full setup) and go to the H.WARE:ANL.HW (Analog Output Hardware) menu.
3. H.WARE:ANL.HW.TYPE: Select voltage or current output.
4. Other options are available. See Settings page 16 for details.
5. Additional settings are available in the ANL.OUT (Analog Output Menu). See Settings page 16 for details.

7.4.2. Testing and Debugging

Test functions are provided in the HD.WARE:ANL.HW menu:

1. HD.WARE:ANL.HW:FRC.OUT (Force Output) allows the analog output to be manually set. Use the **<UP>** and **<DOWN>** keys to change the output level.
2. HD.WARE:ALLOC (Hardware Allocation) checks the configuration of each item of hardware. Use the **<UP>** and **<DOWN>** keys to move between hardware items.

See also the Troubleshooting section in the module manual.

7.5. Communications

There are several accessory modules which provide additional communications ports. Examples are M4201, M4202 and M4203.

7.5.1. Configuration

Configuration parameters are divided into hardware (e.g. baud rate or parity) and application (e.g. print format, auto transmit format or networking) settings.

1. Ensure module is connected and instrument is switched on.
2. Enter safe setup (or full setup) and go to the HDWARE:SER2.HW (Serial Port 2 Hardware) menu.
3. HDWARE:SER2.HW: Configure settings for the port. For example, set the baud rate, parity, data and stop bits.
4. Application Settings:
 - a. Networking: Go to the SER.NET menu. Select the port used in SER.NET:SERIAL. Other options are also available. See Settings page 16 for details.
 - b. Automatic Transmit: Go to the SER.AUT menu. Select the port used in SER.AUT:SERIAL. Other options are also available. See Settings page 16 for details.
 - c. Printing: Go to the PRINT menu. Select the port used in PRINT:SERIAL. Other options are also available. See Settings page 16 for details.

7.5.2. Testing and debugging

Setup can be checked in the HD.WARE menu:

1. HD.WARE:ALLOC (Hardware Allocation) checks the configuration of each item of hardware. Use the **<UP>** and **<DOWN>** keys to move between hardware items.

See also the Troubleshooting section in the module manual.

7.6. Ethernet Module

Ethernet connectivity is provided via the M4221 accessory module. This module appears in place of a communications module. SER.3A and SER.3B are routed to the Ethernet module.

7.6.1. Configuration

Configuration parameters are divided into hardware (e.g. IP address, network mask or default gateway) and application (e.g. print format, auto transmit format or networking) settings.

1. Ensure module is connected and instrument is switched on.
2. Enter safe setup (or full setup) and go to the HDWARE: ETH.HW (Ethernet Hardware) menu.
3. HDWARE:ETH.HW: Configure settings for the module. DHCP is often sufficient, however you should obtain correct settings from your network administrator.
4. Application Settings: These settings are identical to the communication module discussed in Section 7.5.
5. The module supports 1 bi-directional TCP connection on port 2222 representing SER.3A, and upto 10 transmit-only TCP connections on port 2223 representing SER.3B.

7.6.2. Testing and debugging

The current IP configuration can be found under the Acc menu for the module. PC network tools such as “ping” and “telnet” in addition to the viewer software can be used to establish a connection to the indicator over the network. See also the Troubleshooting section in the module manual.

8. Error Messages

8.1. Overview

Error messages may be displayed to warn of operation outside of the acceptable limits. Short messages (XXXXXX) will appear as a single message. Longer messages (XXXXXX) (YYYYYY) will appear on the display in two parts, first the (XXXXXX) part, then the (YYYYYY) part.

8.2. Weighing Errors

These messages show status messages or errors that may occur during normal weighing operation.

Error	Description	Resolution
(U.LOAD) (O.LOAD)	The weight is below the minimum allowable weight reading or above the maximum allowable weight reading. WARNING: Overloading may damage mechanical scale elements.	Change the weight. Check loadcell connections. Check for damaged loadcell.
(ERROR) (RANGE)	The weight reading is beyond the limit set for Zero operation. The operation of the <ZERO> key is limited in the setup during installation.	Increase the Zero Range (Z.RANGE) or use the <TARE> key instead.
(ERROR) (MOTION)	Scale motion has prevented a <ZERO> , <TARE> or <PRINT> operation from occurring.	Try the operation again once the scale is stable.
(ERROR) (ADC)	An error with the ADC has prevented a <ZERO> or <TARE> operation from occurring.	Ensure loadcell cabling is correct.

8.3. Setup Errors

These messages show status messages or errors that may occur during the instrument setup.

Error	Description	Resolution
(ENTRY) (DENIED)	When accessing setup, more than three attempts have been made with the incorrect passcode.	Turn the instrument off. When the instrument is turned back on, enter the correct passcode to access setup.
(WR DENIED) (RD DENIED)	The instrument may be in Safe Setup and an item that needs Full Setup has been selected for editing.	Access Full Setup to access this item.

8.4. Calibration Errors

Following are a list of the possible error messages that may be displayed to warn of failed or incorrect calibration:

Error	Description	Resolution
(FAILED) (BAND)	An attempt has been made to calibrate with a weight or signal which is not in the valid range.	Check weights and retry.
(FAILED) (ERROR)	An attempt has been made to calibrate while the scale signal is not valid.	Check loadcell connection and the 4-wire/6-wire setting.
(FAILED) (TIMEOUT)	For an unknown reason, the calibration was unable to complete.	Retry.
(FAILED) (RES)	An attempt has been made to calibrate the scale to a resolution which is too high for the instrument.	Check weights and retry.
(FAILED) (TOO CLOSE)	An attempt has been made to add a linearisation point too close to zero, span or another linearisation point.	Check weights and retry.
Y ANGLE LOW	The Angle of the truck is too low in the Y axis.	Adjust truck angle and retry.
Y ANGLE HIGH	The Angle of the truck is too high in the Y axis.	Adjust truck angle and retry.
X ANGLE LOW	The Angle of the truck is too low in the X axis.	Adjust truck angle and retry.
X ANGLE HIGH	The Angle of the truck is too high in the X axis.	Adjust truck angle and retry.

8.5. Diagnostic Errors

The instrument continually monitors the condition of the internal circuits. Any faults or out-of-tolerance conditions are shown on the display as an **E** type error message.

Error	Description	Resolution
(E0001)	The power supply voltage is too low.	Check supply
(E0002)	The power supply voltage is too high.	Check supply
(E0004)	Positive sense voltage out of range.	Check scale connections. Check SCALE:BUILD:CABLE setting.
(E0008)	Negative sense voltage out of range.	Check scale connections. Check SCALE:BUILD:CABLE setting.
(E0010)	Temperature is outside of allowable limits	Check location
(E0020)	Module Error	Replace Module
(E0040)	Data not received from Tilt Sensor	Check Tilt Sensor
(E0200)	The calibration information has been lost.	Re-calibrate
(E0400)	The factory information has been lost.	Return for Service
(E0800)	Application settings have been set to defaults.	Check and re-enter application settings
(E2000)	ADC Out of Range Error. This may be caused from a broken load cell cable or sense not connected in 6 wire mode.	Check SCALE:BUILD:CABLE setting. Check load cell cable, wiring, etc.
(E4000)	The runtime information has been lost.	Check Zero and Tare settings.

Notes:

Notes:

The **E** type error messages are additive. For example if instrument is running off batteries and the temperature drops, the battery voltage may be too low. The resulting error messages will be **E 0011** (0001 + 0010). The numbers add in hexadecimal as follows:

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - A - B - C - D - E - F

(For example, 2 + 4 = 6, or 4 + 8 = C)

SMART WEIGHING SOLUTIONS

