



ZM 200 Series Training

Sunday, November 05, 2017

Avery Weigh-Tronix

ZM200 Series Training Agenda

- ZM200 Series Models
- Mechanical Review - Assembly
- System Hardware & Components
- Hardware Connections & Jumper Settings
- PC setup of Serial and Ethernet ports
- Passwords, Key Functions & Menu Navigation
- User, About, Audit Menus
- Diagnostics – Scale A/D , Serial , Setpoint I/O
- Setup Menu
- Calibration & Scale Metrology

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ZM200 Series Training Agenda

- Alternate Calibration
- Custom Units of Measure
- Filtering
- System Menu
- Tare Settings
- Communication Ports
- Ethernet: TCP/IP
- Protocol Configuration
- Print Formats – Front Panel Editing
- Print Tokens and Parameters

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ZM200 Series Training Agenda

- Enquiry, SMA, NCI protocols
- Remote Inputs and Setpoint Outputs
- Applications
 - Accumulator, Counting, Target, Batching
 - Peak, Remote Display
- ZM201 NiMH Battery Option & Sealing Kit
- ZM201 Signal Processor
 - PC Application – Remote Cal / Wt Simulator
- ZM205 Baggage Scale

ZM200 Series Training Agenda

- Service & User Manuals
- Ztools / Zcom / Zport
 - Firmware Updates / Configuration Files
- Other Tech Guides
- Final Review - Model Comparisons

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ZM201 & ZM205 models

- ZM201-SD2
- ZM201-PD2 -> Large LCD
- ZM201-SP2
- ZM201-SP0
- ZM205-SP2
- ZM205-SR2

1st digit

S = Stainless

P = ABS Plastic

2nd digit

D = Desktop

P = Panel Mount

R = Remote Display

3rd digit

0 = No display

2 = TN Green Backlit LCD

Model code: serial tags and shipping labels

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SD2 - Stainless Steel



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PD2 – ABS Plastic



[ZM201 ABS Pole Mount](#)

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PD2 – Back Connections



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SP2 - Panel Mount



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SP0 - Signal Processor



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ZM205 – Baggage Scale



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Panel Mount – Rear Connections



ZM201-SP2

ZM201-SP0

ZM205-SP2

ZM205-SR2

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ZM200 Family



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ZM201's



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ABS-PD2 disassembly

Remove 4 phillips head screws from corners

Remove 3 green two-part connecters – use flat head screwdriver

Do not need to remove battery compartment screws

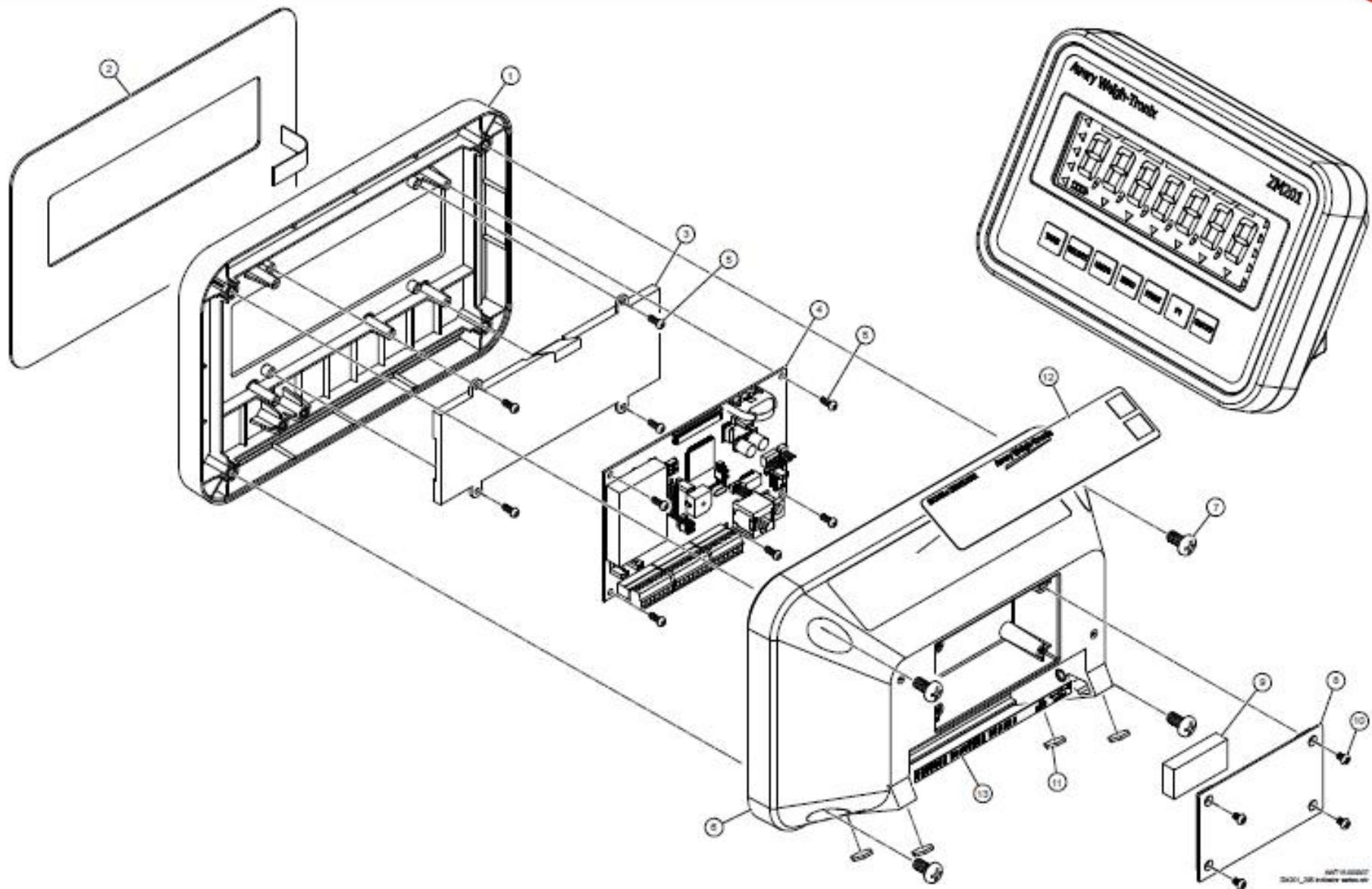
Separate the 2 halves

Be careful of lose screws!



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ABS-PD2 Assembly



SST-SD2 disassembly

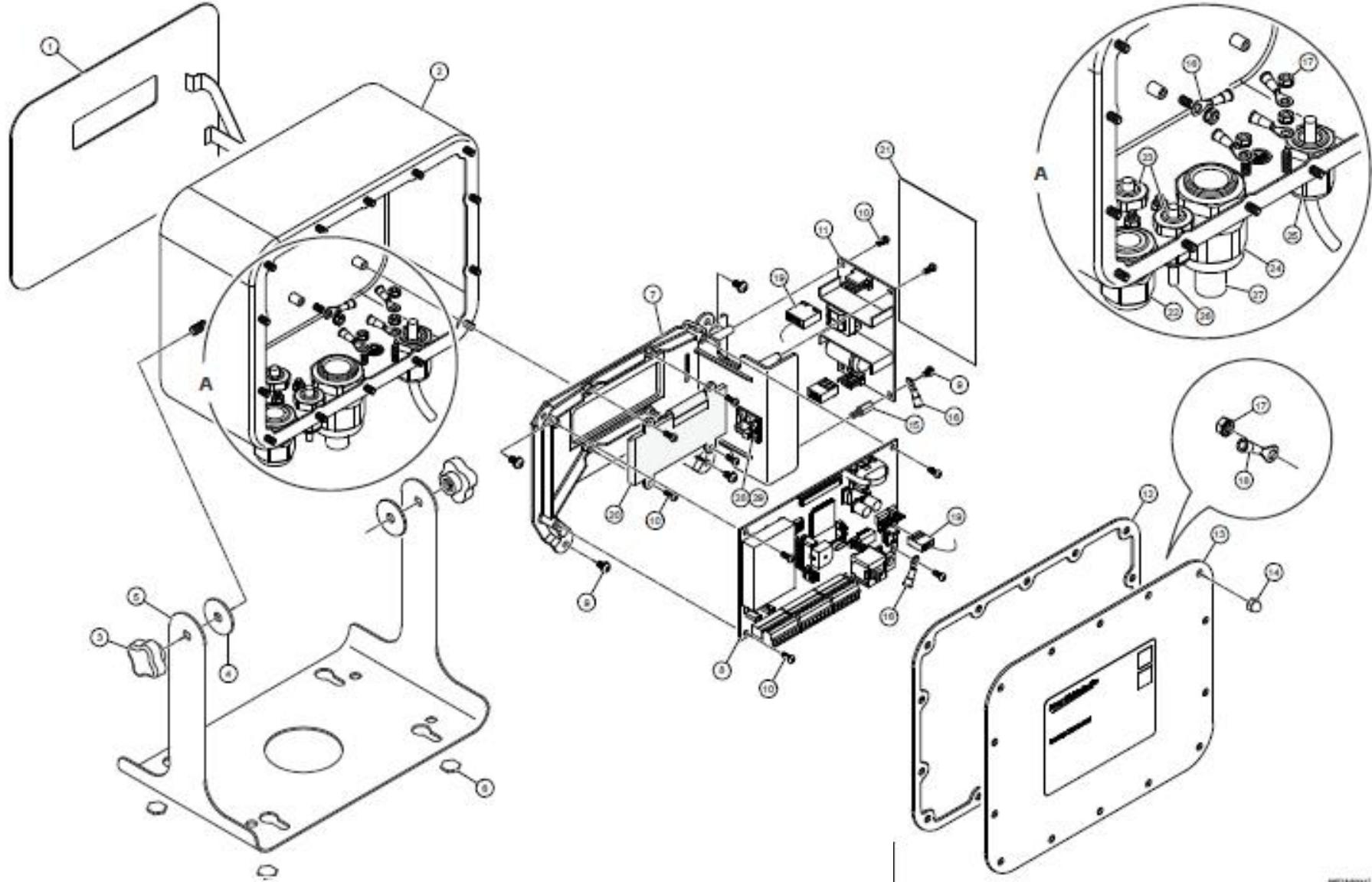
Remove the 14 Acorn Nuts using a 7mm socket driver

Remove the tethered ground strap on inside of backplate

Do not lose your acorn nuts!

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SST-SD2 Assembly

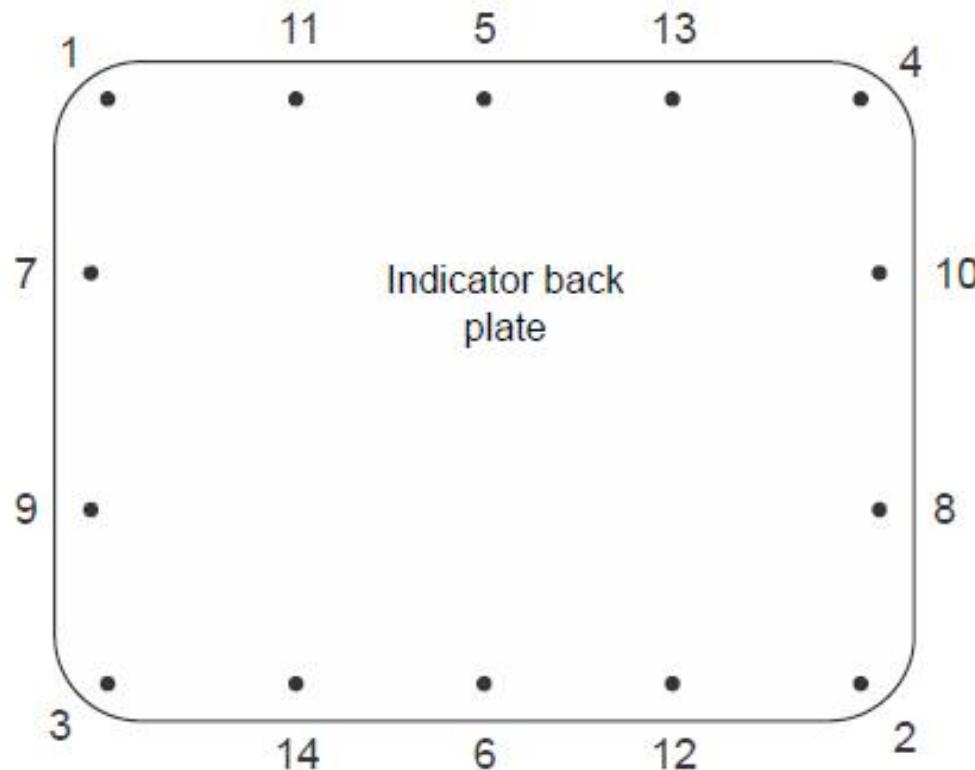


SST-SD2 Back Cover / Acorn Nuts

7mm socket - Torque to 6 in-lb

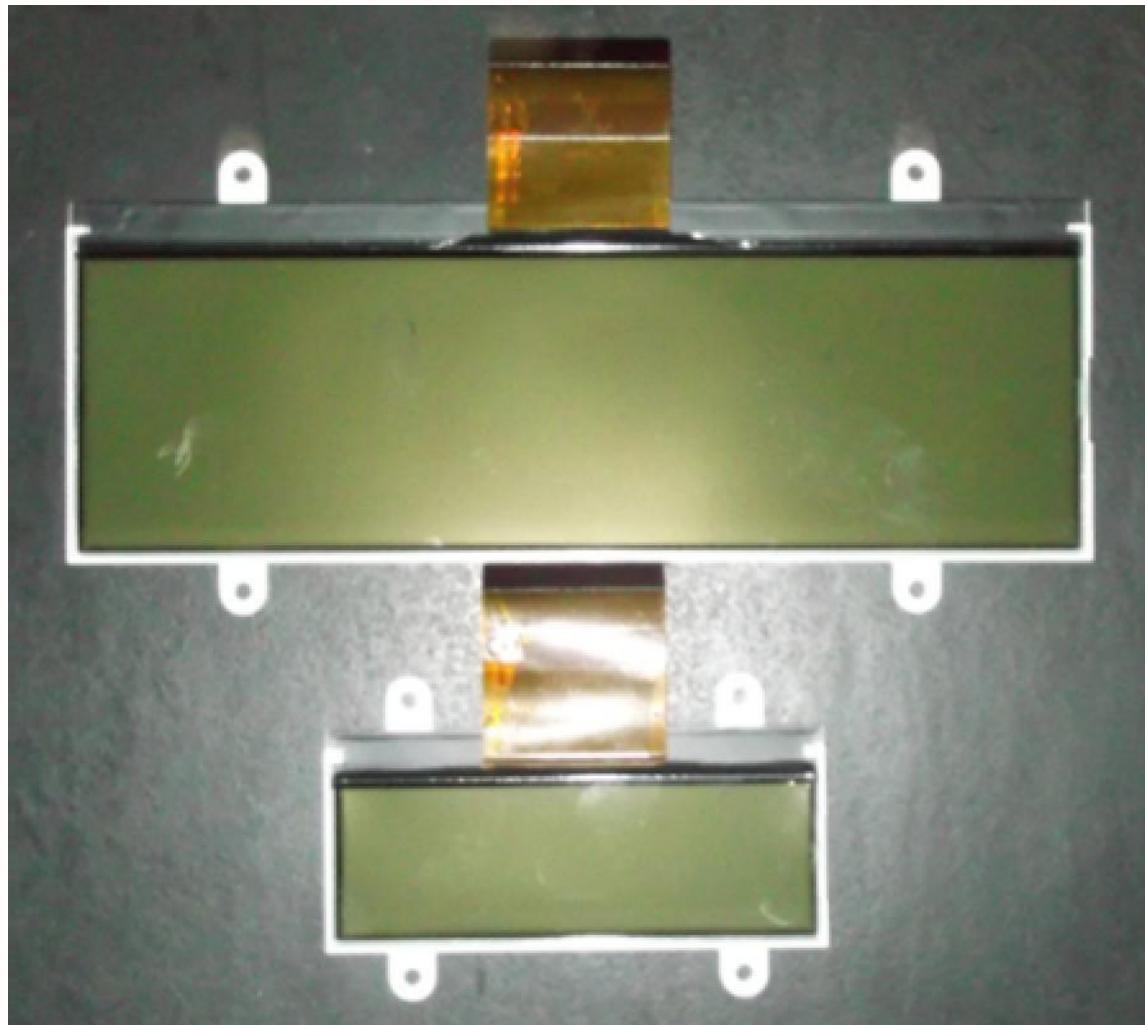
Finger tighten all nuts first...follow pattern shown

Approximately 1/4 turn after finger tight = 6 in-lb



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Display Boards

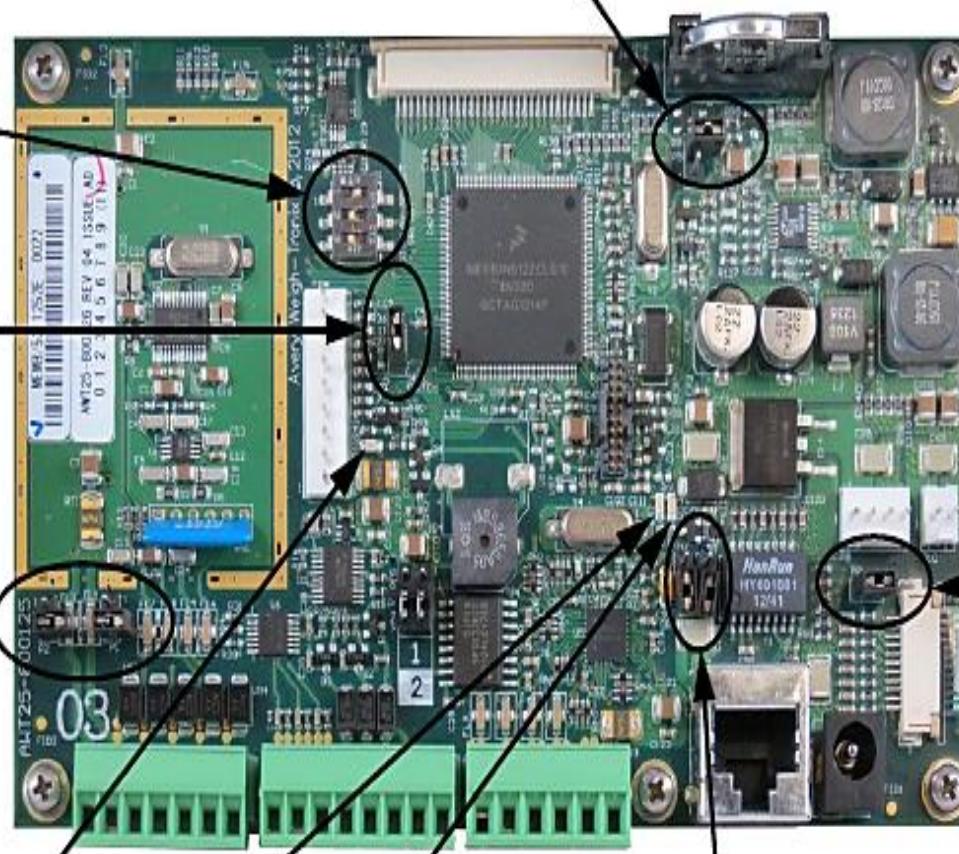


PD2 model
30mm (1.2 ") digits

SD2 and SP2 models
13mm (0.5") digits

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Model select jumpers



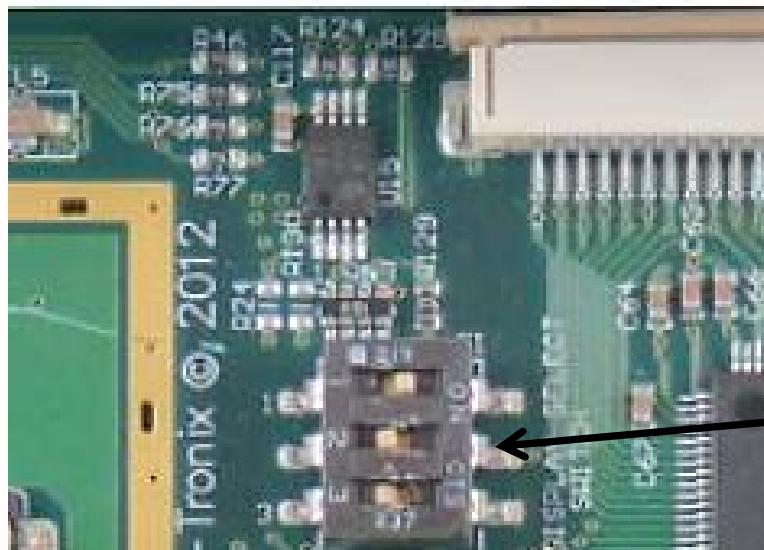
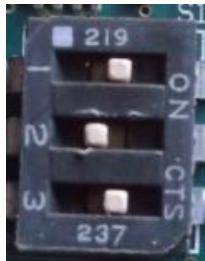
DS1: Blinks once/second when all is OK

DS2: Blinks when there is ethernet data transfer.

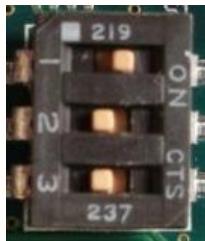
DS3: Lights when the ethernet is connected.

Model select jumpers

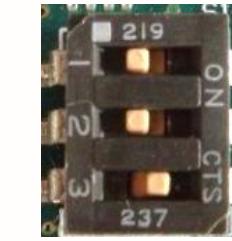
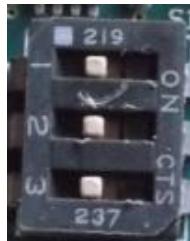
ZM201-PD2



ZM201-SD2



ZM201-SD2



Sets default IP
192.168.1.15

Model	S1-1	S1-2	S1-3
ZM201-SD2	ON	OFF	OFF
ZM201-PD2	ON	OFF	ON
ZM201-SP0	OFF	OFF	OFF
ZM201-SP0 Default IP	OFF	OFF	ON

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AC/DC Power Supply

ZM201 SST (SD2) model only

- Wide-Range AC Input 90-264 VAC
- Small Footprint - 3.5"x 2"x 0.85"
- Conducted EMI exceeds FCC and CISPR 22 Class B requirements
- Approved to UL60950-1: 2003, CSA-22.2, No. 60950-1-03, IEC and EN60950-1
- Class B Rating
- RoHS Compliant
- CE marking for LVD
- Same Mfg as Z 3xx series

Rated Output 20 watts

International Safety Standard Approvals



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SST model Glands

1 PG13.5 Load cell

2 PG7 Com Ports or I/O

1 PG11 Power cord

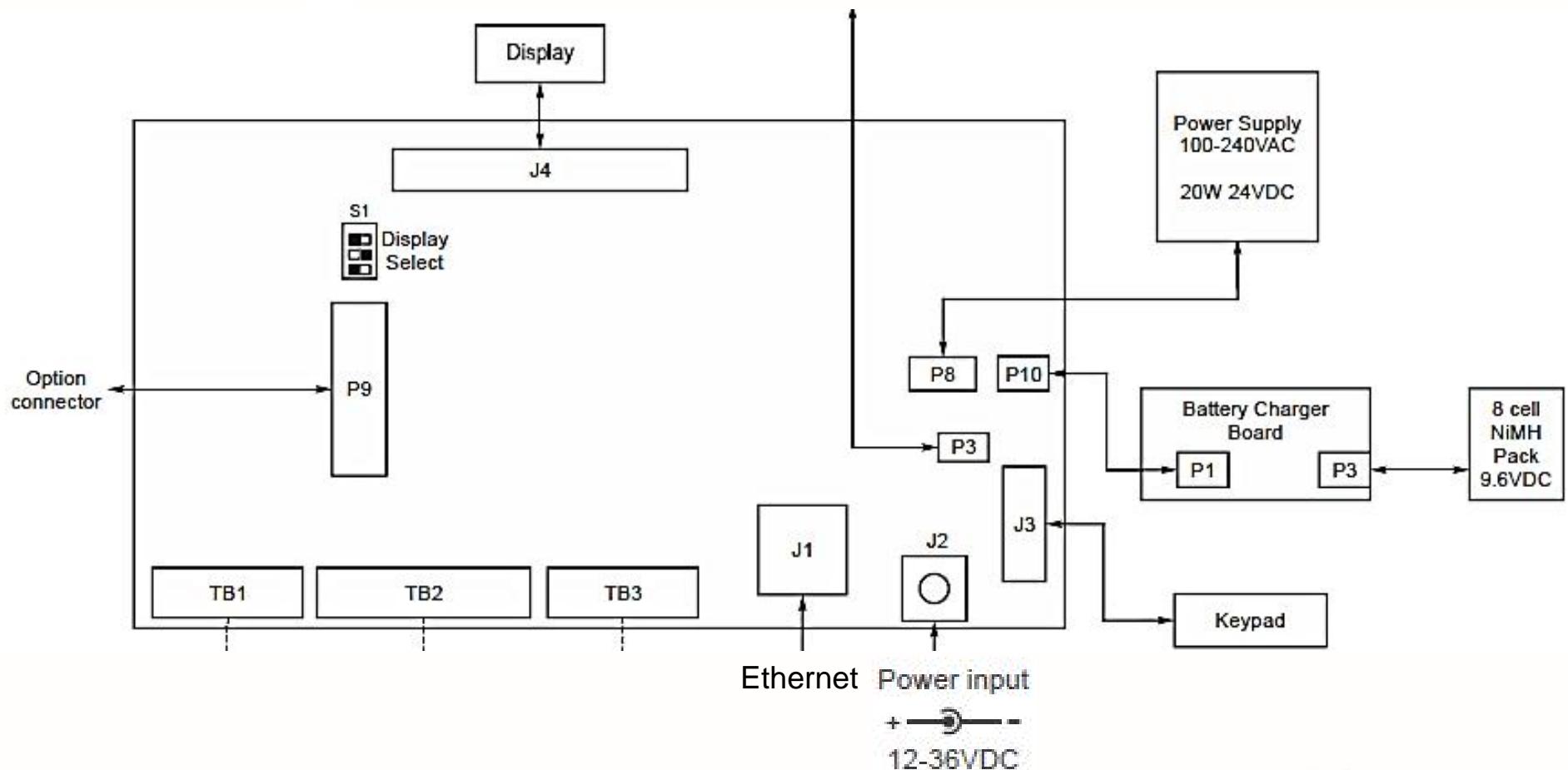
1 NPT $\frac{3}{4}$ 26.67 mm (1.05") dia
Conduit connection
Ethernet QD option



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Block Diagram

Always ON when jumper installed (AC)
Remove to use ON/OFF switch (DC/Battery)



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External Connections

Same connections as Z 3xx series

Scale Interface	
TB1	Description
1	-EXC
2	+EXC
3	-SEN
4	+SEN
5	-SIG
6	+SIG
7	SHIELD

Input / Output	
TB2	Description
1	GND
2	Input 1
3	Input 2
4	Input 3
5	Digital Out 1
6	Digital Out 2
7	Digital Out 3
8	Relay Voltage

Com 1 & 2 RS232	
TB3	Description
1	GND
2	TX1
3	TX2
4	RX1
5	RX2
6	5VDC

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Load Cell connection

Scale Interface	
TB1	Description
1	-EXC
2	+EXC
3	-SEN
4	+SEN
5	-SIG
6	+SIG
7	SHIELD

Black
Green or Red

Red or Green
White
Shield

Do not connect the Sense leads
Observe weight
Did you get upper dashes only?
Connect Sense jumpers P1 & P2

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Load Cell connection

Scale Interface	
TB1	Description
1	-EXC
2	+EXC
3	-SEN
4	+SEN
5	-SIG
6	+SIG
7	SHIELD

Black
Green
Blue
Yellow
Red
White
Shield

Remove Sense jumpers
Connect the Sense wires

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Scale Interface Test

1. Set LC SIM to 0 mV/V (full CCW) and ZERO scale
2. Rotate LC Simulator Clockwise – weight should increase
3. Set LC SIM to 1mV / V – display should be ~ 2500 kg

Serial RS232

Com 1 & 2 RS232	
TB3	Description
1	GND
2	TX1
3	TX2
4	RX1
5	RX2
6	5VDC

Black

Red

Green

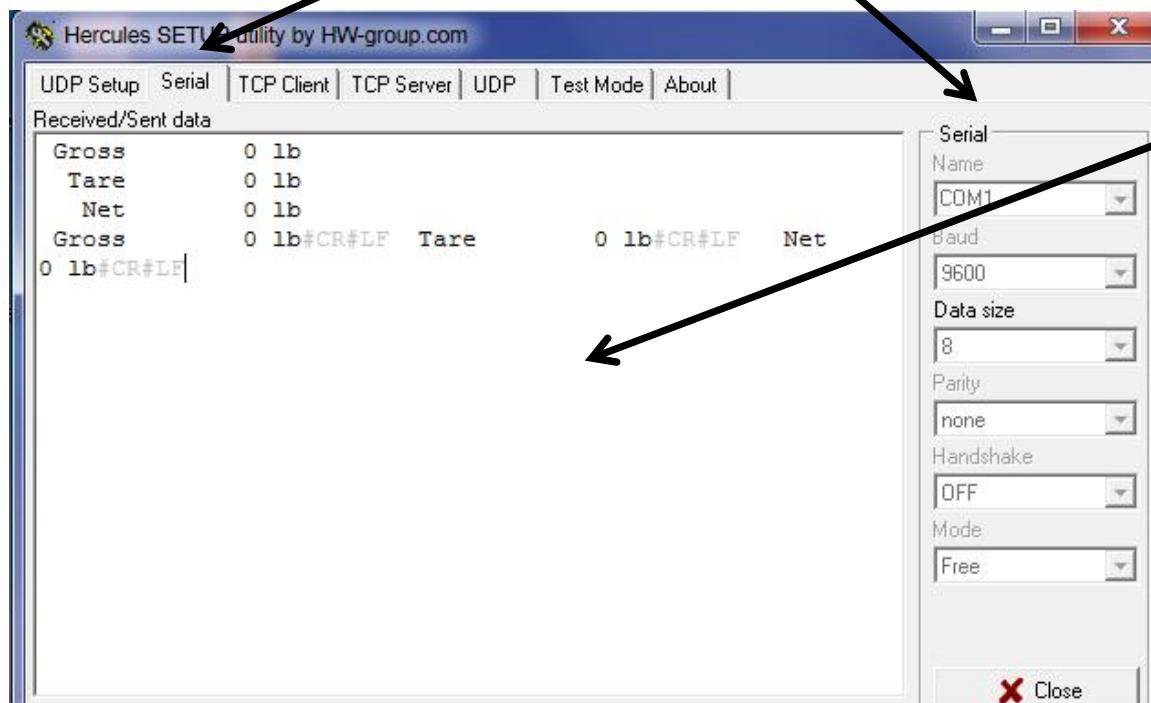
PC Serial Cable 47355-0010MTS

[Hercules COM Setup](#)

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Serial RS232 Test

1. Open Hercules and select SERIAL tab
2. Check Settings – defaults should match ZM
3. Select OPEN
4. Press PRINT key on ZM → PF #1 = GTN



[Hercules](#)

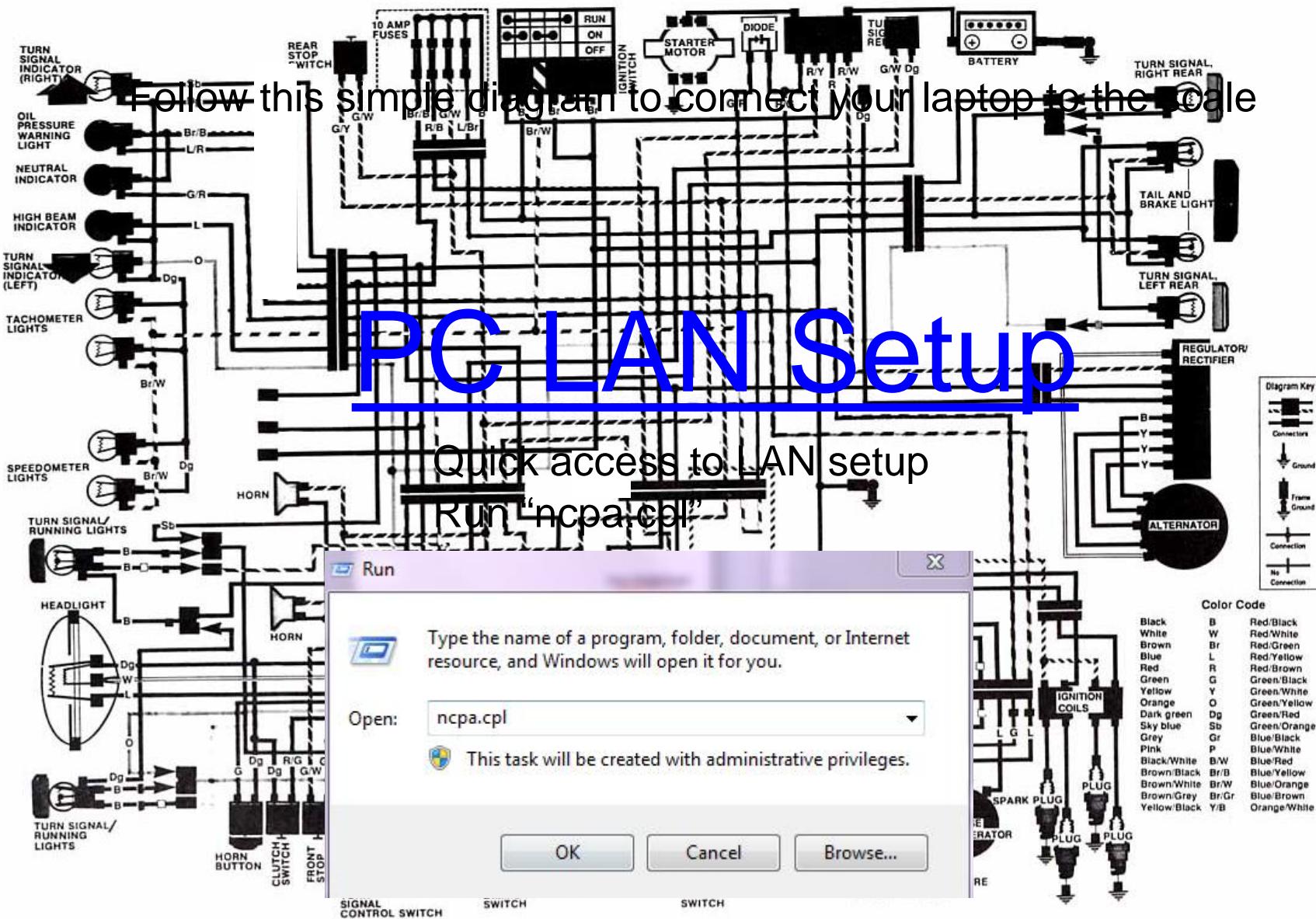
Right click in Received data window

Toggle between ASCII and Hex chars

Try different Special Char settings

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Ethernet Connection



Ethernet Connection

Ping test

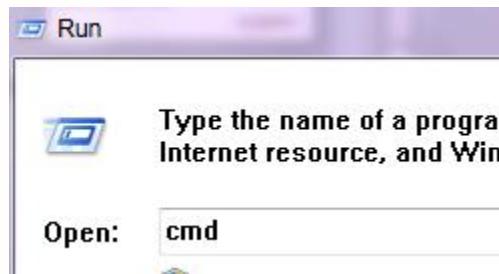
Start Button



Type “cmd” in “Search programs and files”



or in Run -> Open”



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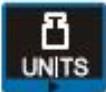
Ethernet Connection

Ping test

Ping 192.168.1.21

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201 Key Functions

	Weigh mode - Press the TARE key to perform a tare function or the key prompts for a preset tare, if enabled. Menu Navigation - Acts as an up arrow key for menu navigation. Numeric entry - Increments a value. Allows you to access minus sign and comma.
	Weigh mode - Press the SELECT key to toggle between Gross, Net, Tare and any other active display values. Menu Navigation - Press and hold to enter the setpoint editor. Acts as a down arrow key. Numeric entry - Decrement a value. Allows you to access minus sign and comma.
	Weigh mode - Press the PRINT to send information to a peripheral device. Performs accumulator function, if enabled. Menu Navigation - Acts as a left arrow key. Numeric entry - Functions as a backspace.
	Weigh mode - Press the UNITS key to scroll through the active units of measure. Menu Navigation - Acts as a right arrow key. Numeric entry - Inserts a new digit and moves the cursor position to the right.
	Press the ZERO key to zero the display. Acts as an ENTER key to accept a displayed value or function. Also used to access the Quick Code entry for menu navigation.
	Press and hold F1 to view the password entry screen. Press to select application specific choices. Aborts a numeric entry and acts as an ESCAPE key for menu navigation.
	If DC powered, press to turn the indicator on. Press and hold for two seconds to turn the indicator off. P3 jumper on main PCB must be removed for ON/OFF key to function. If P3 jumper is in place, when power is applied to the indicator it will be on.

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Z Series Key Navigation

Press **SELECT/ ▼** to move down in a menu

Press **TARE/ ▲** to move up in a menu, except at the bottom item in a menu, then use **ZERO/ ←** or **F1**

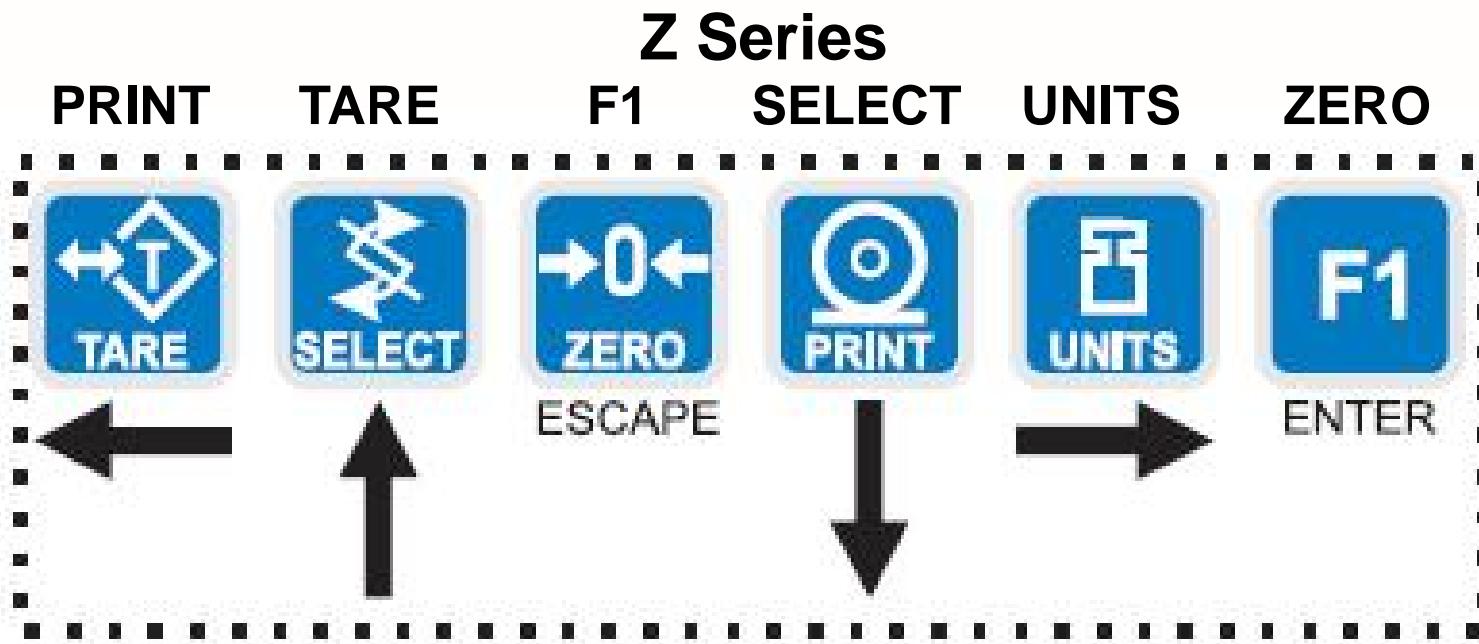
Press **PRINT/ ←** to move left in a menu

Press **UNITS/ ➤** to move right in a menu

Press **ZERO/ ←** to accept a value or choice and move up in the menu.

Press **F1** to escape and move up in the menu

E1005 Key Navigation



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Key Navigation Arrows



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Numeric Entry

These segments flash in numeric entry mode

TARE / ▲ – Press to increment the flashing number

SELECT / ▼ – Press to decrement the flashing number

PRINT / ◀ – Press to backspace cursor in a number

UNITS / ▶ – Press to advance cursor in a number

ZERO / ↵ – Press to accept a value

F1 / ESC – Press to escape an entry screen

TARE increments flashing digit 0 -> 1 -> 2 -> 3....

SELECT decrements flashing digit 0 -> “-” -> 9 -> 8 -> 7

UNITS adds “0”

PRINT removes last digit

Passwords

Password	Menu Level	Accessed Menus
111	USER	User, About, Audit
3570	DIAGNOSTICS	Diag, User, About, Audit
3088	ADMIN	Setup, Diag, User, About, Audit
2580	CALIBRATE	Calib
1793	SUPER	Application specific items. See User manual.

[Numeric Entry](#)

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Bar Graph segments

All Segments Flashing

In a menu screen...use Navigation keys



Center Flashing / Others Off

In a numeric entry screen



Right Flashing / Others Off

In a preset list menu...use PRINT and UNITS



Left Flashing / Others Off

In a string index...use String Index action chart



Every Alternate Segment Flashing

Octet entry for IP, Subnet or Gateway address.



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Setup password entry

TARE ↑ increments : SELECT ↓ decrements : UNITS → add “0” : PRINT ← remove digit

Example: key in the password 3088

NOTE: 5 secs w/o key press aborts entry

Press & hold **F1** key until **PASS** is displayed, then release...

Flashing **0** is displayed

Press **TARE** until **3** is displayed

Press **UNITS** to insert a **0**

Press **UNITS** again to insert another **0**

Press **SELECT** until **8** is displayed

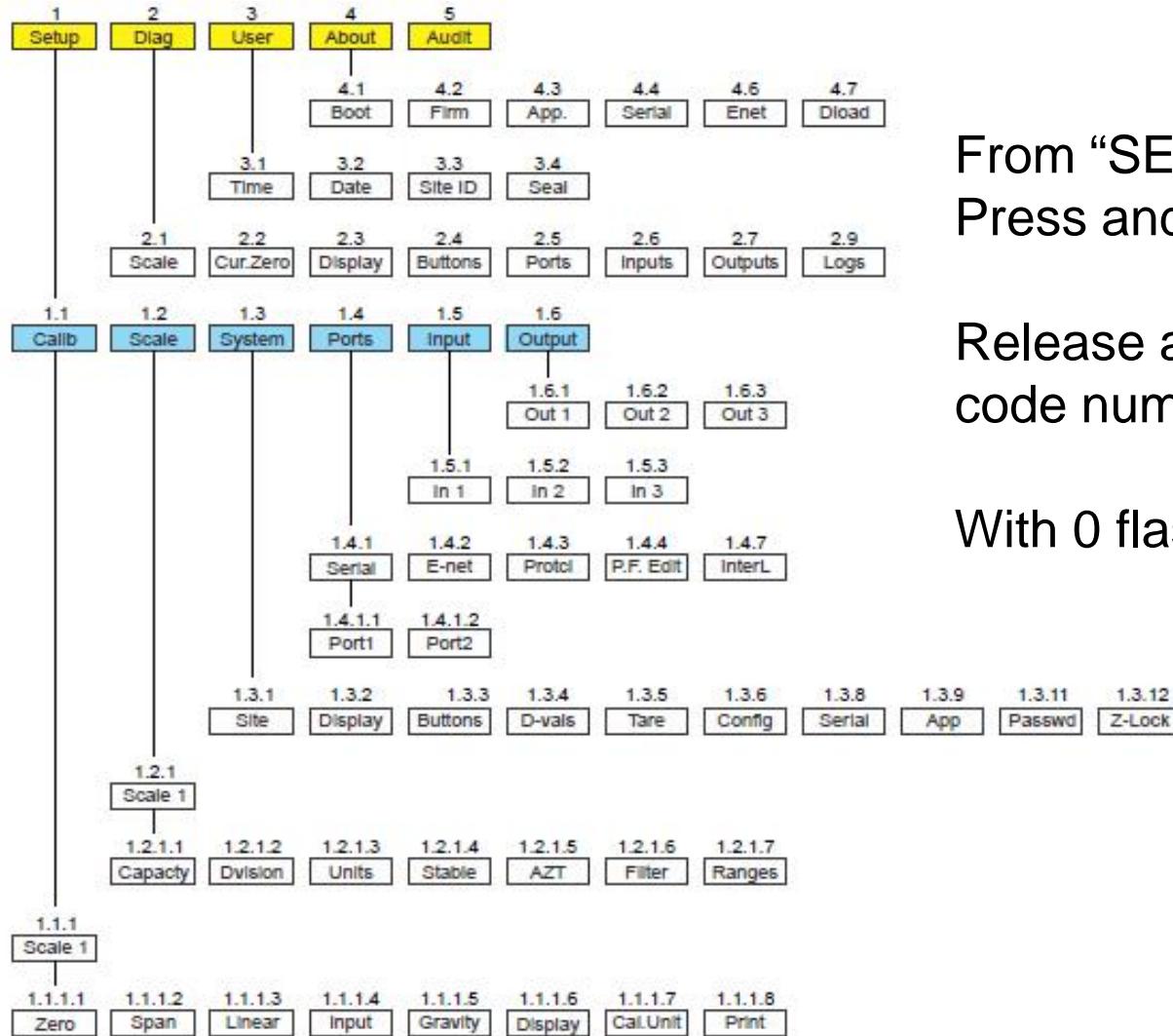
Press **UNITS** to insert a **0**

Press **SELECT** until **8** is displayed

Press **ZERO** to access the **SETUP** menu

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Quick Access Codes



From “SETUP”

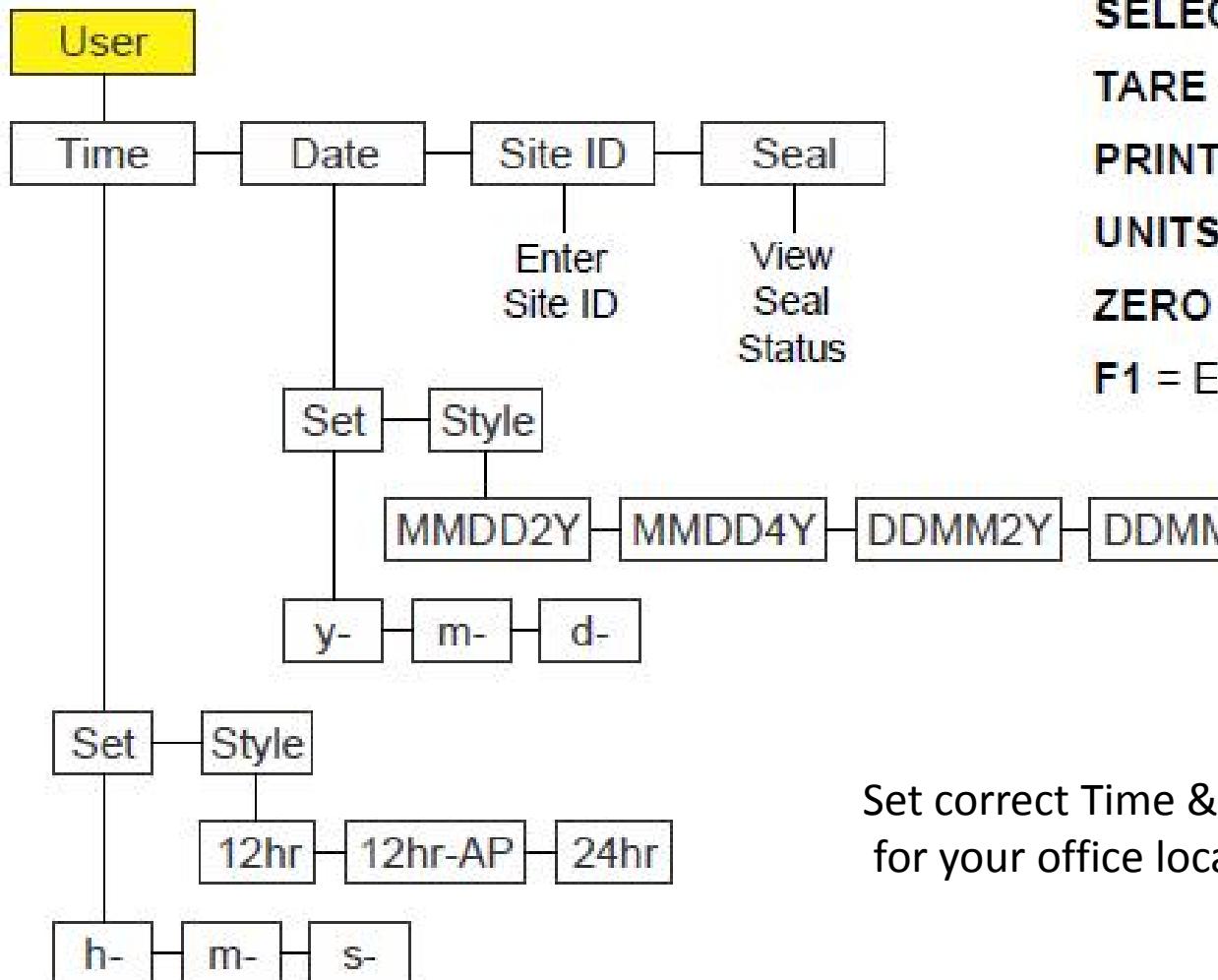
Press and hold ZERO > “P 0”

Release and enter quick access code number

With 0 flashing press SELECT for “.”

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User Menu - 111



SELECT = ▼

TARE = ▲

PRINT = ◀

UNITS = ►

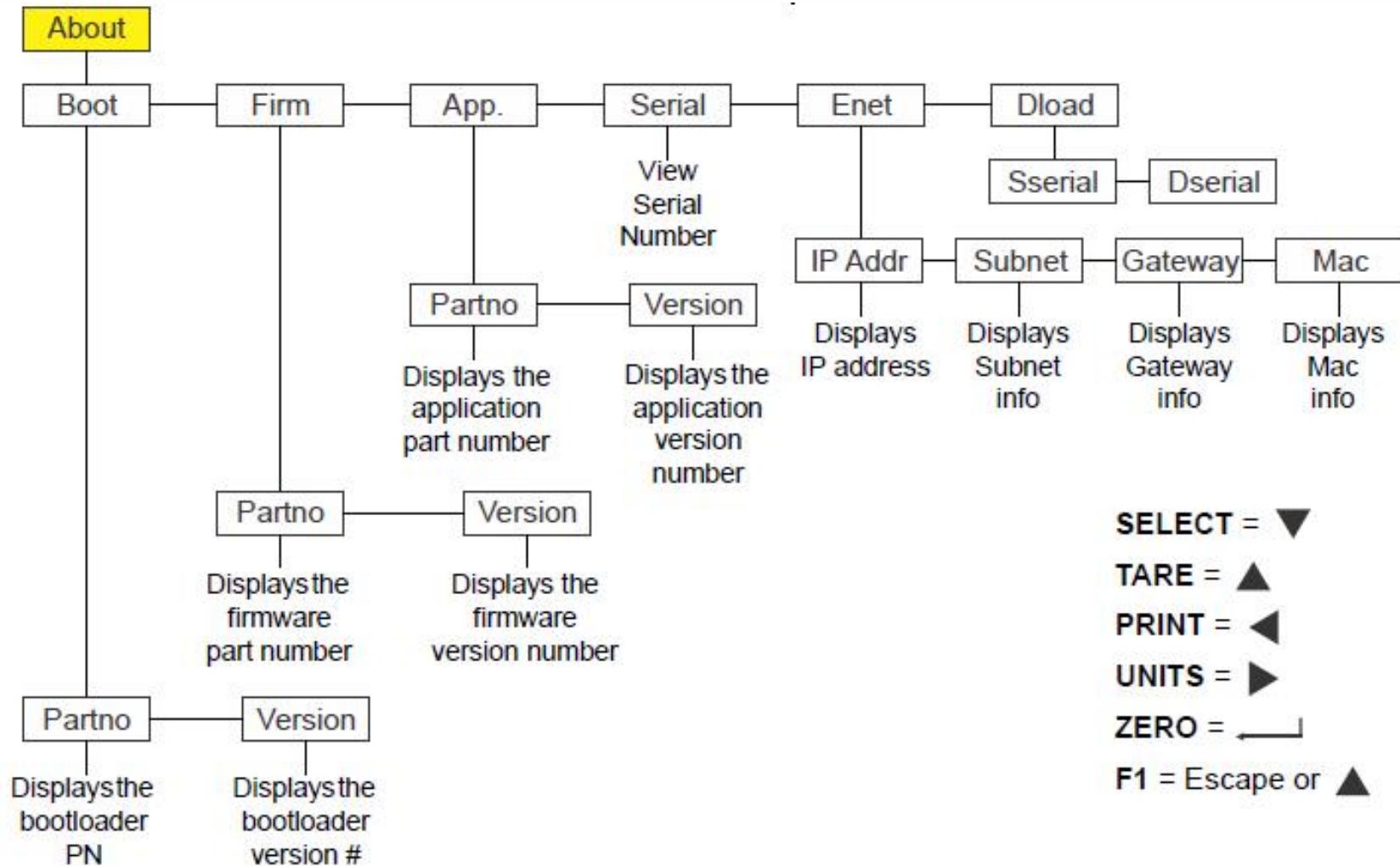
ZERO = ←

F1 = Escape or ▲

Set correct Time & Date
for your office location

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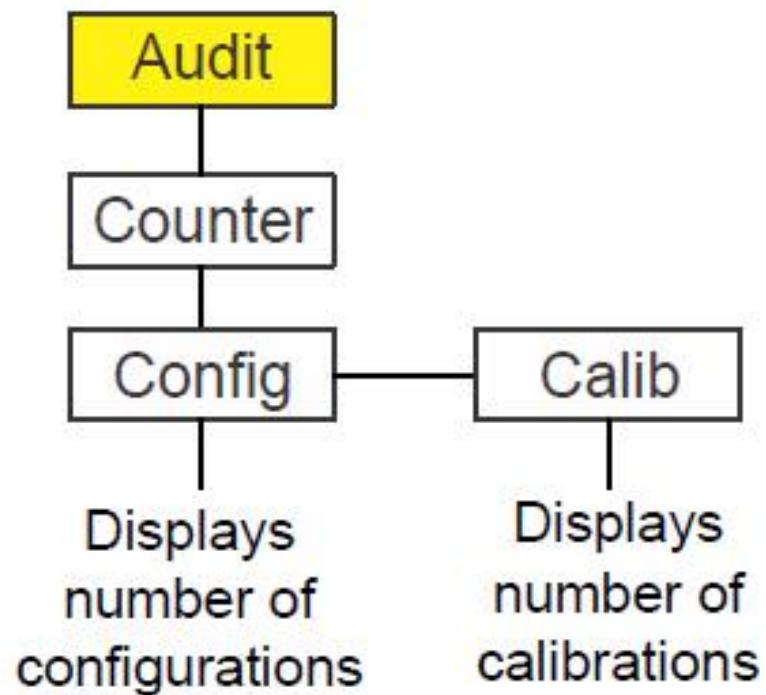
About Menu



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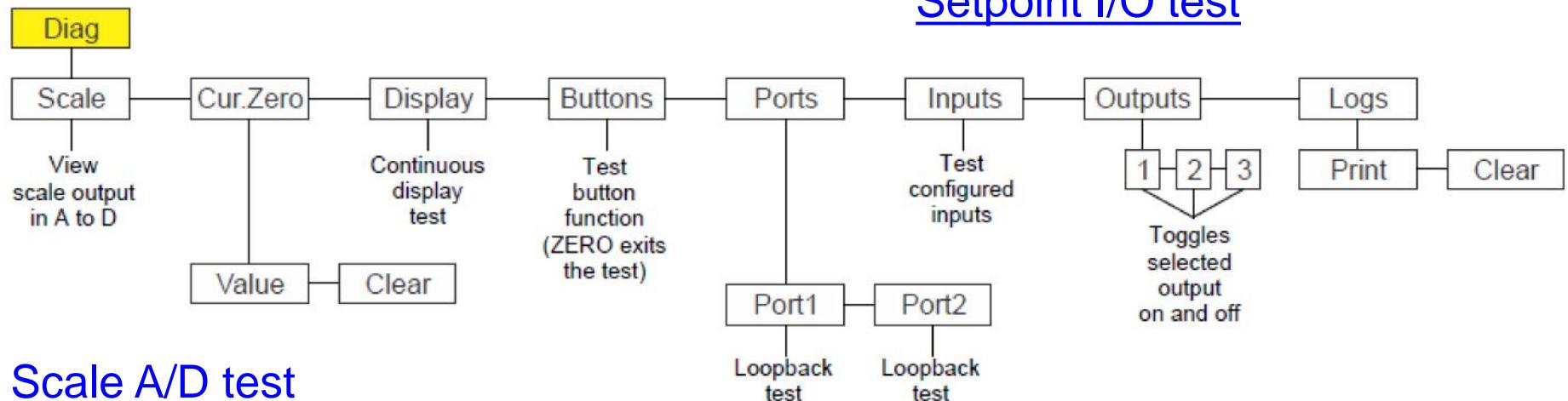
Audit Menu

Category II Audit Trail



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Diagnostics Menu - 3570



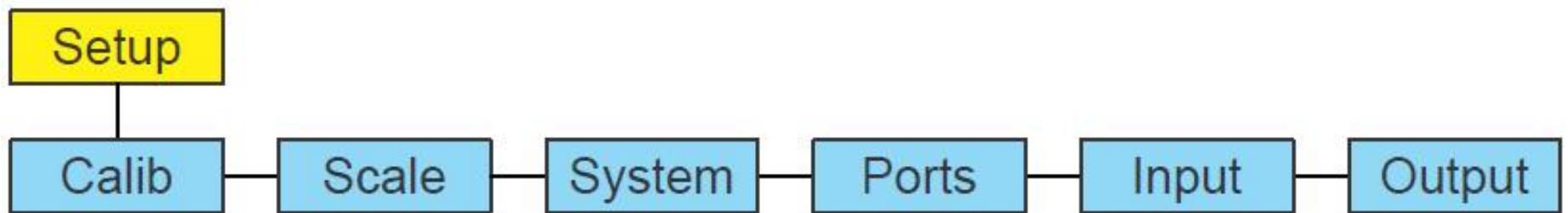
Setpoint I/O test

Scale A/D test

Install jumper between
9p Cable pins 2 and 3
TB3 pins 2 and 4 for COM 1
TB3 pins 3 and 5 for COM 2
perform the loopback test

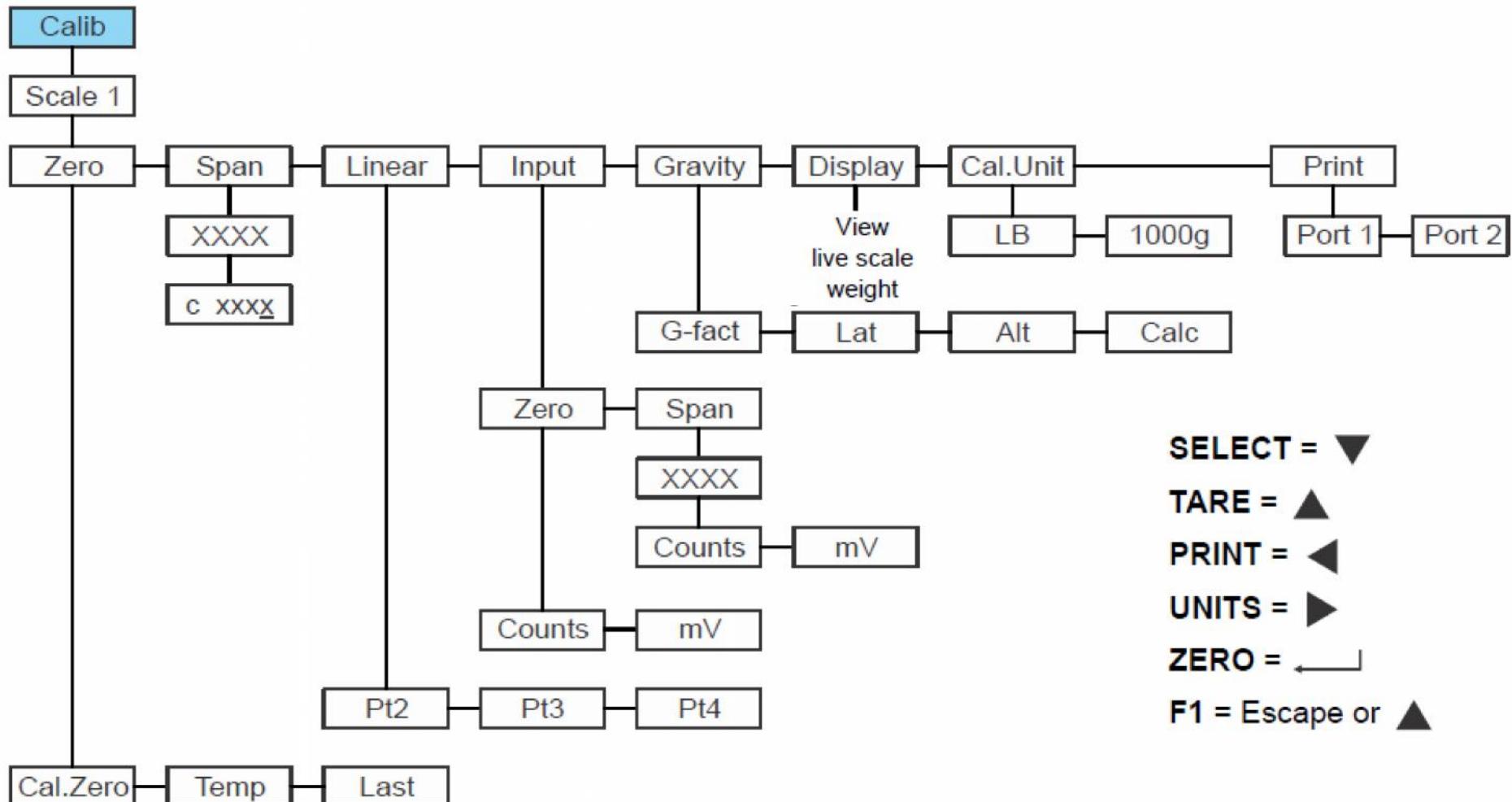
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Setup Menu - 3088



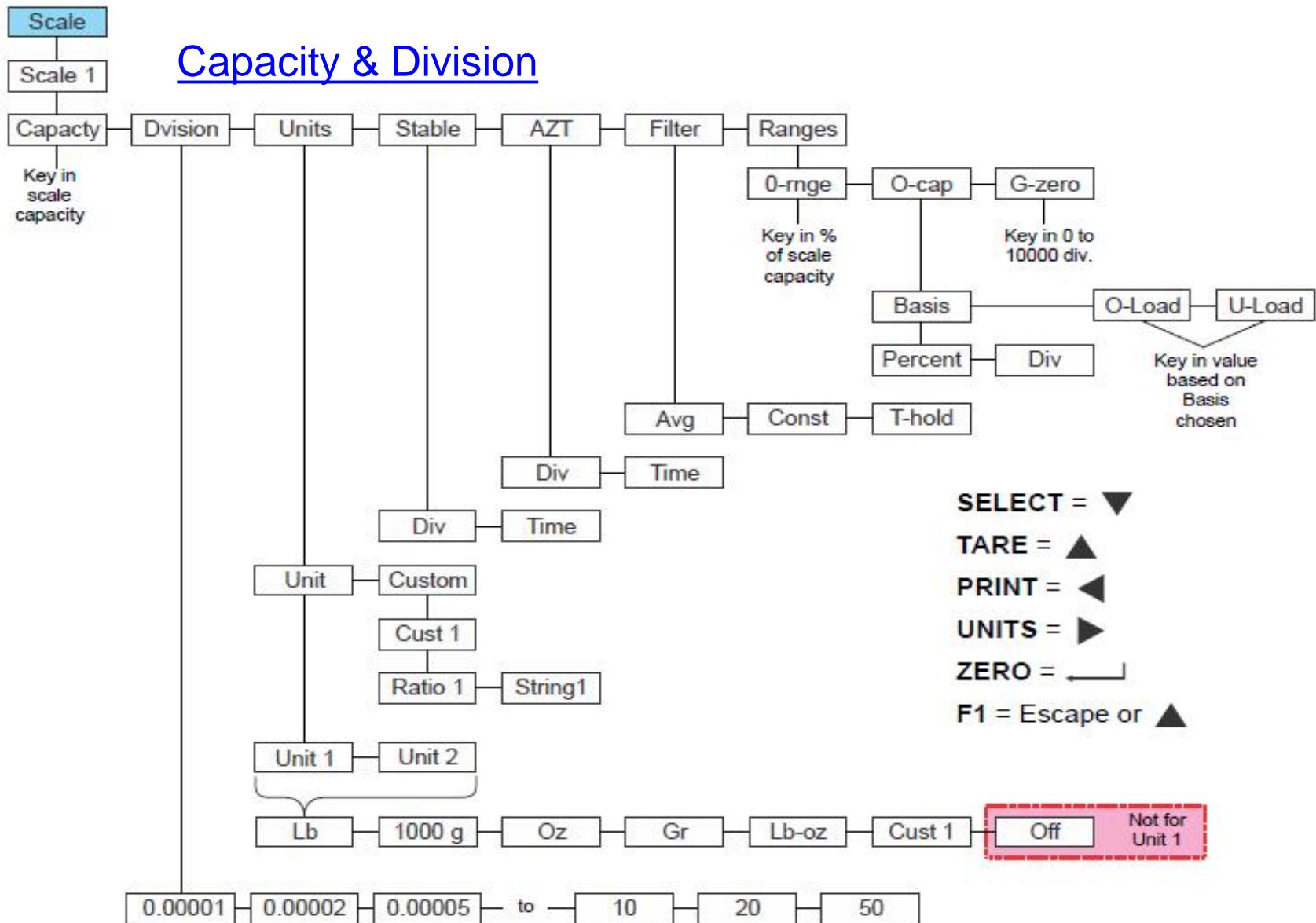
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Calibration Menu

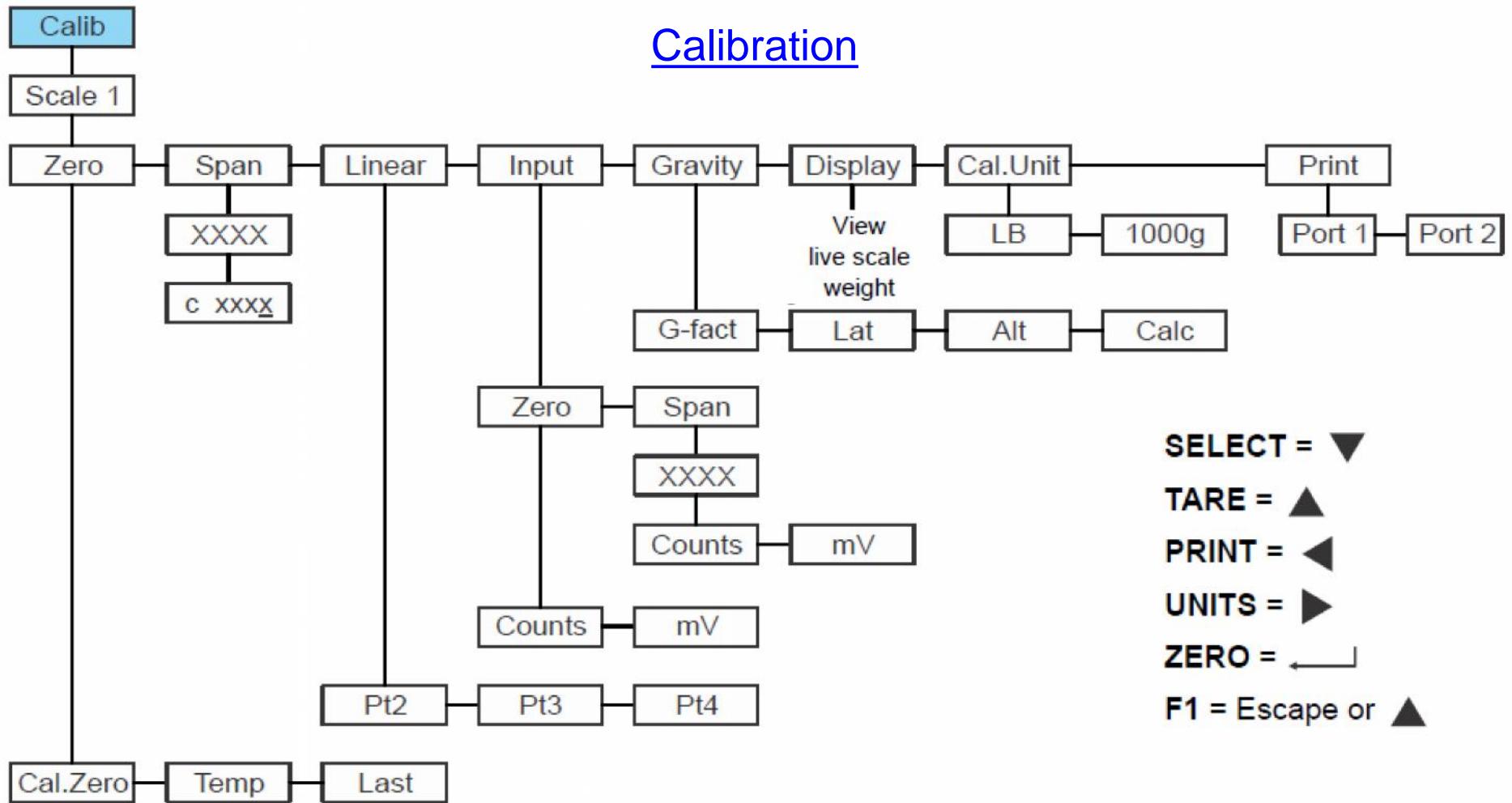


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Scale Menu

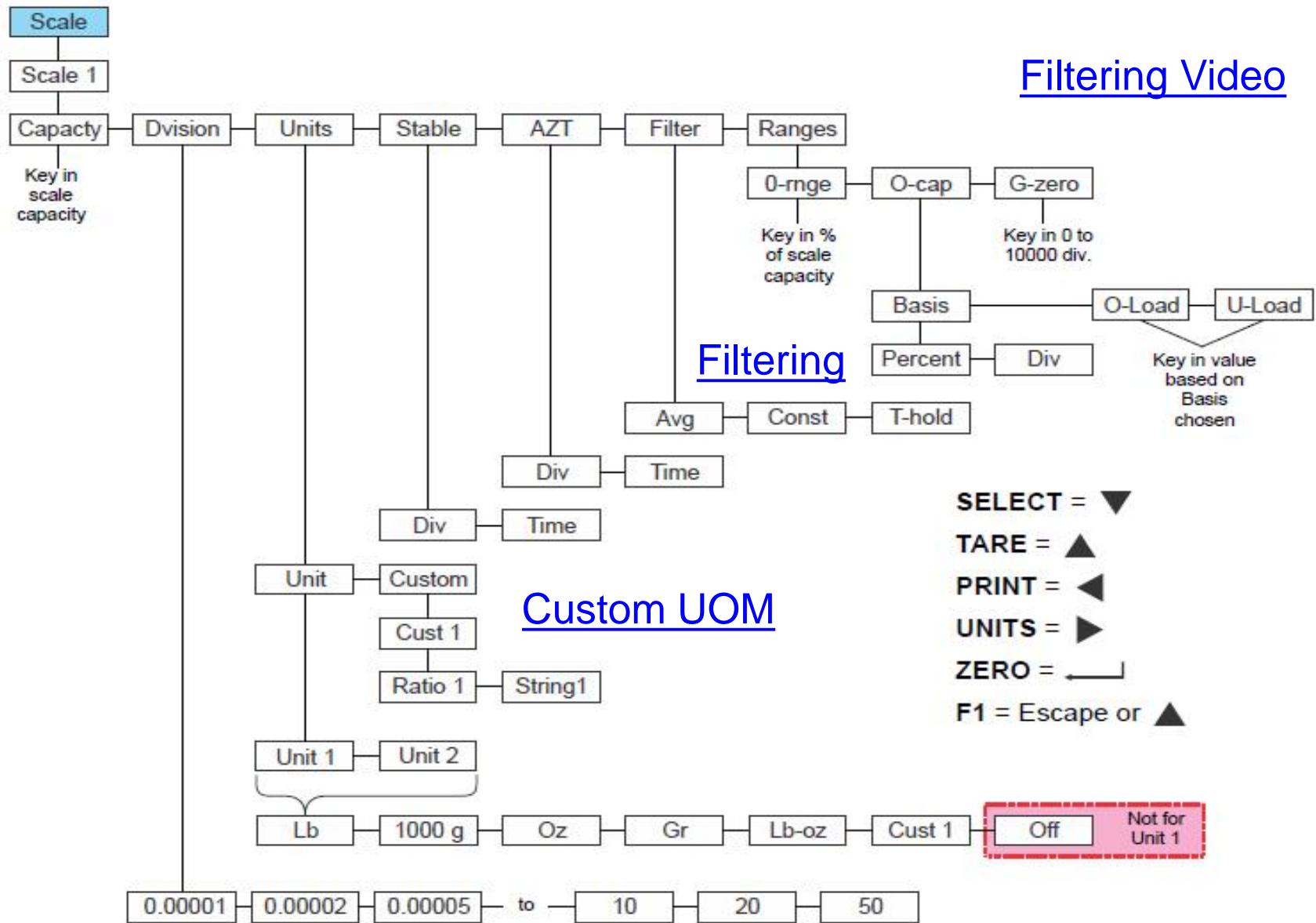


Calibration Menu

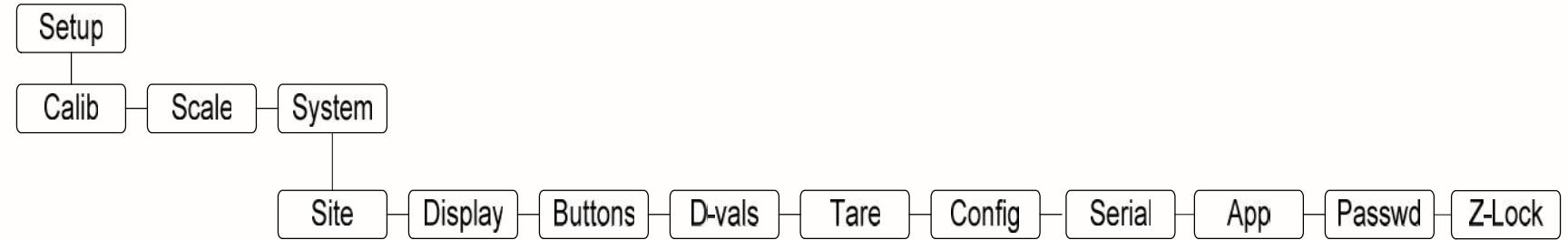


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Scale Menu

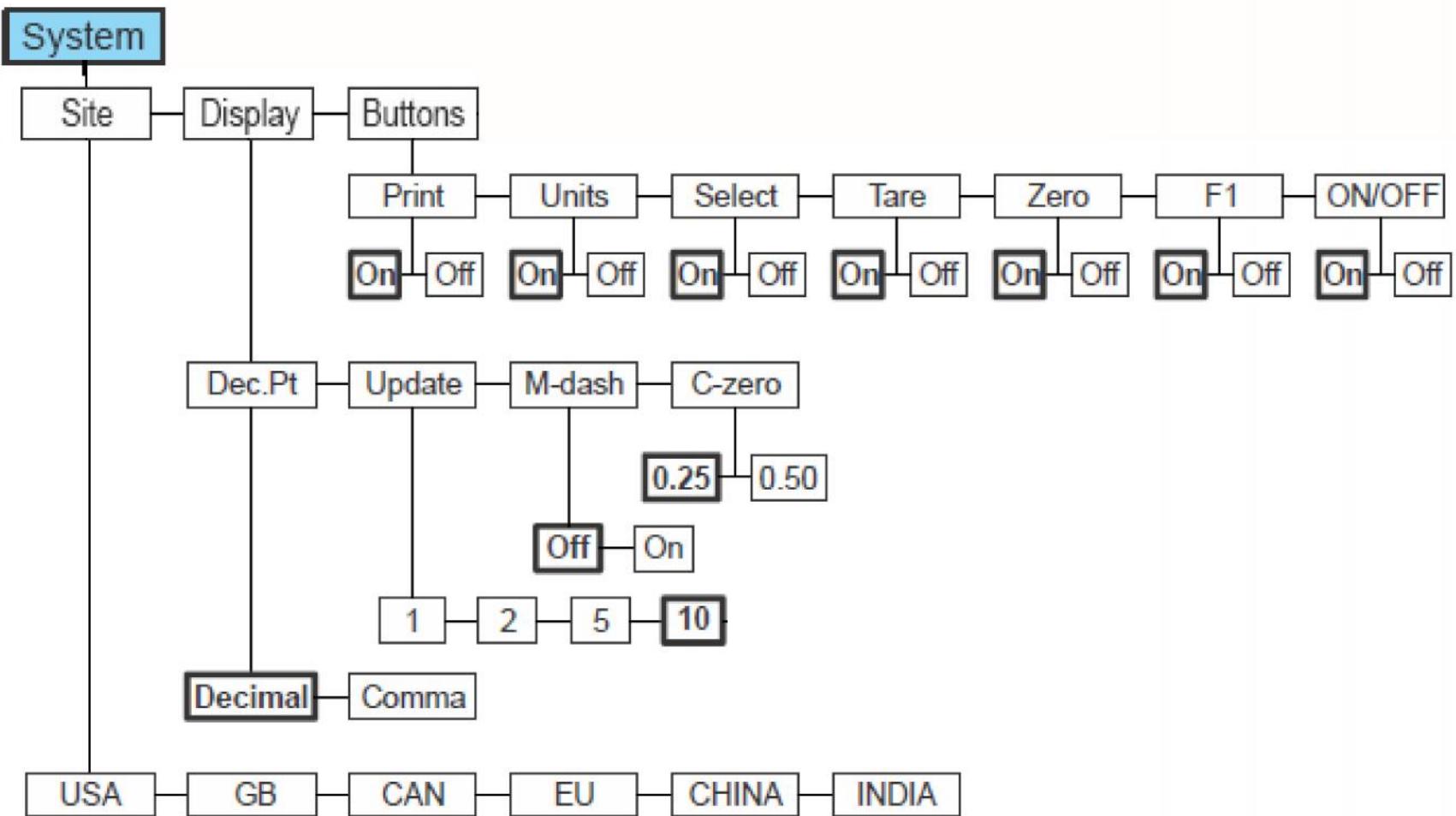


System Menu



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System > Site, Display, Buttons



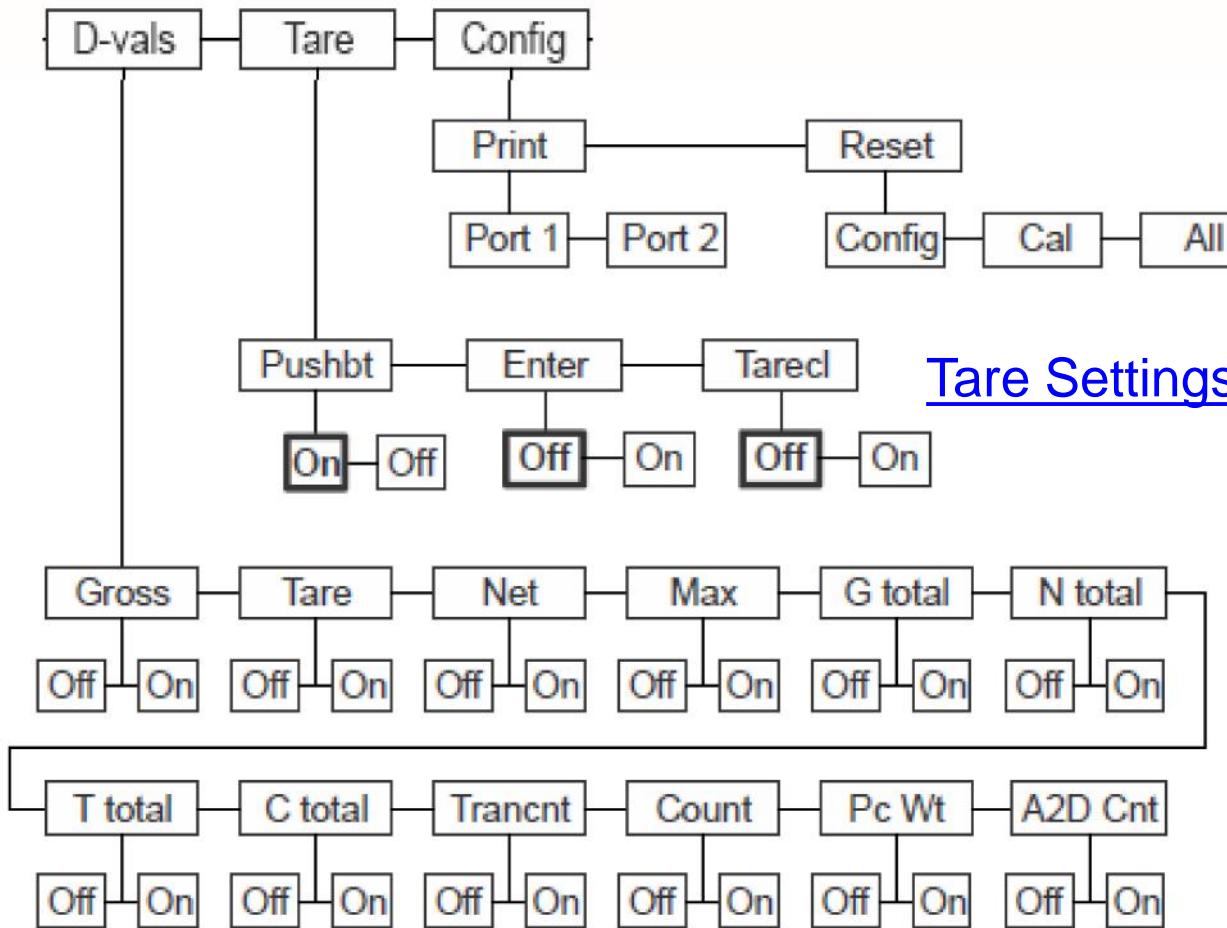
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Site - Default Settings

	USA	GB	CAN	EU	CHINA	INDIA
Capacity	5000	2500	2500	2500	2500	2500
Division	1	0.5	0.5	0.5	0.5	0.5
Unit of measure	lb	kg	kg	kg	kg	kg
Unit of measure 2	kg	off	off	off	off	off
Cal unit	lb	kg	kg	kg	kg	kg
Cal wt	5000	2500	2500	2500	2500	2500
Zero Range	100	2	2	2	2	2
Over Basis	Percent	Division	Percent	Division	Division	Division
Separator	decimal	decimal	decimal	comma	decimal	decimal
Date Format	MM-DD-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY	DD-MM-YY
Time Format	12 Hr	24	24	24	24	24
Average	10	10	10	10	10	10
Filter Constant	1	1	1	1	1	1
Filter Threshold	100	50	50	50	50	50
Under Cap. Div.	250	20	250	250	250	250
AZT Div.	3	.25	3	3	3	3
Motion Div.	3	.25	3	3	3	3
App	General	General	General	General	General	General

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System > D-Val, Tare, Config



Tare Settings

Defaults vary
with application

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Key Entry Tare

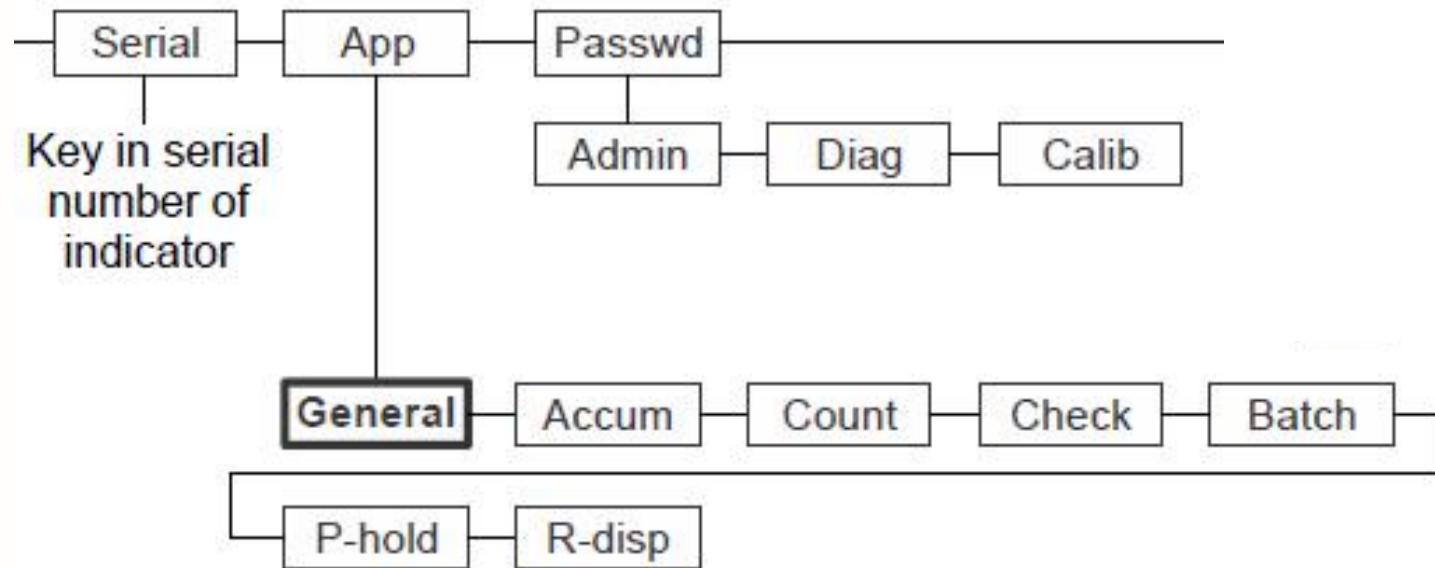
Must be enabled in SETUP > SYSTEM > TARE menu

1. Press SELECT → Tare → TARE annunciator → displayed
2. Press the TARE button → procedure
3. Scroll in Tare → Pushbt → Enter → Tarecl → procedure
4. Press the ZERO button → sequence → On → Off → On → Off → On → sequence
5. Display indicates NET weight

[Tare Entry](#)

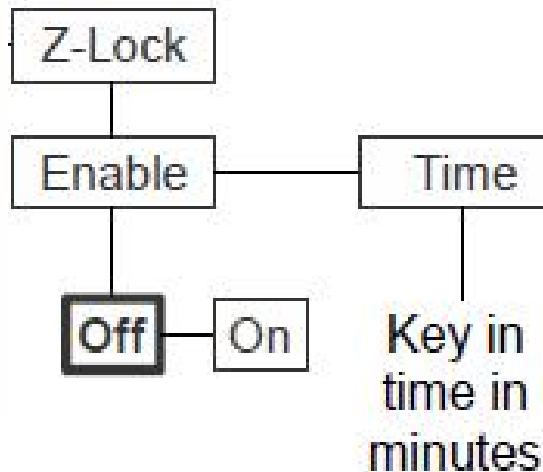
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System > Serial, App, Password



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System > Z-Lock



1. Enable ON
2. Set timer to 1 min
3. Exit & save
4. Add weight & wait

Restore setting -> ENABLE OFF

Z-Lock

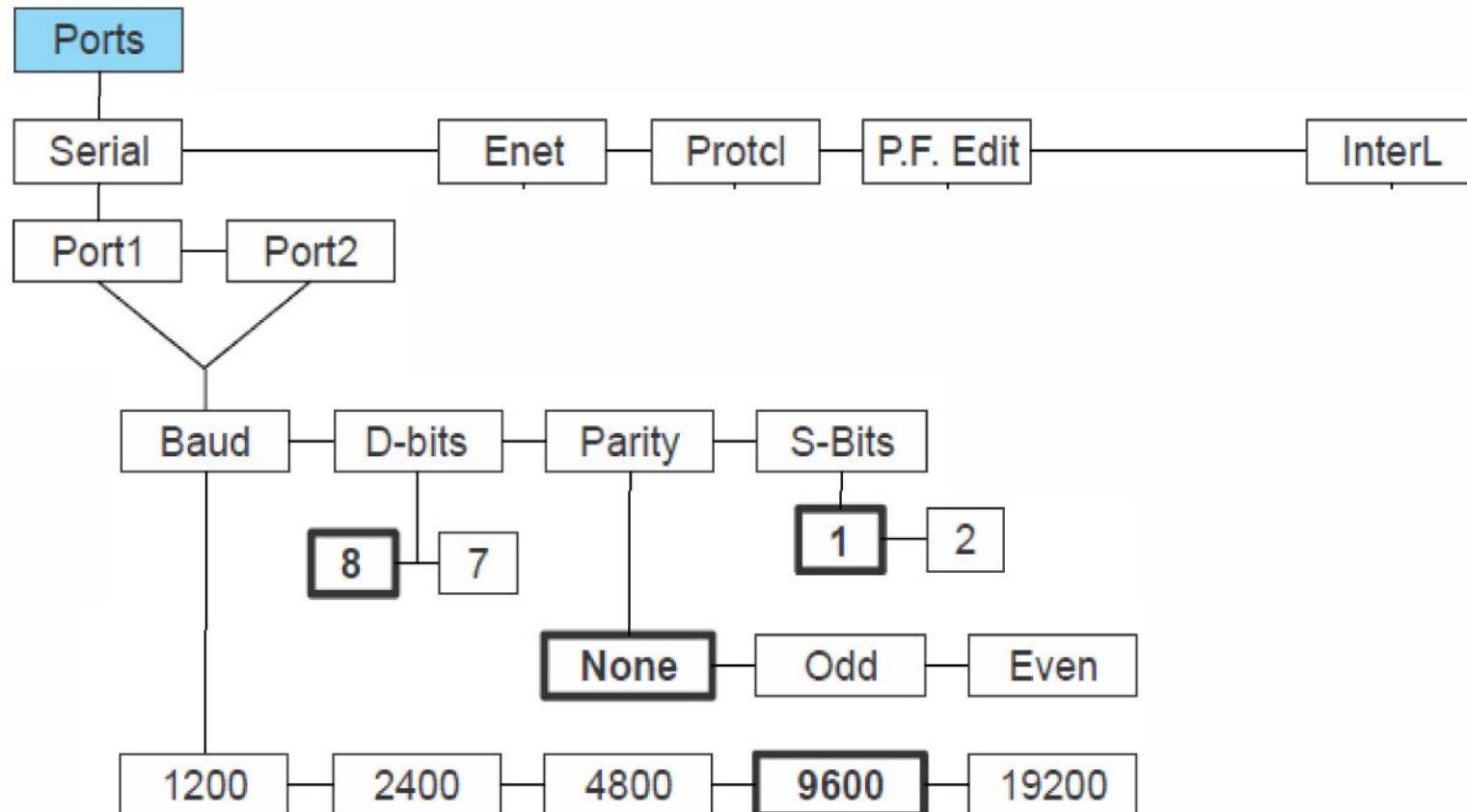
PrESS

2Ero

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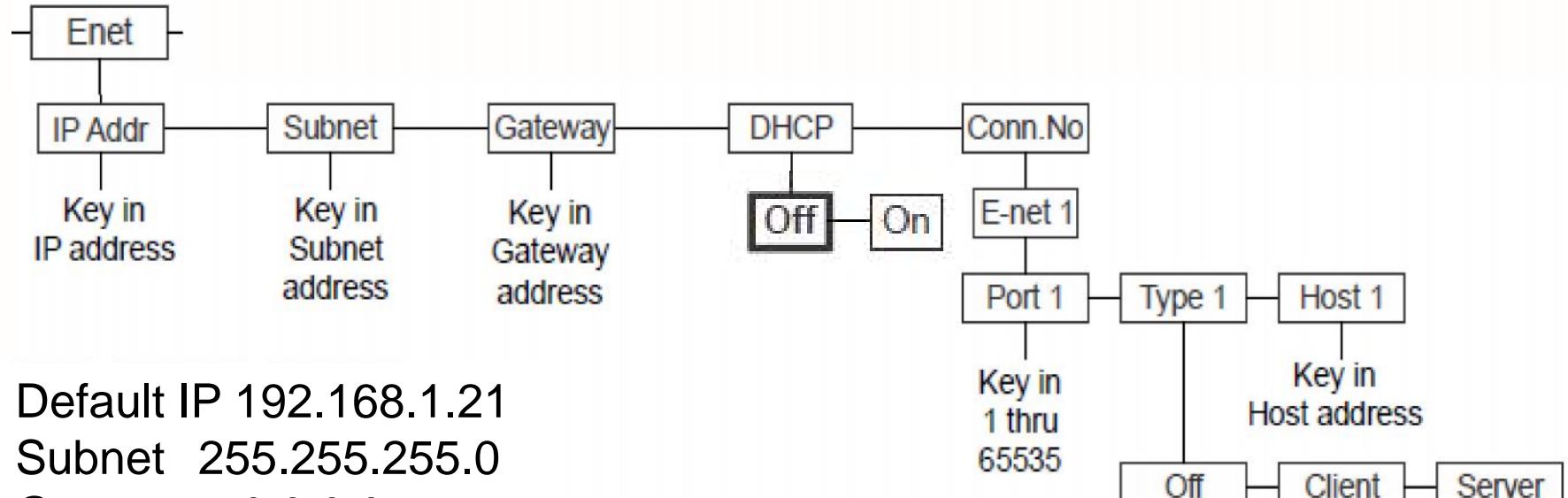
Ports Menu

Serial



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Ports > Ethernet



Default IP 192.168.1.21

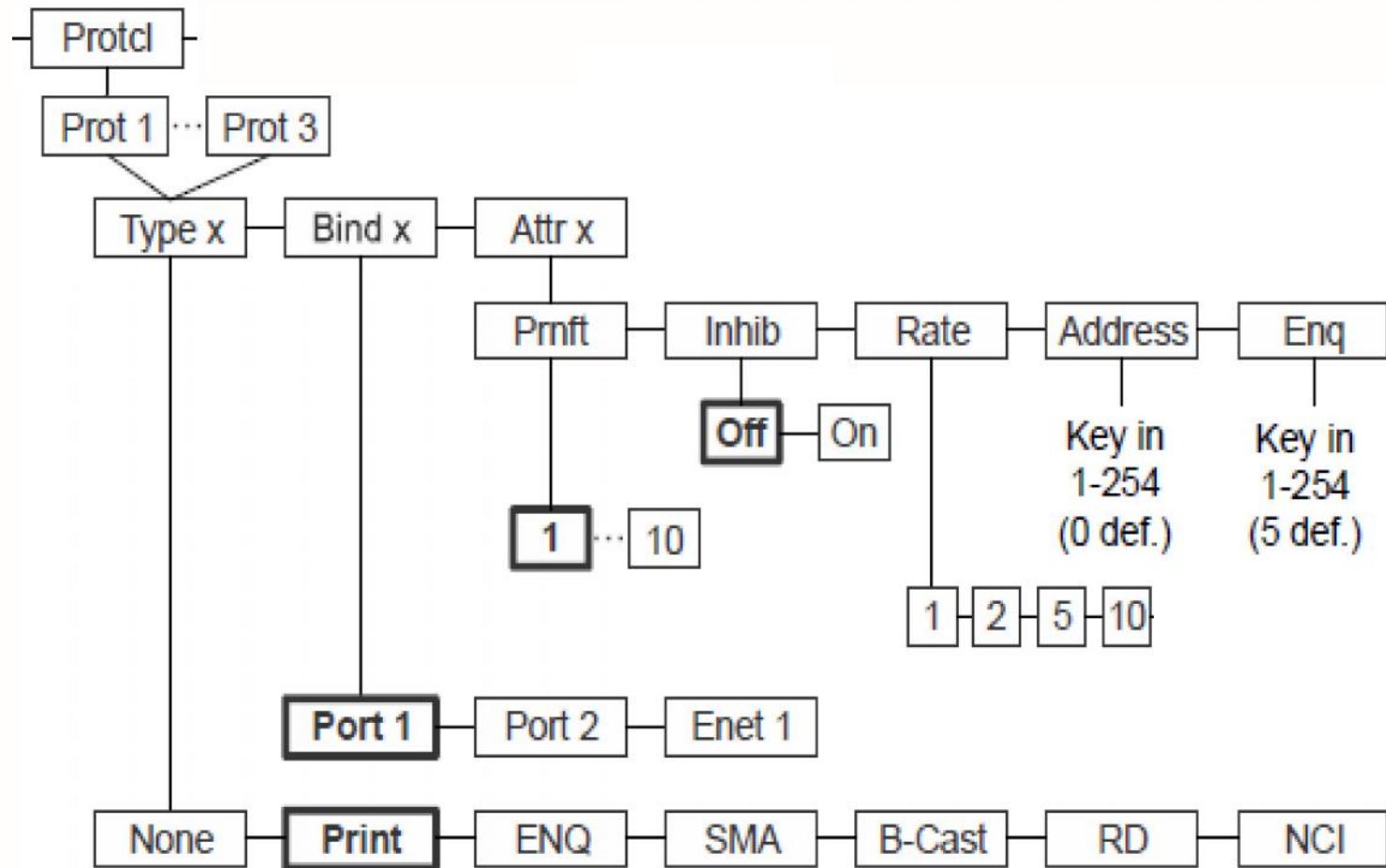
Subnet 255.255.255.0

Gateway 0.0.0.0

DHCP = OFF

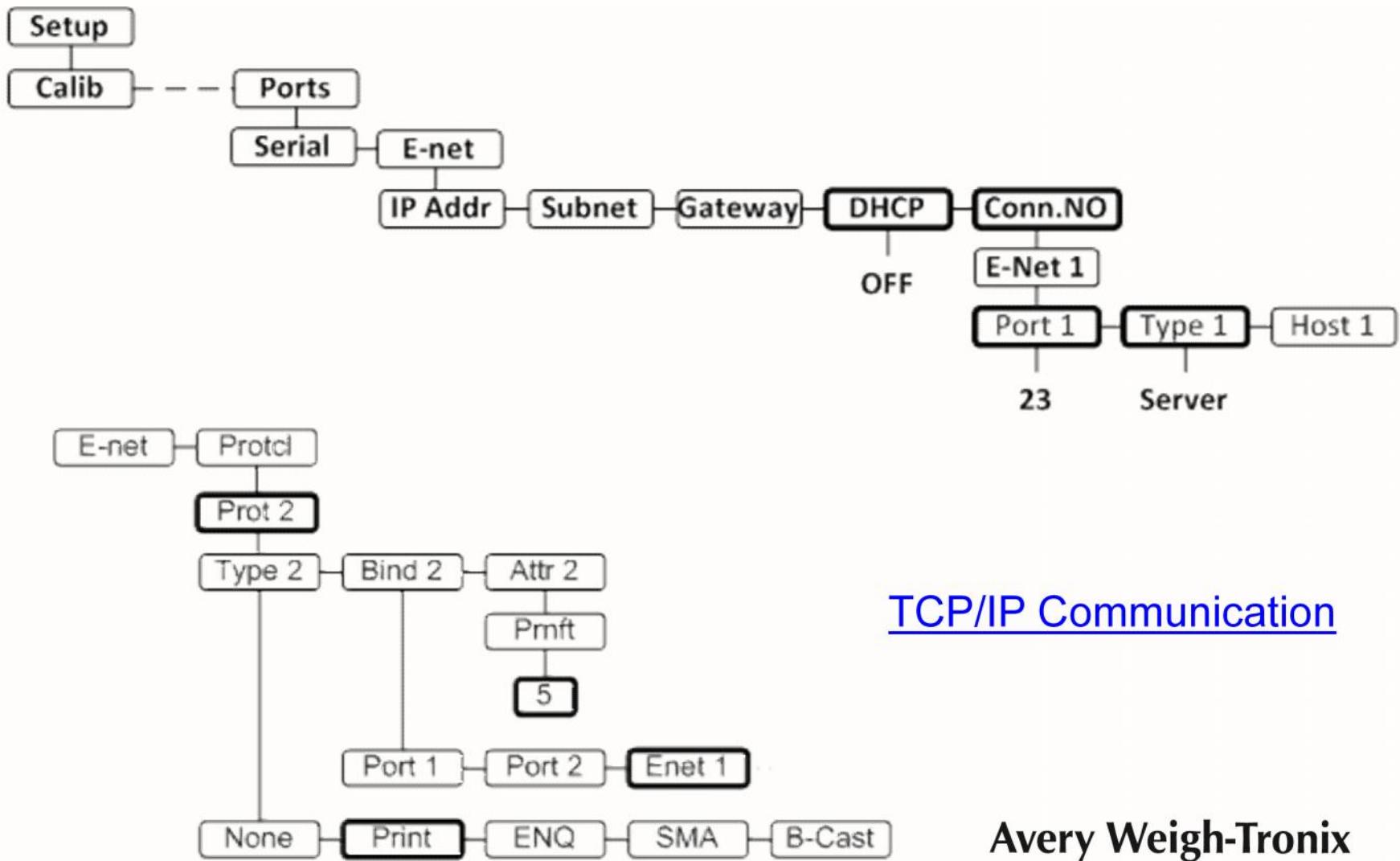
Port # usually assigned by IT
Host IP required for Client mode

Ports > Protocol

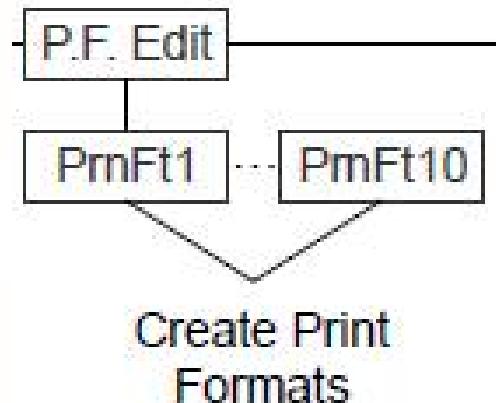


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TCP/IP Test



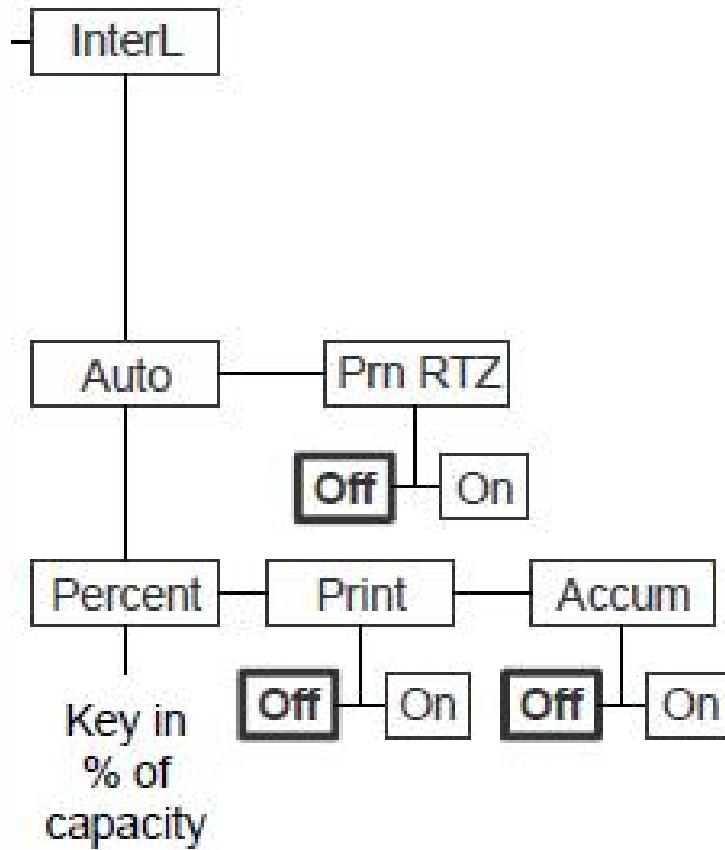
Ports > P.F. Editor



- 1 General APP – GTN
- 2 Accumulator - GTN and transaction count
- 3 Count
- 4 Checkweigh - Net wt
- 5 Batch - Displayed wt
- 6 Peak – Gross Peak wt
- 7 Remote Display – Displayed wt (Master)
- 8 Total - Accumulator App (Press & Hold PRINT)
- 9 Total – Count App (Press & Hold PRINT)
- 10 Blank

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Ports > AutoPrint / RTZ Interlock



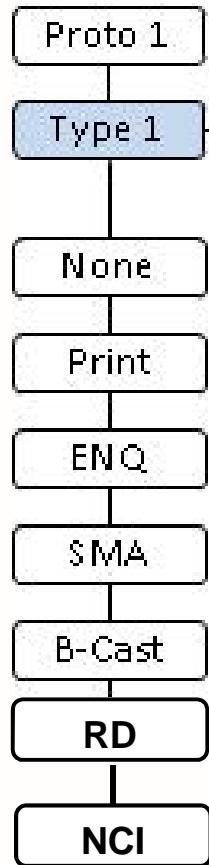
Auto Print / Accum & Print Return to Zero
use Gross Zero Band to re-arm

Auto Print requires Protocol TYPE = PRINT

Auto Accum only applies when APP = ACCUM

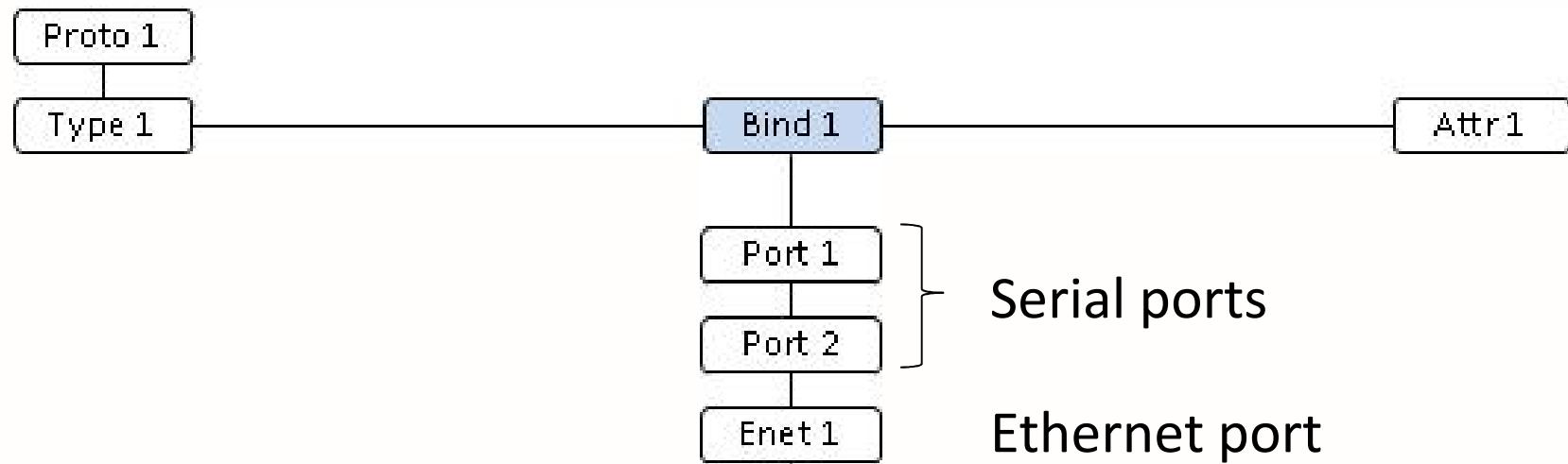
Auto Accum also does Auto Print
...so if both are ON it will print twice

Protocol Types



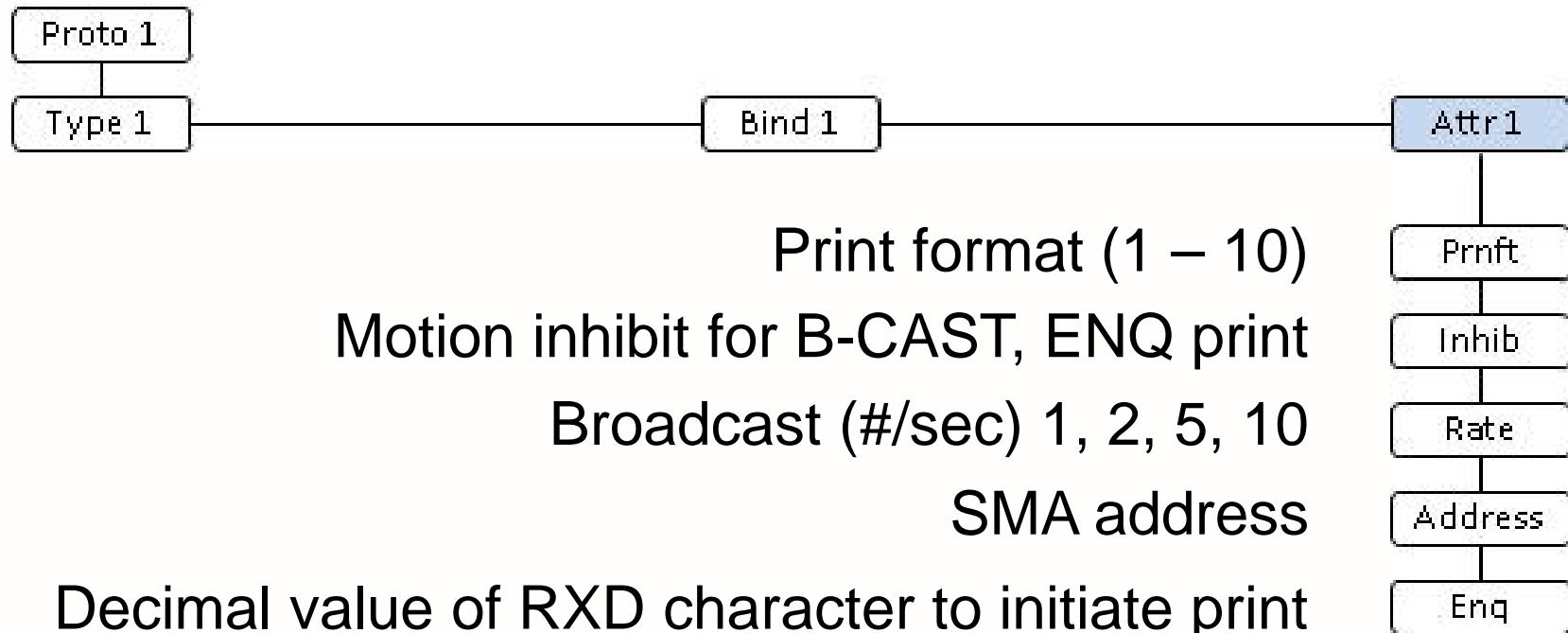
- Disables the protocol
- PRINT key, Auto Print, Command/Response P
- Enquire code from external device
- Scale Manufacturer's Association
- Continuous
- Remote Display APP
- NCI Protocol

Binding



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Protocol Attributes



Protocol Examples



Print GTN to Port 1



Continuous to Port 2



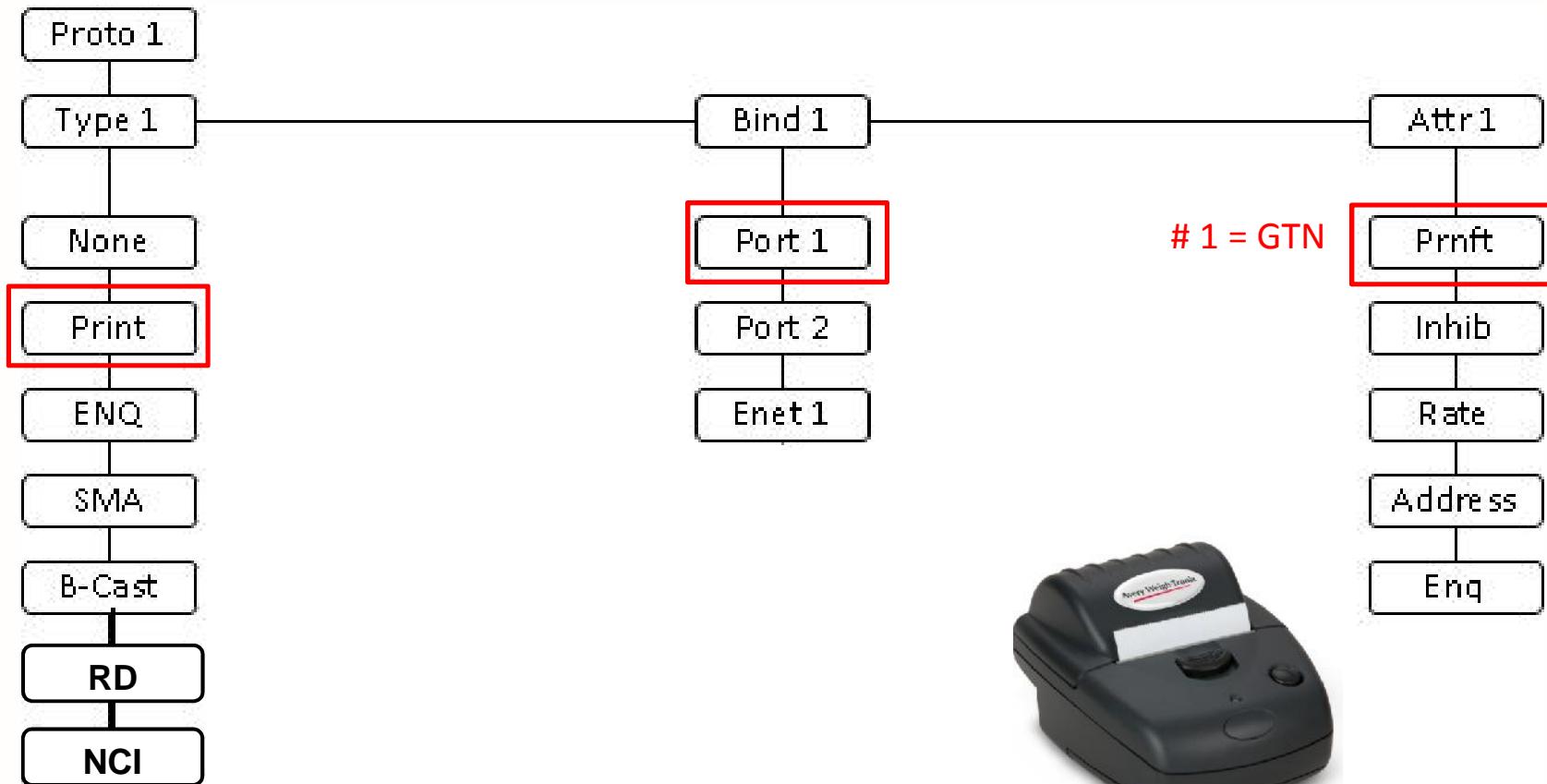
SMA via Ethernet



Can you help me figure out how to set this up?

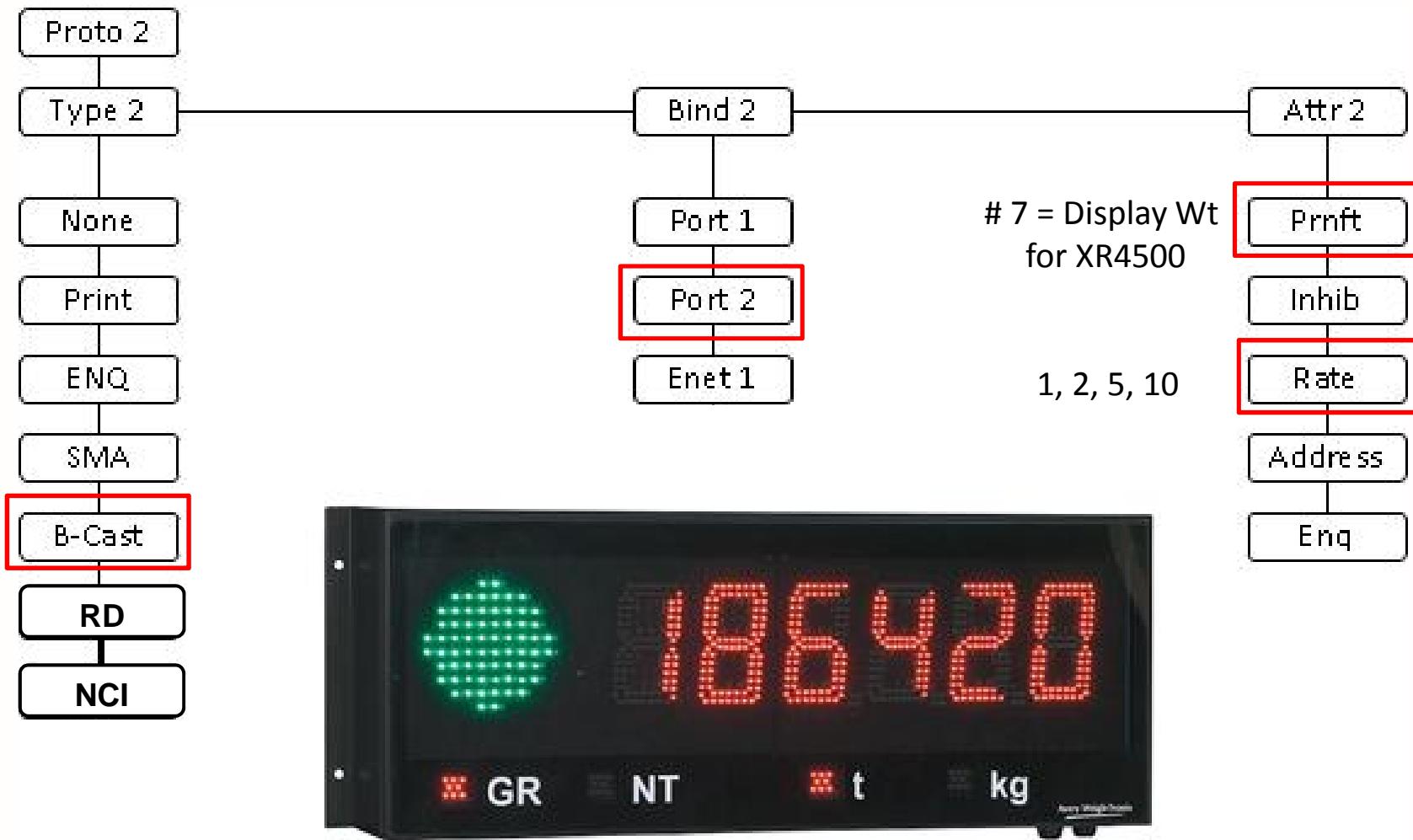
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Serial Printer example



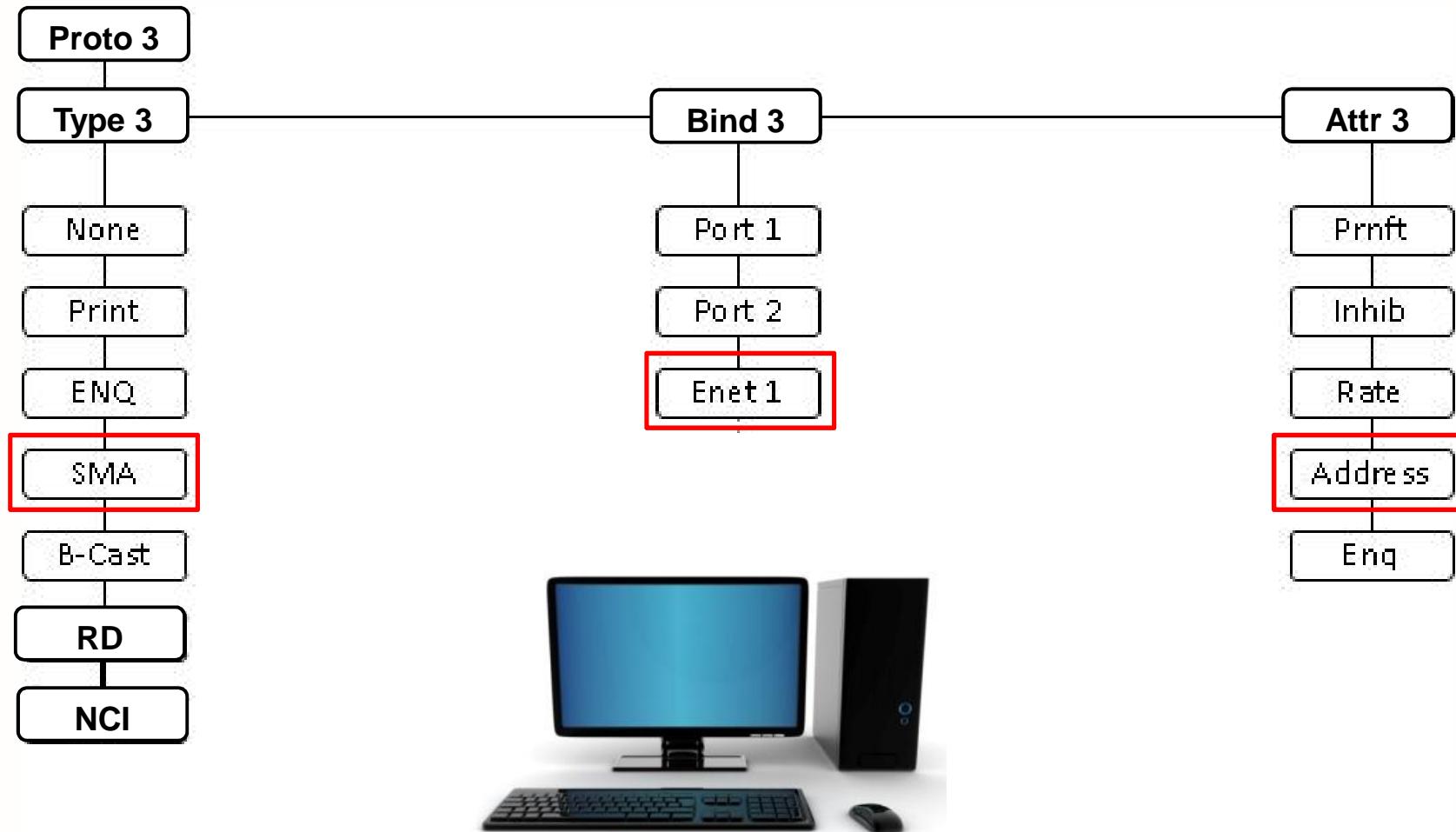
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Remote Display example



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Ethernet example



E-NET setup : TCP/IP
Connection: Port #, Server
or Client using SMA addressing

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Print Formatting

Create new or modify existing print formats

- System and Application Variables -> referred to as Tokens
- ASCII characters
- Control Codes

Append option parameters to modify default behavior

- Width or number of digits / characters
- Spaces / leading zeros
- Alternate units of measure
- High resolution format
- Rounded weight
- Omit decimal point
- Printed format – Time & Date

String Indexing / Character Edit

	Table 1: Key Action When In The String Index Select Mode					
Action	TARE	SELECT	ZERO	PRINT	UNITS	F1
Momentary Key Press	Does nothing	Selects the index character for editing using the key actions in Table 2	Nice Exit	Moves left one position in the index	Moves right one position in the index	ESC/Abort
Long Key Press	Deletes current character	Insert new character after this point Default character added is 32 (space)	Does nothing	Page Up (Decrement index by 10)	Page Down (Increments index by 10)	Does nothing

After you select the index number, use the Table 2 key actions to edit the character for that index number.

	Table 2: Key Action When In The Character Edit Mode					
Action	TARE	SELECT	ZERO	PRINT	UNITS	F1
Single Key Press	Increments the flashing digit by 1	Decrements the flashing digit by 1	Enter	Delete flashing digit	Add Digit	ESC/Abort
Long Key Press	Move flashing digit left	Move flashing digit right	Does nothing	Delete the entire entry	Does nothing	Does nothing

Print Format example

Add the company name **AWTX** to Print Format #1...GTN

Start by adding up the number of characters needed including any spaces, carriage returns and line feeds.

A	V	E	R	Y	Cr	Lf	
1	2	3	4	5	6	7	← Text, etc. to insert
65	86	69	82	89	13	10	← Number of characters to insert

← *Decimal value to enter*

SETUP > PORTS > P.F.EDIT > PRNFT 1 > Press SELECT



Index # , (Token) Character
Token 1 = Gross Wt

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Insert Spaces

Press and hold the SELECT key to insert characters
(space = decimal 32)

Index # will increment by 1 every second as spaces are inserted

For this example we needed 6 spaces

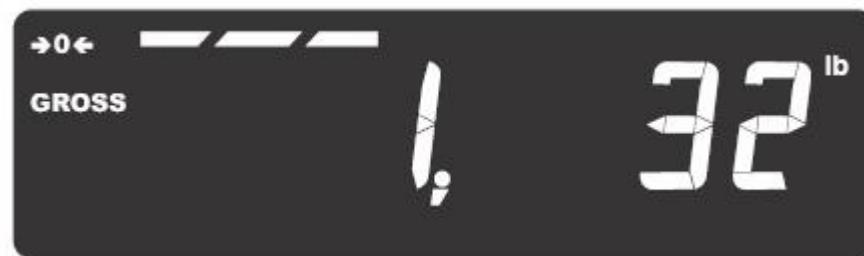
Press and hold SELECT key until display shows...



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Reposition Index Position

Press PRINT to navigate back up to Index Position #1



Press SELECT to start character edit



NOTE: Press & Hold PRINT or UNITS speeds up
Index position navigation Avery Weigh-Tronix

Edit Characters

A	W	T	X	Cr	Lf	← Text, etc. to insert
1	2	3	4	5	6	← Number of characters to insert
65	87	84	88	13	10	← Decimal value to enter

Enter 65 and press ZERO



1. Press UNITS to advance to next Index position
2. Press SELECT > 2, 32 is displayed
3. Enter decimal value for next letter > press ZERO.

Repeat steps 1 - 3 until last character is entered > 10 for the line feed.

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Edit Characters



PRESS ZERO TO COMPLETE THE EDIT!!!
Must return to the “PRNFT x” for SAVED EXIT

Exit & SAVE YES

Now test your printout using the serial cable

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System & Application Variables

t - System Token Examples: t1 = Gross, t2 = Tare, t3 = Net, t9 = units
t12 = Count, t200 = Time , t201 = Date

A - App Variable Examples: A4 = SP Out1, A10 = SP Out1 actual

When a system or application variable is entered, a decimal 49 ("1") is automatically appended to the print string

"1" (49) represents the **VALUE** function of the variable

"2" (50) represents the **NAME** function of the variable

To print the name of the variable change the 49 to 50
or enter the name using ASCII character entry

Optional Parameters

[- Parameter opening bracket Start entry of optional parameters
When an opening bracket "[" is selected a "]" is automatically appended

] - Parameter closing bracket End entry of optional parameters
Multiple parameters can be inserted in between the [and] brackets

Example: **[W6Z1D2]**

W6 = Width 6 characters
Z1 = Send leading zeros
D2 = Omit decimal point

Insert required number of spaces between brackets, reposition and edit

Variable & Parameter Entry

System or Application variables require knowledge of token number assignments

Parameter options require knowledge of parameter characters and their attributes

Have SERVICE manual available!

Special entry procedures are necessary to insert System or Application variables and optional parameters

Have SERVICE manual available!!!

Or use Ztools

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Exercise: Add Time to example

Add Time to the 2nd line

Remember to add spaces, carriage returns, line feeds as needed for proper alignment

P.F.Edit > Press **SELECT** > 1 > Press **SELECT**

1. Press **UNITS** to scroll to the required string index position... "8,t 001"
2. Press and hold **SELECT** to insert 3 spaces... "11,t 001"
3. Press **PRINT** to return to the previous index position "8 032"
4. Press **SELECT > 32** is displayed
5. Press **PRINT** key twice > **0** to clear value
6. Press **SELECT** until the desired choice is flashing **t** for **System token**
7. Press **UNITS** to shift in a **0**.
8. Enter **200** for **TIME** token...press **ZERO**

NOTE: the value **49** is appended automatically to represent the value

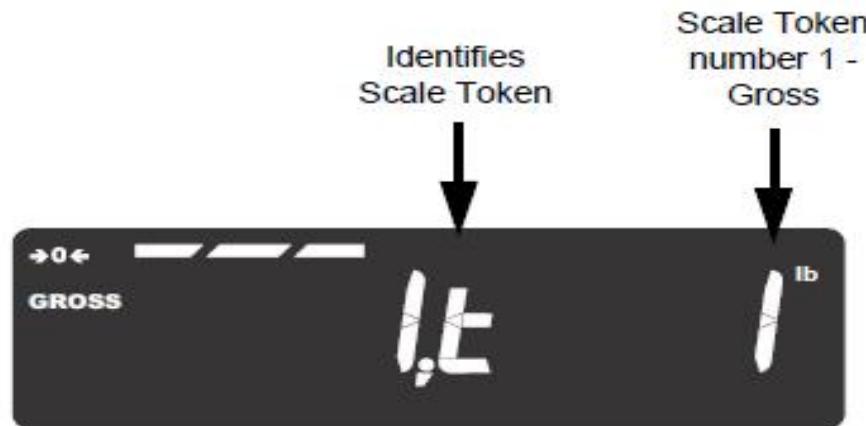
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Exercise: Add Time example

Add carriage return & line feed

9. Press **UNITS** to scroll to the required string index position..."9,t 32"
10. Press **SELECT >** 32 is displayed
11. Enter 13 for carriage return...press **ZERO**
12. Press **UNITS**..."10,t 32"
13. Press **SELECT >** 32 is displayed
14. Enter 10 for line feed...press **ZERO**
15. Press **ZERO** to save

Token Function Types



This ASCII number identifies the type of scale token. In this case it identifies the token as the word

Gross

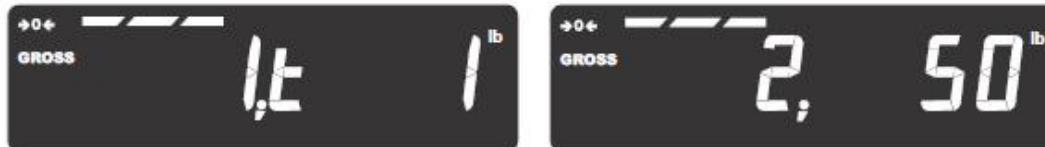


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Token Parameters

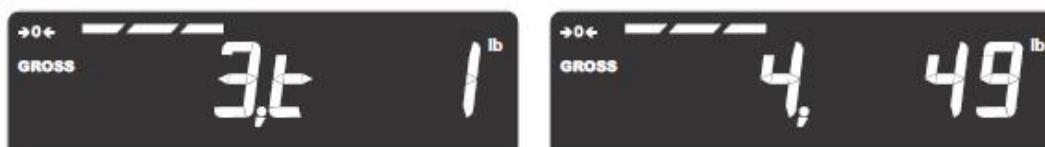
A Customer may wish to have the data transmitted with leading zeros and not spaces.
The print format sequence would look like this ...

"1,t 1" Gross Wt token
"2, 50" Name "Gross"



The above token and function will output the text "Gross"

"3,t 1" Gross Wt token
"4, 49" Value



The above token and function will output the Gross weight value.

"5, [" Start parameter
"6, 90" Z Leading Zero



"7, 49" Dec 1 represents
print Leading Zeros
"8,]" End parameter



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System Variables (Tokens)

Token #	Token name	Token Description	Function "1" (dec 49)	Function "2" (dec 50)	Parameter Table
decimal			Value	Name	
1	GWT	Gross Weight	value	"Gross "	WEIGHT
2	SAT	Tare Weight	value	"Tare "	WEIGHT
3	NWT	Net Weight	value	"Net "	WEIGHT
4	MOTN	Motion	"0" stable, "1" motion	"Motion"	INTEGER
5	WST	MotionString	"S" stable, "M" motion	"sMotion"	STRING
6	OVER	Overload	"0" no overload, "1" overload	"Overload"	INTEGER
7	UNDER	Underload	"0" no underload, "1" underload	"Underload"	INTEGER
8	CZ	Center Zero	"0" no center zero, "1" center zero	"Center of Zero"	INTEGER
9	UNIT	Unit	"lb" (or active unit)	"Units"	UNIT
10	PGW	Peak Max weight	value	"Peak Max"	WEIGHT
12	CNT	Count	value	"Count"	INTEGER
13	PCE	Piece Weight	value	"Piece Weight"	WEIGHT

System Variables (cont.)

Token #	Token name	Token Description	Function "1" (dec 49)	Function "2" (dec 50)	Parameter Table
15	WSTAT	Weight Status	"O", "U", "M", "S", "E": see WSTAT table in <i>Additional token tables on page 98</i>	"Weight Status"	WSTAT
16	ACT	Active Display Value	value	active display name	WEIGHT
17	TSAT	Tare Type	"NT", "T", "PT": see TARE table in <i>Additional token tables on page 98</i>	"Tare Type"	TARE
104	GAT	Accumulated Gross Weight Total	value	"Gross Total"	WEIGHT
105	TAT	Accumulated Tare Weight Total	value	"Tare Total"	WEIGHT
106	NAT	Accumulated Net Weight Total	value	"Net Total"	WEIGHT
107	CAT	Accumulated Count Value Total	value	"Count Total"	INTEGER
200	TIM	Time	value	"Time"	TIME
201	DAT	Date	value	"Date"	DATE
250	OUT1	Output 1		"OUT1"	
251	OUT2	Output 2		"OUT2"	
252	OUT3	Output 3		"OUT3"	
300	RTN	Transaction Count	value	"Transaction Count"	INTEGER
302	CKSM	Checksum	see Checksum table	"Checksum"	CHECKSUM
309	SITE	Site ID	value	"Site ID"	STRING
310	SN	Serial Number	value	"Serial Number"	STRING
311	LK	Condec Units	"L" or "K"		
312	STAT	Condec Status	" " (space) stable, "M" motion, "O" out of range		

System Variables (cont.)

Token #	Token name	Token Description	Function "1" (dec 49)	Function "2" (dec 50)	Parameter Table
313	DIS	AWTX Status Bytes	see DIS table in <i>Additional token tables on page 98</i>	"Status"	DIS
314	UTID	Unique Transaction ID	value	UTID	
500	NULL	Null	null char (dec 0)		
501	SOP	Start Optional Parameters	[
502	EOP	End Optional Parameters]		

Application Variables

App Variable	Description	"Function ""1" (dec 49)	"Function ""2" (dec 50)	
4	Output 1	value		FLOAT
5	Output 2	value		FLOAT
6	Output 3	value		FLOAT
10	Output 1 Actual	value	"Actual1"	FLOAT
11	Output 2 Actual	value	"Actual2"	FLOAT
12	Output 3 Actual	value	"Actual3"	FLOAT
13	Remote Input 1		Remote Switch Input 1 Name	INTEGER
14	Remote Input 2		Remote Switch Input 2 Name	INTEGER
15	Remote Input 3		Remote Switch Input 3 Name	INTEGER

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Parameters

Parameter Table	Parameter Description	Parameter character	Default Value	Alternate Values	Comments
WEIGHT	Width	W (87)	7	1 - 9 characters	sets minimum width
	Precision	P (80)	0 = normal precision	0 - 8 characters	sets number of digits right of decimal
	Leading Zero	Z (90)	0 = Leading Spaces	1 = Leading Zeros	
	Sign	p (112)	1 = Show -	2 = Show +	
				3 = Show All	
				4 = Hide All	
	Multiplier	m (109)	0 = None	1 = *10, 2 = *100, 3 = *1000, 4 = *10000, 5 = *100000	
	Decimal Point	D (68)	1 = Show	2 = Hide	
	Justification	J (74)	1 = Right	2 = Left	
	Unit of Measure	u (117)	1 = Current	2 = Calibration unit	allows printing in alternate units
				3 = Rounded current unit	
				4 = Rounded calibration unit	
				5 = Unit 1	
				6 = Unit 2	
	Reset	R (82)		Accumulators and Counters only	clear or reset value after printing
	Round	r(114)	1 = Current	2 = Calibration unit	use metrology compatible rounding of division size for selected unit
				3 = Rounded current unit	
				4 = Rounded calibration unit	
				5 = Unit 1	
				6 = Unit 2	

SMA Commands

Sent	Action	Response
<LF>W<CR>	Weight of the current scale is return.	Standard response (displayed weight)
<LF>P<CR>	Indicator attempts to capture a stable weight on the current scale.	Standard response (displayed weight). Weight is returned as center dashes <-----> if a stable weight cannot be
<LF>Z<CR>	Indicator attempts to zero the current scale.	Standard response (displayed weight)
<LF>T<CR>	Indicator attempts to tare the current scale.	Standard response (displayed weight)
<LF>T<xxxxxx.xxx><CR>	The indicator attempts to set the current scale's tare weight to the value that was sent.	Standard response (displayed weight)
<LF>M<CR>	The indicator returns the current scale's Tare weight.	Standard response (tare weight)
<LF>C<CR>	The indicator sets the current scale's Tare weight to zero.	Standard response (gross weight)
<LF>U<CR>	The indicator will cycle the unit of measure on the current scale	Standard response (displayed weight)
<LF>U<uuu><CR>	The indicator will set the unit of measure to <uuu> on the current scale.	Standard response (displayed weight)
<LF>D<CR>	The indicator will return a diagnostic message.	<LF><r><e><c><m><CR> <r> - 'R' (RAM error) or ' ' (space) (RAM ok) <e> - 'E' (EEPROM
<LF>A<CR>	The indicator will respond with the first line of the About data.	See "About Command Response" (below)
<LF>B<CR>	The indicator will respond with the rest of the About data.	See "About Command Response" (below)
<LF>I<CR>	The indicator will respond with the first line of the scale Information data. (for the current scale)	See "Scale Information Command Response" (below)
<LF>N<CR>	The indicator will respond with the rest of the scale Information data. (for the current scale)	See "Scale Information Command Response" (below)
<ESC>	The indicator will reboot itself	None

W Command response

<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>

<LF> Line feed Start of the response message.

<s> Scale Status 'Z' Center of Zero

 'O' Over Capacity

 'U' Under Capacity

 'E' Zero Error

 'T' Tare Error

 <space> None of the above conditions

<r> range Multi-interval range. Always '1' for ZM200 series

<n> gross/net status 'G' = Gross weight

 'T' = Tare weight

 'N' = Net weight

<m> Motion status 'M' = scale is in motion

 <space> = scale is stable

<f> Future use <space> = always a space

SMA “W” Test

Send <LF>W<CR>

<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>

[Hercules](#)

Send	
0A570D	<input checked="" type="checkbox"/> HEX <input type="button" value="Send"/>
<LF>W<CR>	<input type="checkbox"/> HEX <input type="button" value="Send"/>
#010#087#013	<input type="checkbox"/> HEX <input type="button" value="Send"/>



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A/B About Commands

A and B commands are used together to get general scale info

A returns the 1st response

B must be sent successively to get the 2nd, 3rd, 4th, 5th and 6th
`<LF><xxx>:<yyyyy><CR>`

1st response: <xxx> = “SMA” <yyyyy> = compliance level/revision

2nd response: <xxx> = “MFG” <yyyyy> = manufacturer

3rd response: <xxx> = “MOD” <yyyyy> = model name

4th response: <xxx> = “REV” <yyyyy> = software revision

5th response: <xxx> = “SN ” <yyyyy> = indicator serial number

6th response: <xxx> = “END” <yyyyy> = end of About

I/N Info Commands

I and N commands are used together to get detailed scale info
I returns the 1st response

N must be sent successively to get the 2nd, 3rd, 4th, 5th and 6th

<LF><xxx>:<yyyyy><CR>

I 1st response: <xxx> = “SMA” <yyyyy> = compliance level/revision

N 2nd response: <xxx> = “TYP” <yyyyy> = ‘S’ for Scale mode (‘C’ if
Classifier)

N 3rd response: <xxx> = “CAP” <yyyyy> = uuu:ccc:n:d where

uuu = unit of measure

ccc = capacity of the scale

n = count-by increment

d = decimal point position

‘0’ = none ‘1’ = xxxx.x, ‘2’ = xxx.xx, etc.

N 4th response: <xxx> = same as 3rd response (multi-interval mode n/a)

N 5th response: <xxx> = “CMD” <yyyyy> = “PTMCU”
list of supported SMA commands.

Level 1 commands are not included in the list. Avery Weigh-Tronix

N 6th response: <xxx> = “END” <yyyyy> = end of Info

Special SMA Level 2 commands

<LF>XA<CR> Accumulate command

ACCUM or COUNT app will perform Accumulation

Same as pressing the **PRINT** key

Ports binded to Type = Print will send configured response

Port that initiated command will receive <LF>xa<CR>

<LF>XB<CR> Print command

Same as pressing the **PRINT** key

Ports binded to Type = Print will send configured response

Port that initiated command will receive <LF>xb<CR>

ENQ & Broadcast Commands

A	ACCUM command	"If ACCUM APP is active this command will generate an accumulation transaction, but it does not perform the print function"
P	PRINT command	"Performs same function as pressing the PRINT key. All Ports that are binded with PRINT type will transmit the assigned print format"
S	SELECT command	Performs same function as pressing the SELECT key
T	TARE command	Performs same function as pressing the TARE key
U	UNITS command	Performs same function as pressing the UNITS key
Z	ZERO command	Performs same function as pressing the ZERO key
F	F1 command	Performs same function as pressing the F1 key

Application variables used in print formats only get updated by a **Print** command

ENQ character will not update application variables

Upper or Lower case characters work the same

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NCI Commands

W <Cr>	Weight request	Returns decimal weight, units and status
S <Cr>	Status request	Returns status.
Z <Cr>	Zero request	Scale is Zeroed and returns scale status
H <Cr>	High Resolution Weight request	"Returns decimal wt in 10x or x100 resolution with units and status. For x100 resolution set the associated PROT > ATTR > ENQ menu value to 100. For all other values the H command will return x10 resolution"
U <Cr>	Units request	Changes unit of measure and then returns decimal weight in the new units with status.
M <Cr>	Metrology Raw Counts request	Returns normalized raw counts and scale status.
T <Cr>	Tare request	Scale is Tared and returns scale status.
all else	Unrecognized command	Returns <Cr> ? <Lf>

Remote RD Commands

Incoming commands from the Master indicator that control the Remote display annunciators

G	Gross	Change to Gross weight mode
N	Net	Change to Net weight mode
T	Tare	Change to Tare weight mode
I	lb	Change to Unit 1
k	kg	Change to Unit 2

Outgoing key press commands from the Remote display that control the Master indicator operation.

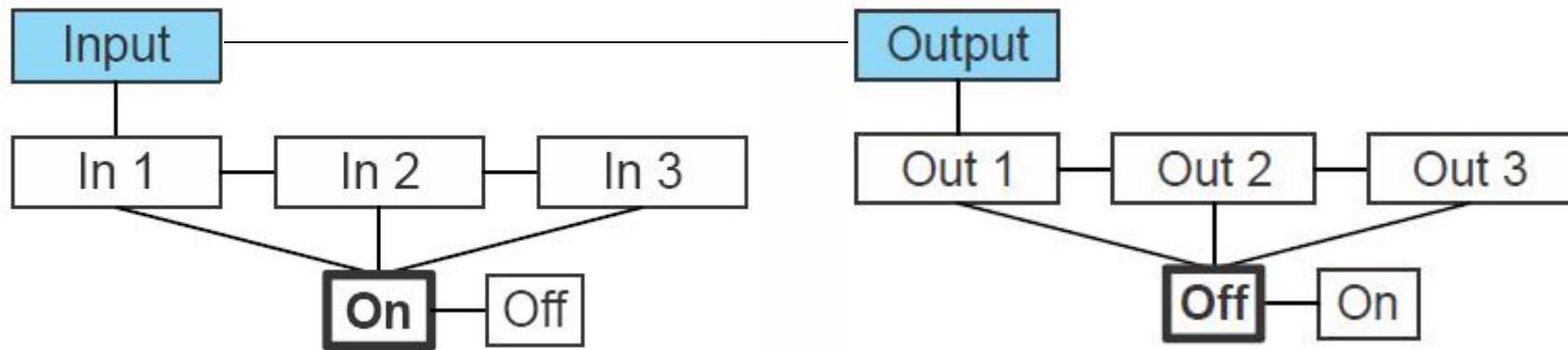
T	TARE
S	SELECT
Z	ZERO
P	PRINT
U	UNITS
F	F1

Key press commands are supported by COM 1 and 2 only

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Input & Output

Enable ON/OFF



Inputs defined in SUPER menu

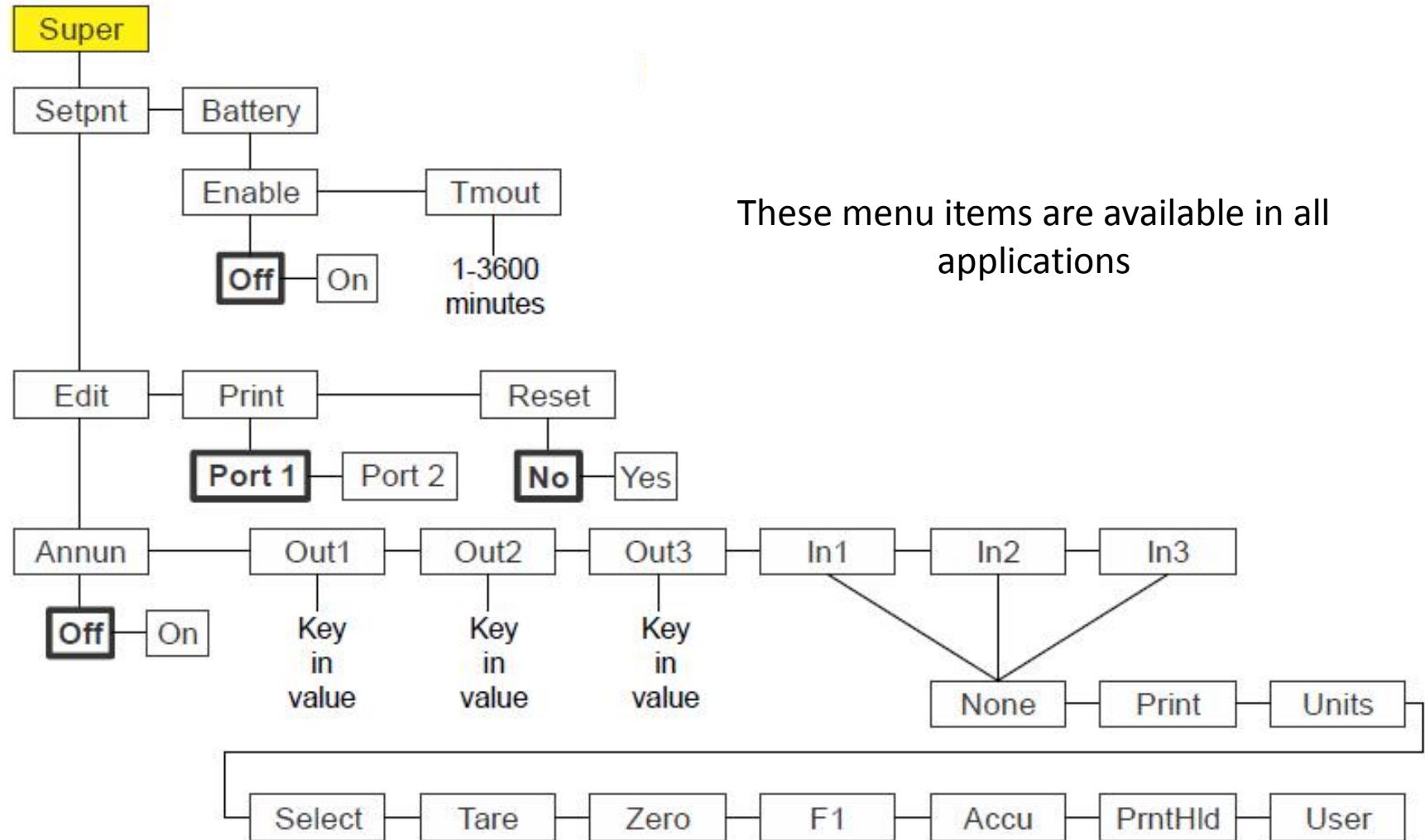
None, Print, Units, Select, Tare, Zero,
F1, Accumulate, Print hold, User

Outputs OFF by default

Must be enabled to test

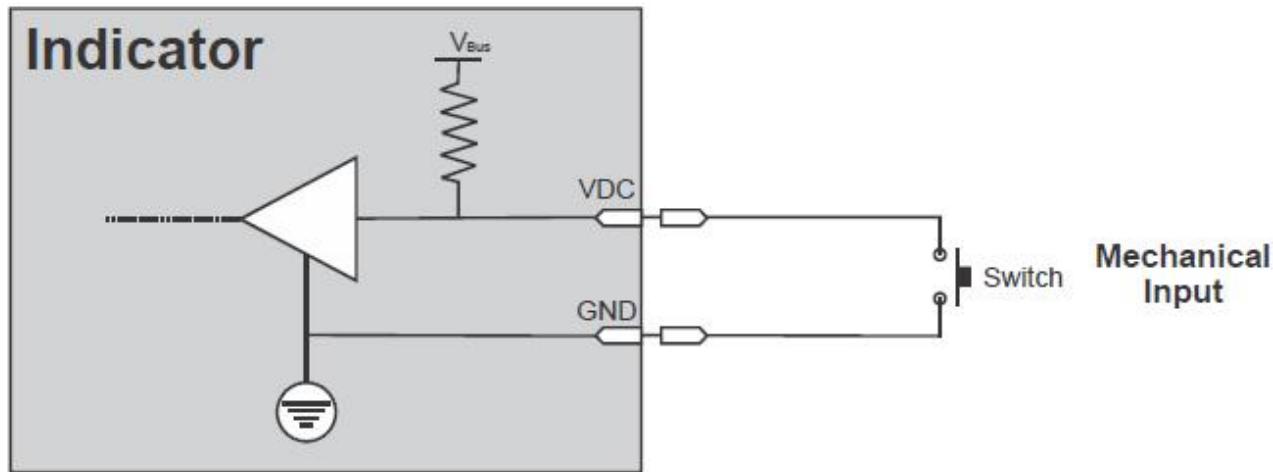
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Supervisor Menu - 1793

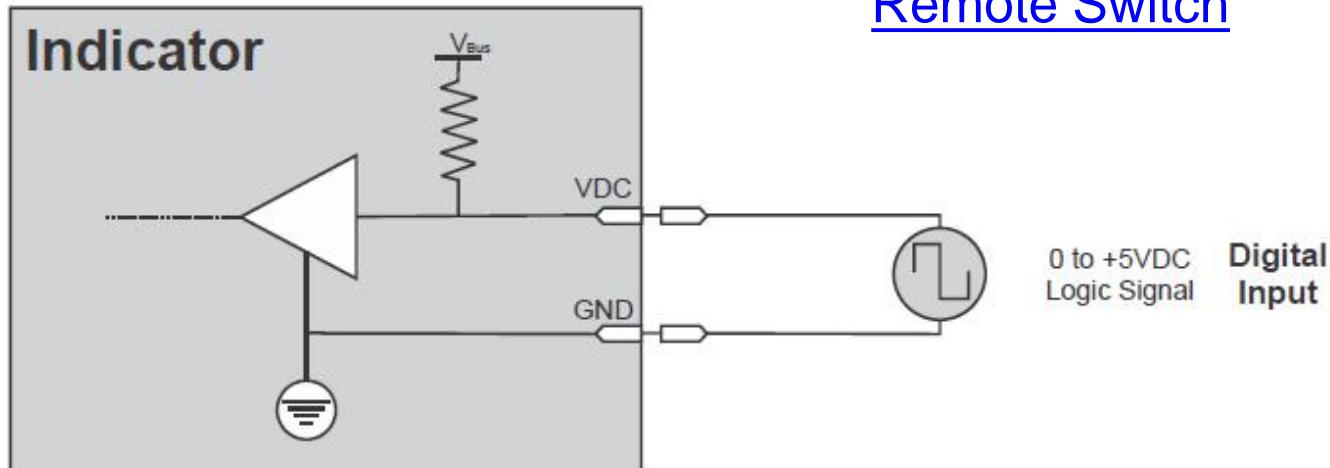


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Remote Inputs



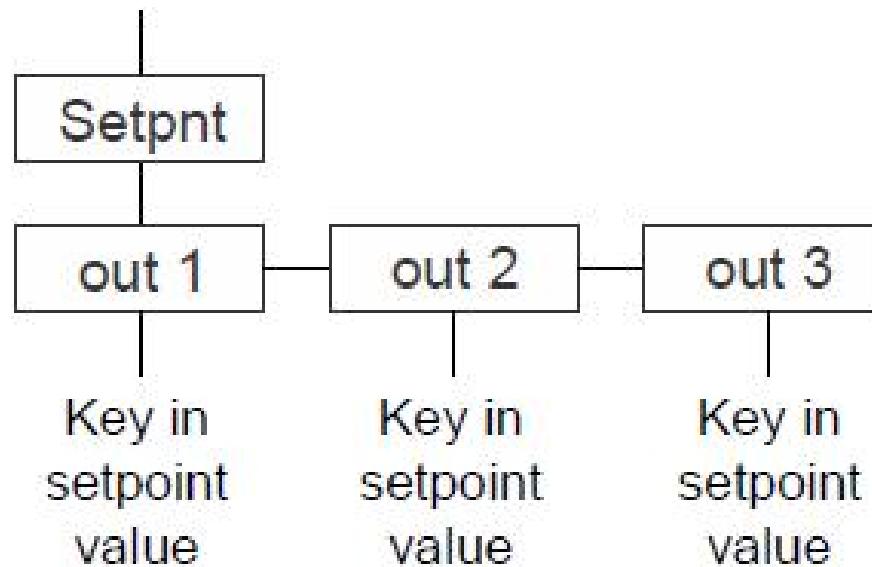
Remote Switch



Inputs can be voltage free or digital signal (PLC) up to +7Vdc **Avery Weigh-Tronix**

Entering Setpoint Values

Press and hold
SELECT key



Setpoints Outputs

	Below Value	Above Value
General	OFF	ON
Accumulator	OFF	ON
Count	OFF	ON
Checkweigher	SP1 - UNDER SP2 - ACCEPT SP3 - OVER	
Batching	ON	OFF
Peak Hold	OFF	ON
Remote Display	OFF	ON

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Setpoint Annunciators



ZM201 – SD2 / SP2



ZM201 – PD2

Annunciators operation can be inverted from physical Output

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Setpoint Output Controls

3 Built-in Outputs

FET's capable of sinking up to 250ma
no optical isolation
recommend the OPTO-22 option

Opto module

Solid state switching device

Relay

Electro-mechanical switching device

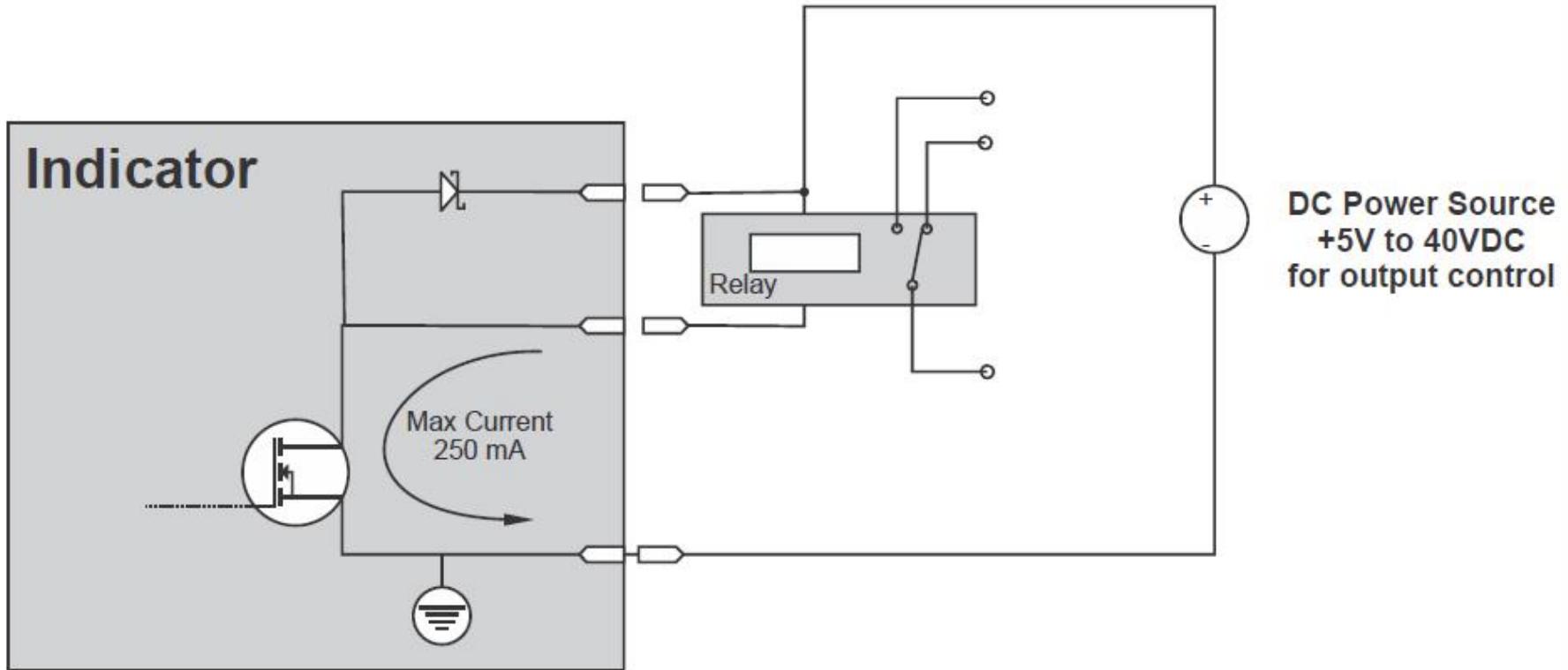
On-board 5VDC

TB3-6 rated at 500ma
PTC - resettable fuse protected
(Positive Temperature Coefficient)

Outputs must be enabled in SETUP > OUTPUT menu

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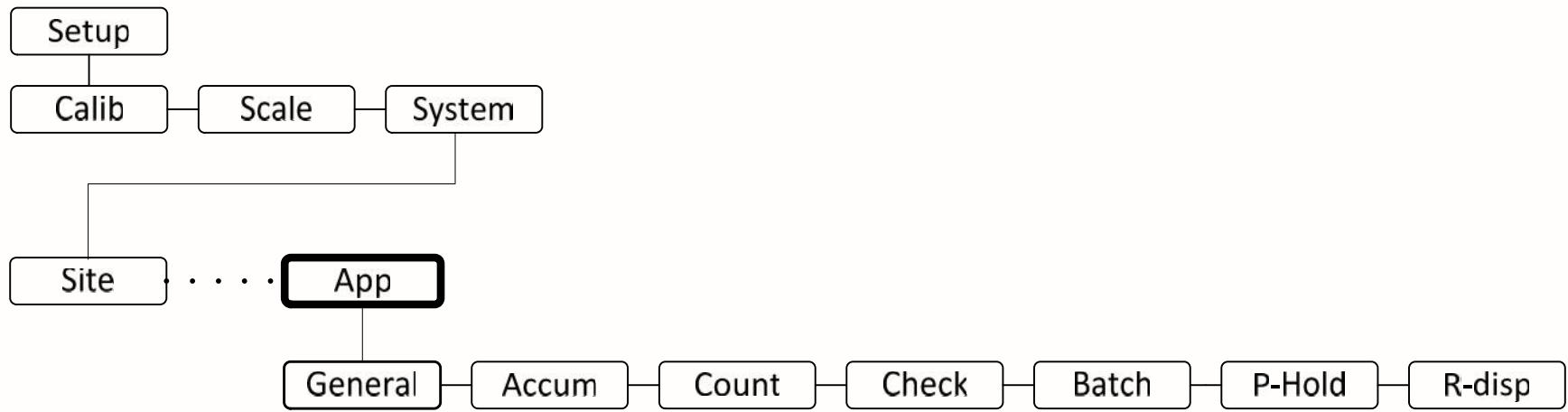
Typical SP Output Connection



Ideal for SSR, Opto-22, Reed or EM relays to drive larger current devices.
or
Direct connection to small DC servo motors, stack lights, low current devices

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Applications



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Applications Overview

- General Weighing is default Application
- Application selection in SETUP > SYSTEM > APP menu
- Only 1 APP can be enabled
- Most application settings configured in SUPER menu
- Setpoint OUT values can be entered using SELECT
(Press & Hold)
- 1793 password can not be changed

General Weighing

F1 No Function

SELECT Scroll thru Gross, Net and Tare

Default Printout = Print Format # 1
Com Port 1 9600 Baud

Gross 272.04 lb

Tare 95.88 lb

Net 176.16 lb

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Accumulator

SELECT

Scroll thru Gross, Net, Tare, Gross Total, Net Total, Transaction Count.

ANNUNCIATORS

Gross Total

Net Total

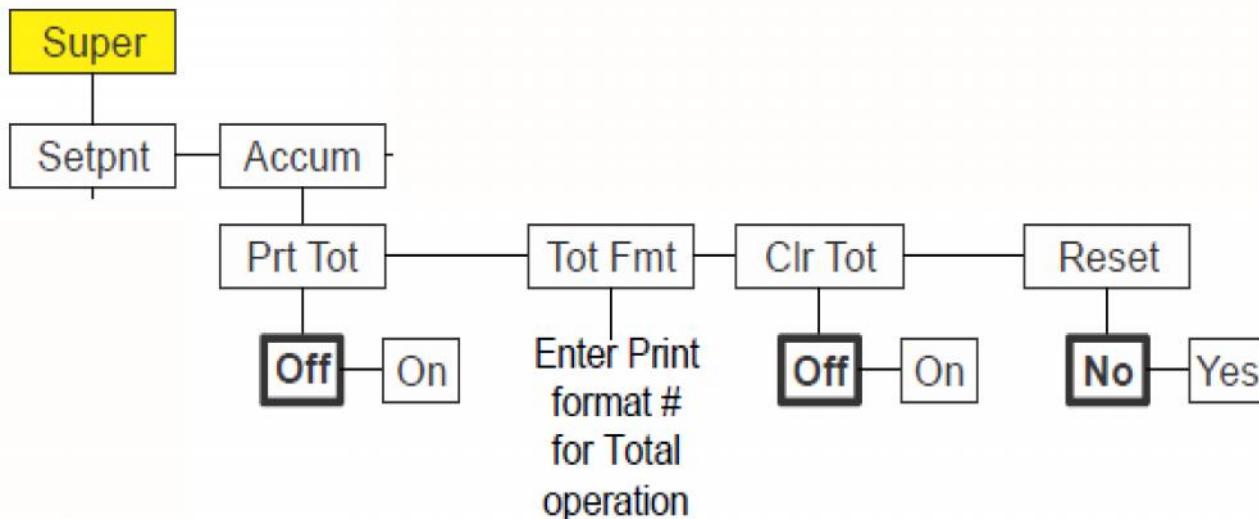
Transaction Count

GROSS and TOTAL

NET and TOTAL

TOTAL

NOTE: Auto Accumulate enabled in SETUP > PORTS > INTERL
will also Autoprint



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Accumulator Printouts

F1 Press to Accumulate only

PRINT Press to Print and Accumulate

Default printout = Print Format # 2

Transaction Count: 10

Gross 272.04 lb

Tare 95.88 lb

Net 176.16 lb

Press and Hold to print Total

Accumulator Total printout = Print Format # 8

Transaction Count: 10

Gross Total 1357.12 lb

Tare Total 356.24 lb

Net Total 1000.88 lb

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Counting

F1

Start Sample

Zeroes > Enter # parts > Add parts > Press F1

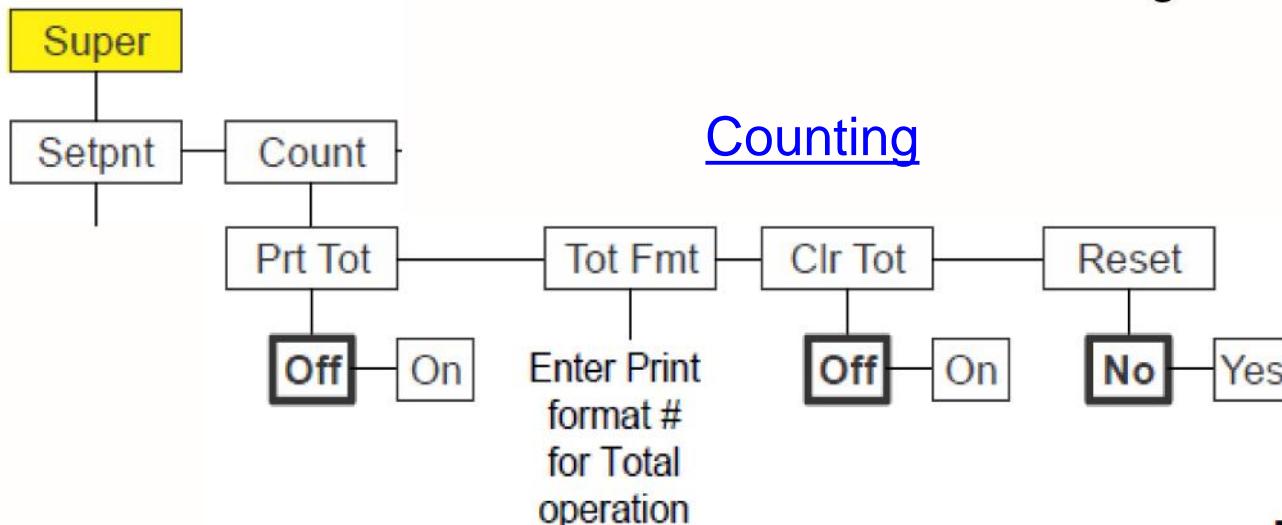
Dribble mode only → count sample parts on scale

Minimum Sample weight is Gross Zero Band (GZB)

Count mode also has Accumulator

SELECT

Scroll thru Gross, Net, Tare, Count, Count Total,
Transaction Total and Piece Weight



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Count Printouts

PRINT Press to Print and Accumulate

Default printout = Print Format # 3

Count 174

Press and Hold to print Total = Print Format # 9

Transaction Count: 10
Count Total 176

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Target

F1

Set Accept Zone using Sample weight or Limit entry

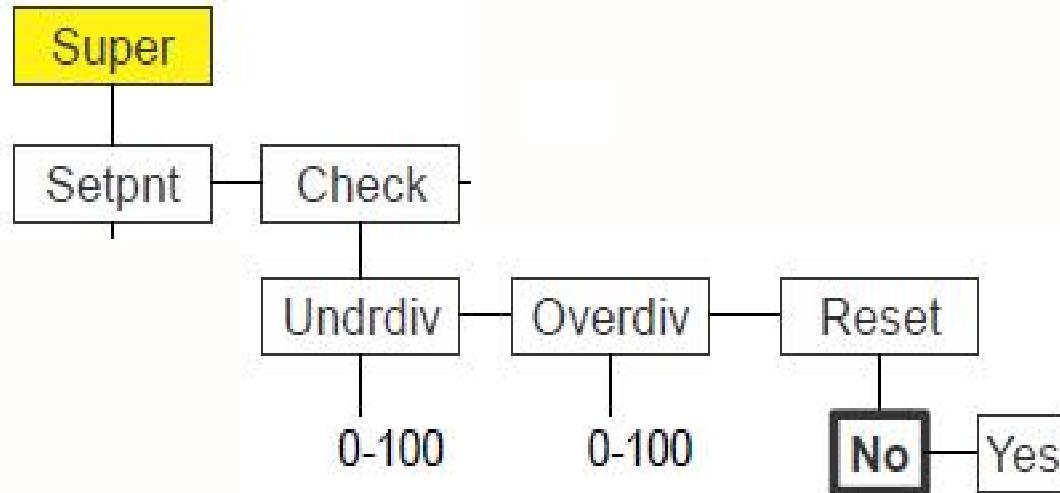
Sample method > With item on scale press F1

Under & Over division values set the Accept Zone
(set prior to performing Sample)

Limit method > With weight below Gross Zero Band
Display prompts to enter LO & HI limit values
Accept Zone between Limit values

SELECT

Scroll thru Gross, Net and Tare



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Target Operation

Check weighing based on NET weight

Latched method for outputs > stable weight sets condition
Outputs & Annunciators unchanged until $wt < GZB$

Under & Over Bar Graph segments fixed at 1 division each

Outputs & Annunciators OFF when weight < GZB

[Check Weighing](#)

Default printout = Print Format # 4

Net 12.34 lb

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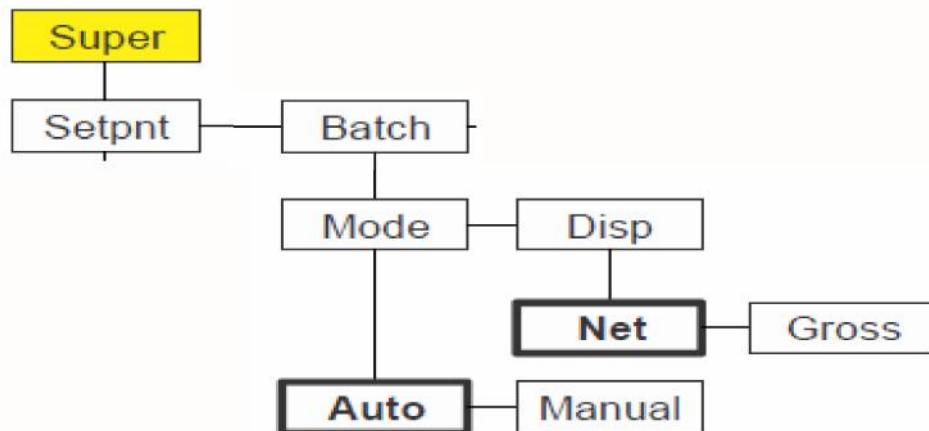
Batch – 3 Ingredient

F1 Start and Stop batch operation

SELECT Scroll thru Gross, Net and Tare
Press & Hold to enter Setpoint OUT values

MODE AUTO > Sequence thru ingredient setpoint automatically
MANUAL > Stops after each ingredient > Press F1 again

DISP NET > Fill based on Net weight
Tare to start and in between ingredients
GROSS > Fill based on Gross weight



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Batch Operation

Pressing **F1** to Stop a Batch forces a restart of entire batch

Gross filling mode uses accumulated weight entry for successive setpoint values

Ingred 1 = 10, Ingred 2 = 20, Ingred 3 = 30

Out 1 = 10, Out 2 = 30 ($10 + 20$) and Out 3 = 60 ($10 + 20 + 30$)

No Preact (in-flight) in 200 series

Bar Graph will indicate batching progress for each ingredient



Default printout = Print Format # 5

G 12.34 lb

[3 Ingredient Batching](#)

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Custom Batch Printout

SP1 Ztools Advance Print Format
{A.4.1}
Actual
{A.10.1}

{T.UNIT.1}
#CR
#LF
SP2
{A.5.1}
Actual
{A.11.1}

{T.UNIT.1}
#CR
#LF
SP3
{A.6.1}
Actual
{A.12.1}

{T.UNIT.1}
#CR
#LF
#LF

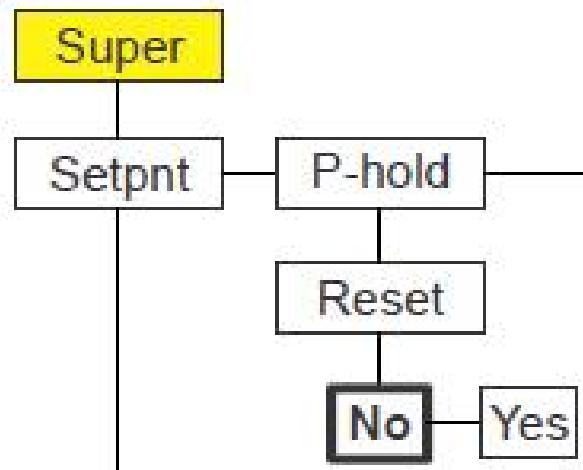
SP1	10	Actual	10.02 lb
SP2	20	Actual	20.04 lb
SP3	30	Actual	30.06 lb

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Peak Hold

F1 Reset Maximum Peak weight to current gross

SELECT Gross and Peak weight



This annunciator
lights for peak
weight

Default printout = Print Format # 6

Peak Gross 1000.02 lb

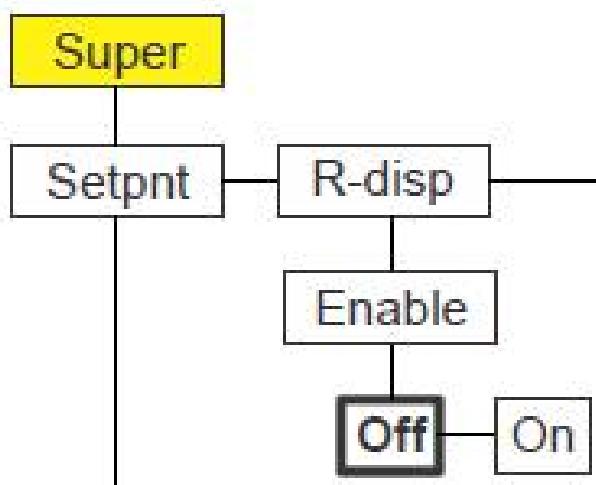
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Remote Display

Remote indicator will display the primary indicator information

TARE, SELECT, PRINT, UNITS, ZERO, F1 keys are functional

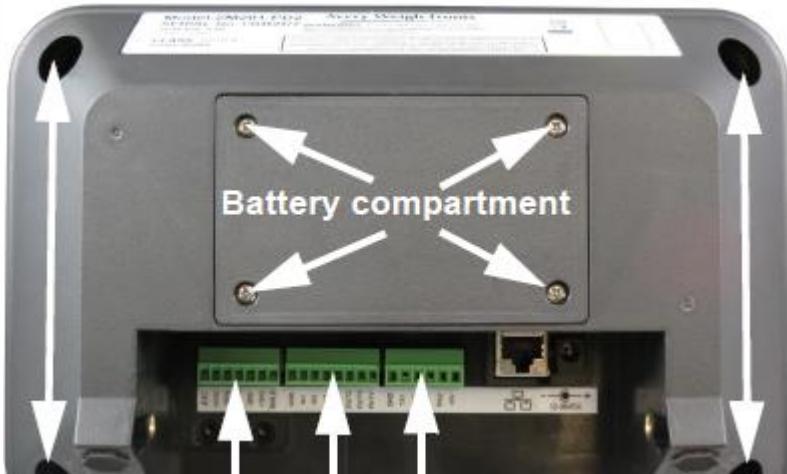
SETUP > PORTS > PROTCL > TYPE x = RD and BIND x = PORT 1 or 2



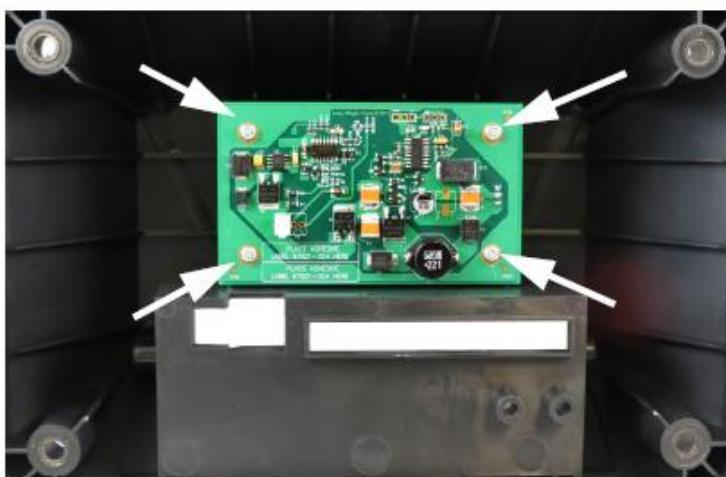
[Remote Display](#)

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ZM201-PD2 Battery Pack

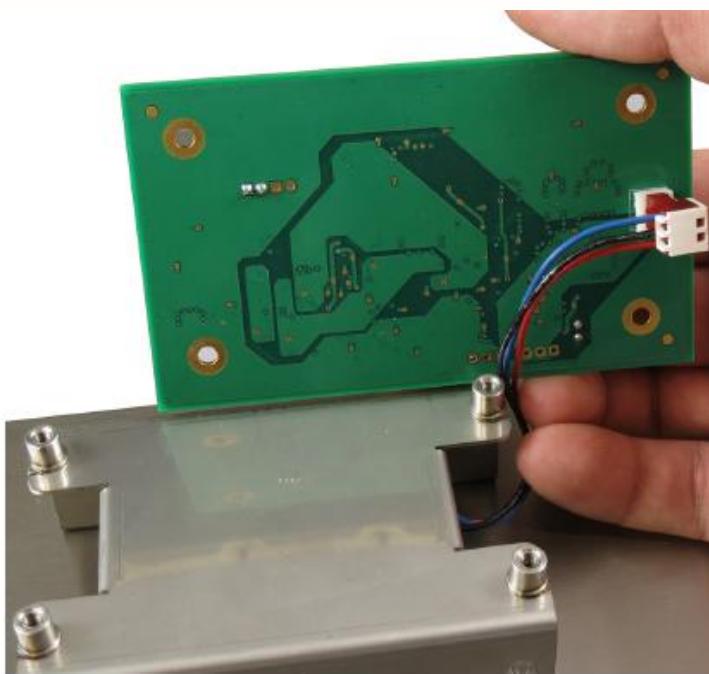
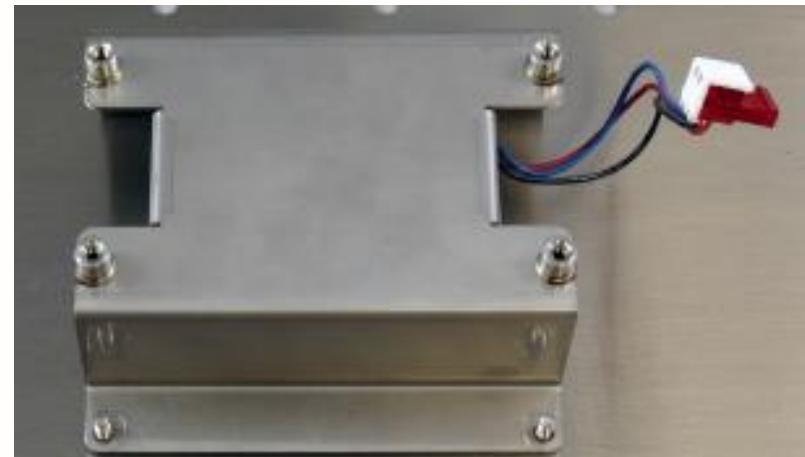
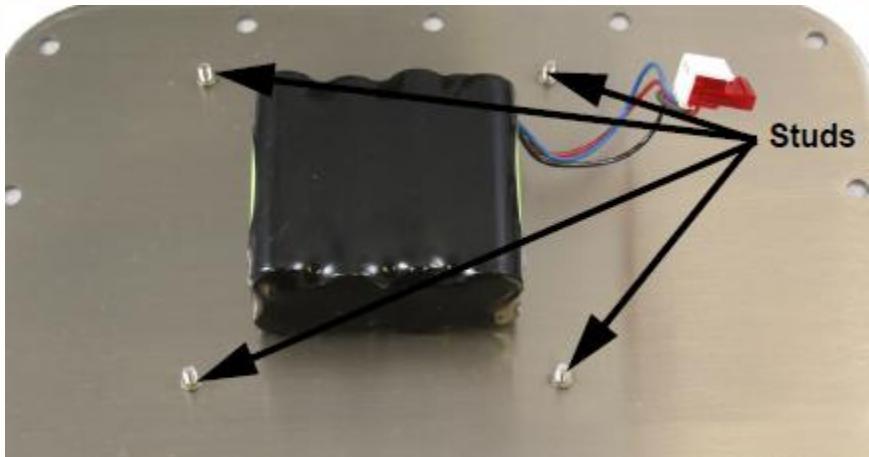


Battery Kit works for both ABS & SST
Extra bracket for SST model only



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ZM201 SST Battery Pack



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ZM201 SST Battery Pack



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ZM201 P3 ON/OFF Jumper



Jumper on P3

P3



Front panel **ON/OFF**
key will not function



Jumper off P3

P3



Front panel **ON/OFF**
key will function

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ZM201 Battery Pack

8 x 1.2v Nickel Metal Hydride (NiMH) = 9.6 volt

18 hr continuous operation with single load cell

14-16 hr with 4 load cells

Extended using Sleep timer

5 hr recharge time

500 recharges

[Battery Timer Enable](#)

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ZM201 Sealing Kit

Sealing kits for ABS & SST

[ZM201 Sealing Kit](#)

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ZM201 SP0 – Modbus TCP

Fixed Output Mapping

Tag Name	Address
Gross	001
Tare	003
Net	005
Motion	007
CenerZero	009
OverUnder Flag	011
HeartBeat	013
ConfigCounter	015
CalibCounter	017
HiResGross	019
calZeroDone	021
calSpanDone	023
PbZero Done	025
PbTareDone	027

Fixed Input Mapping

Tag Name	Address
PbZero	125
PbTare	127
KeypadTare	129
calZero	131
calSpan	133
calWeight	135

Fixed character format
32 bit : unsigned double word
Endian Format : Little
Trade : Off

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SMA Level 2 Calibration commands

Supported by all ZM201 models

<LF>XZ<CR> Cal Zero command

The scale responds with a standard scale response.

If the “Set Zero” operation fails then the scale responds with the <s> field = “0”

<LF>XS<CR> Cal Span command

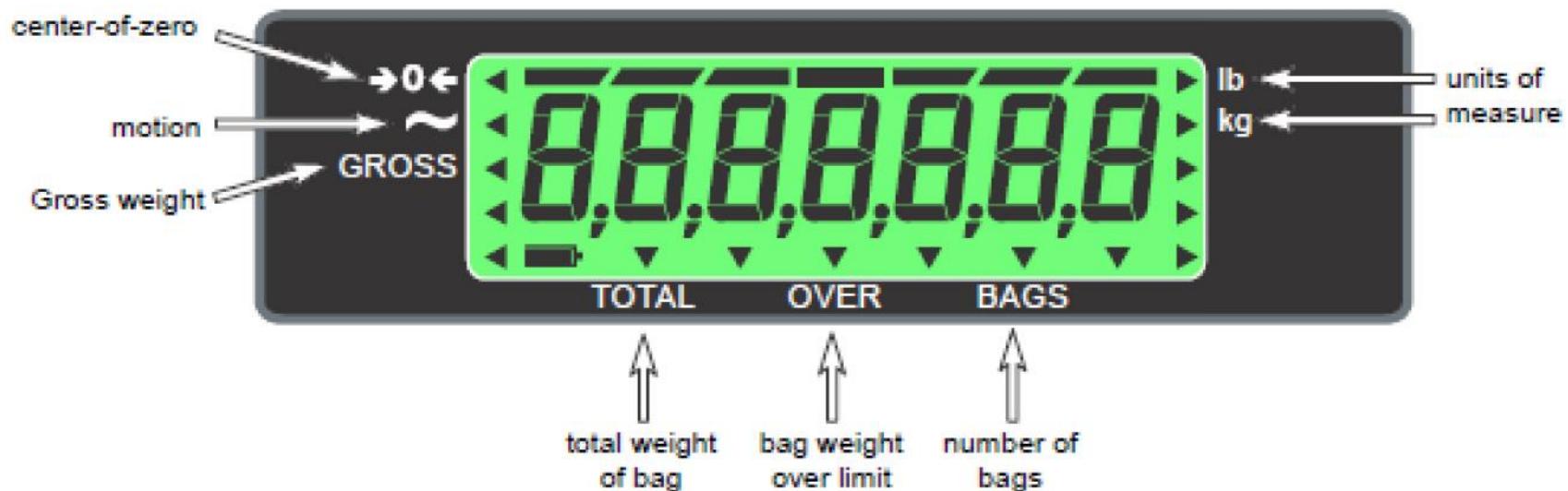
The scale responds with a standard scale response

If the “Set Span” operation fails then the scale responds with the <s> field = “s”

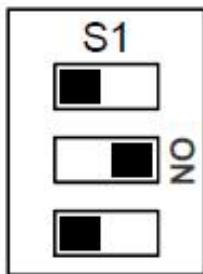
<LF>XC<CR> Get Audit Counters command

The scale responds with <LF>Calib:123456:Config:9876:<CR>

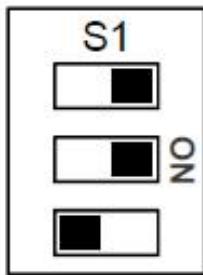
ZM205 Baggage Scale



ZM205 model select jumpers



Master indicator

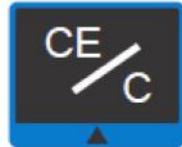
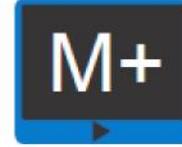


Remote Display



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ZM205 Baggage Scale – Key Functions

Key	Description
 The key features a blue border and a white face. On the left side, the letters 'CE' are printed above a diagonal line that ends with a small 'C'. On the right side, there is a small upward-pointing arrow.	Press the CE/C* key to cancel the previous accumulator or hold the key to clear all accumulators. Also acts as an up arrow key when in the menu structure.
 The key features a blue border and a white face. In the center, the letters 'M+' are printed above a small downward-pointing arrow.	Press the M+ key to subtract the last bag from the total. Also acts as a Left arrow key when in the menu structure.
 The key features a blue border and a white face. In the center, the letters 'M-' are printed above a small leftward-pointing arrow.	Press the M- key to accumulate. Also acts as a Right arrow key in the menu structure.

No TARE, PRINT, UNITS or ON/OFF key

TARE -> CE/C

M+ -> PRINT

M- -> UNITS

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ZM205 Setup Menu - Differences

SYSTEM Menu -> No TARE or APPS selection
PORTS > PROTCL -> for Serial Ports only
PORTS > OPTIONS added for ProfiBus & Relay

ZM205 Operation

Ethernet Port used for Remote display connection

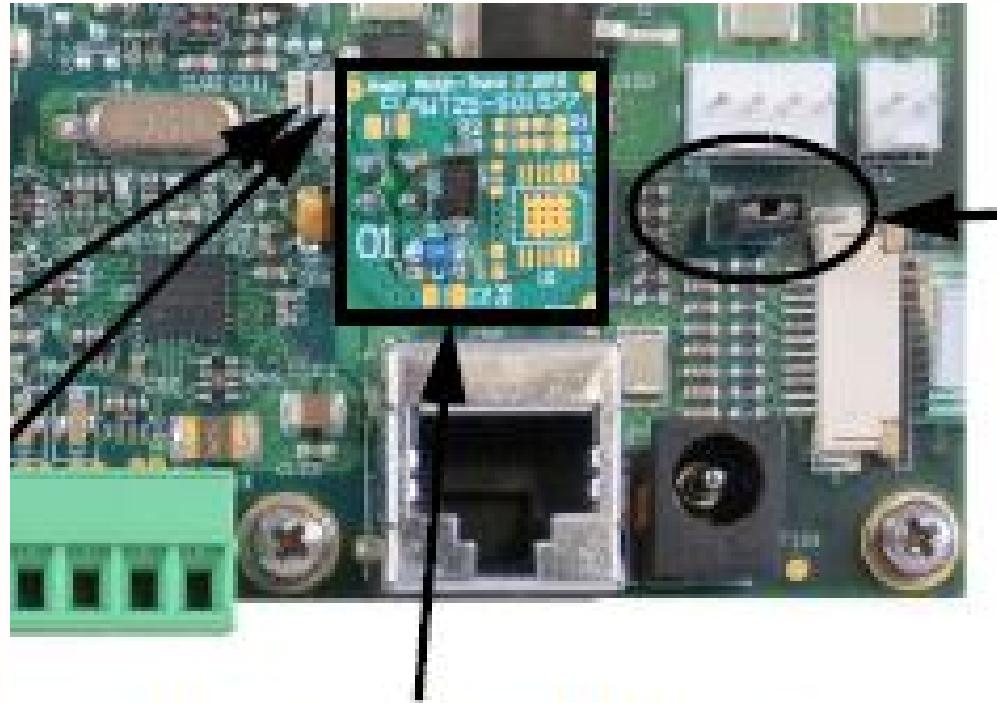
Master / Remote settings are defaulted

M+ adds new bag weight to Accumulator

M- subtracts last bag weight from Accumulator

F1 shows accumulated value

ZM205 POE to Remote



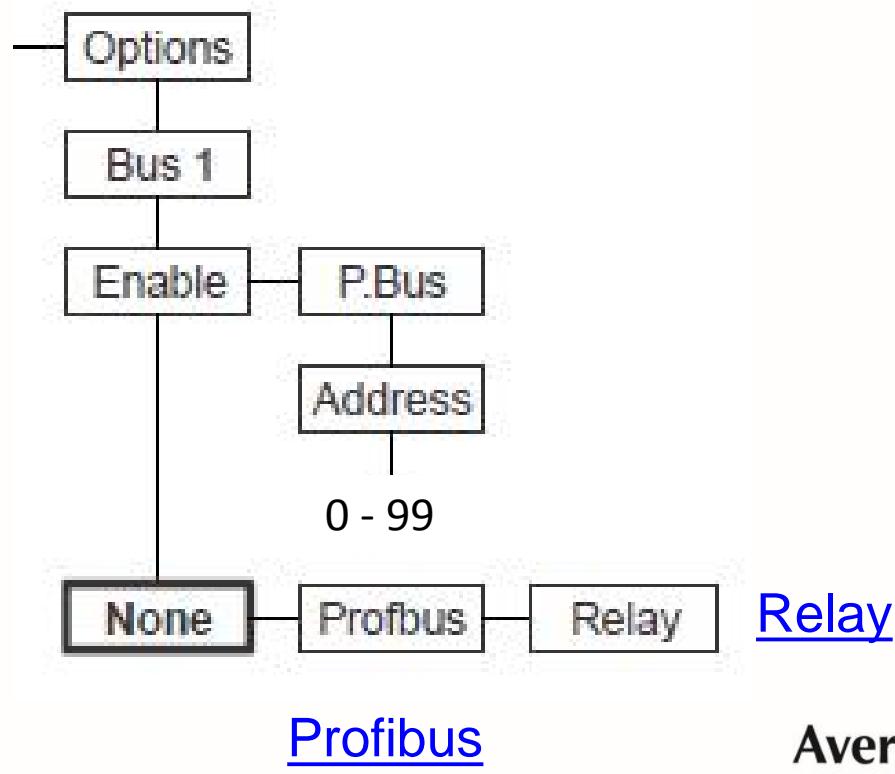
Ethernet Current Limiting board:
Installed on both the main and remote
indicator PC boards at the factory.

**DO NOT CONNECT ETHERNET
WITHOUT THIS BOARD IN PLACE!**

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ZM205 Option Menu – ProfiBus or Relay

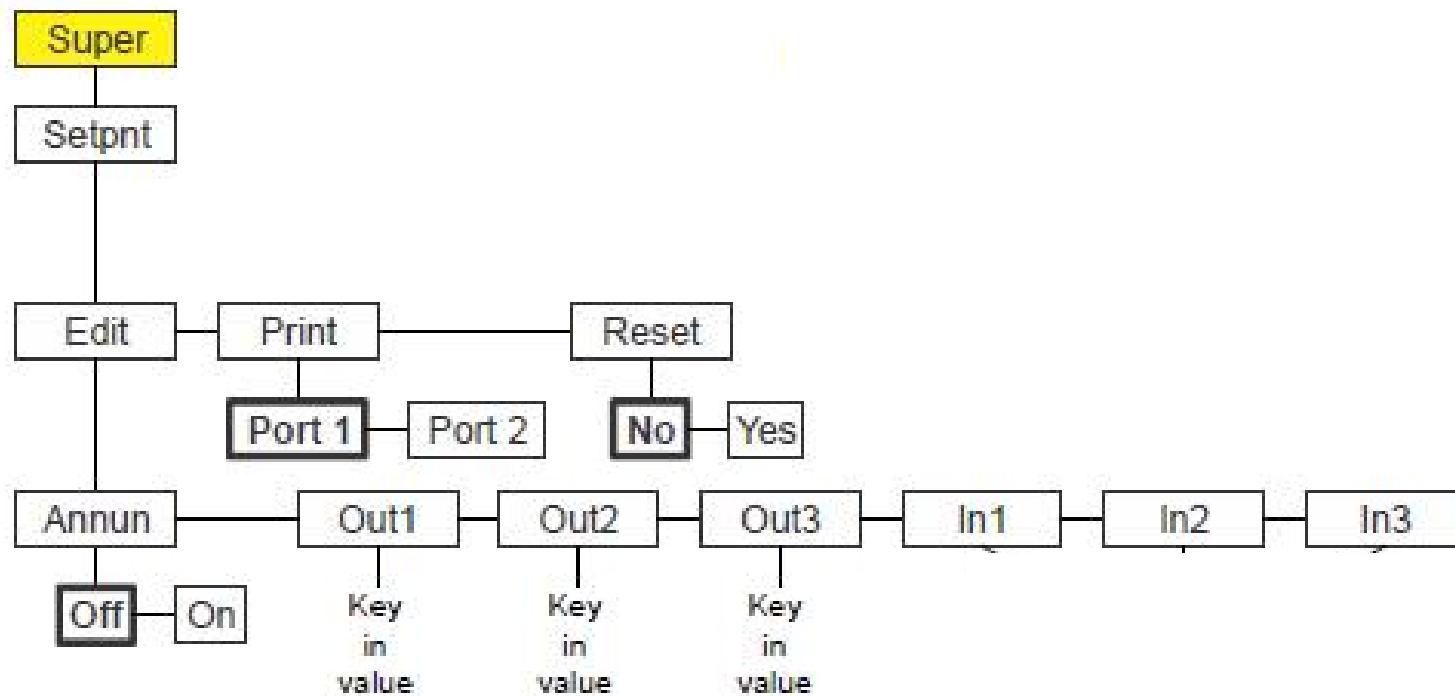
ProfiBus registers match the E1020
Uses DP-V1 Standard interface



[Profibus](#)

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ZM205 SUPER Menu



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ZM205 Setpoints

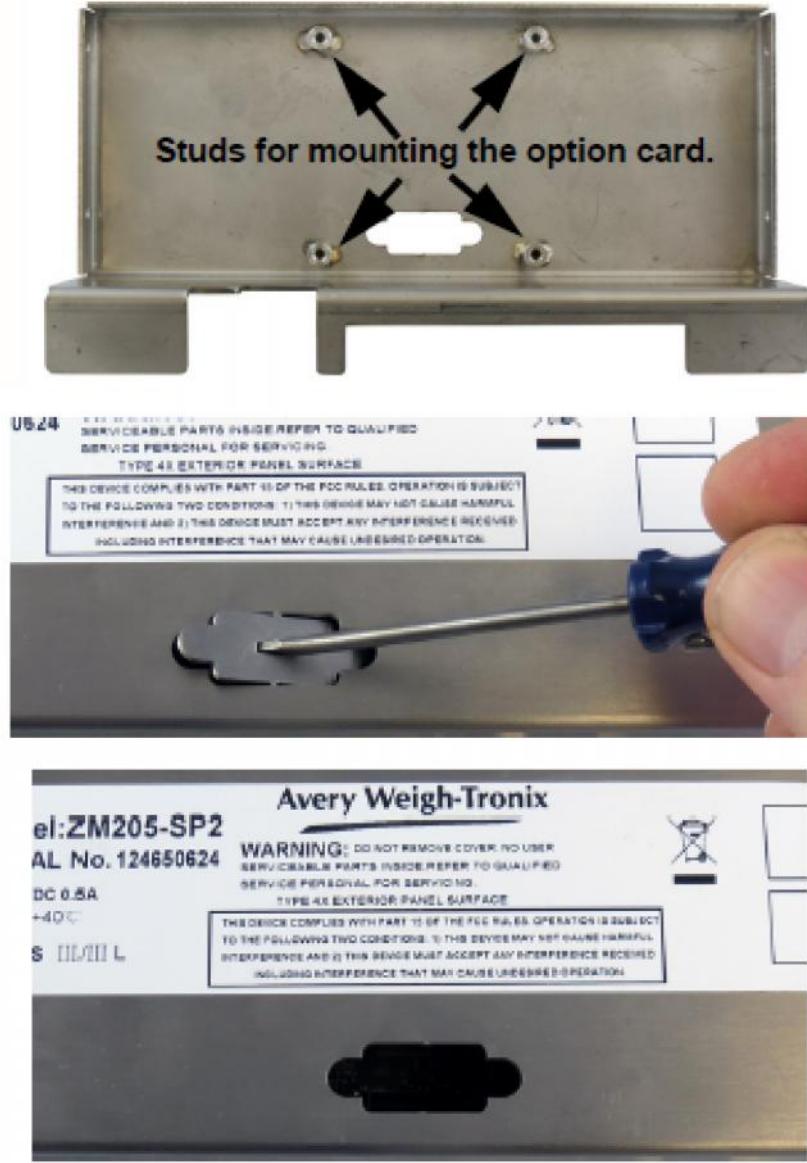
The OVER annunciation is tied to both setpoint OUT 1 and OUT 3 values
If weight exceeds OUT 1 or 3 the OVER annunciation will light

When Relay option is installed, it is triggered by OUT 3 value
If weight exceeds OUT 3, the relay will trigger a peripheral device



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ZM205 Option Board Installation



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ZM205 Options – ProfiBus

OUT	IN
Gross (scaled) Motion 0x00 when stable, 0xFF when motion	Remote Zero
Healthy (see note below) Bit 0 = No Fault (logical ‘and’ of all bits in the word) Bit 1 = A/D O.K. Bit 2 = Ram O.K. Bit 3 = EEPROM O.K. Bit 4 = CPU O.K. Bit 5 = not Overload (bit to be set to “0” when the over range indication occurs. That is when all “-----” appear) Bit 6 = not Underload (bit to be set to “0” when the under range indication occurs. That is when all “-----” appear) Bit 7 = not Asleep Bits 8 to 15 = set to a “1”	

HEALTHY Status: If everything is working then all bits will be set to a “1”
If bit “0” changes to a “0” then check state of Bit7 for true fault or “Sleep mode”.

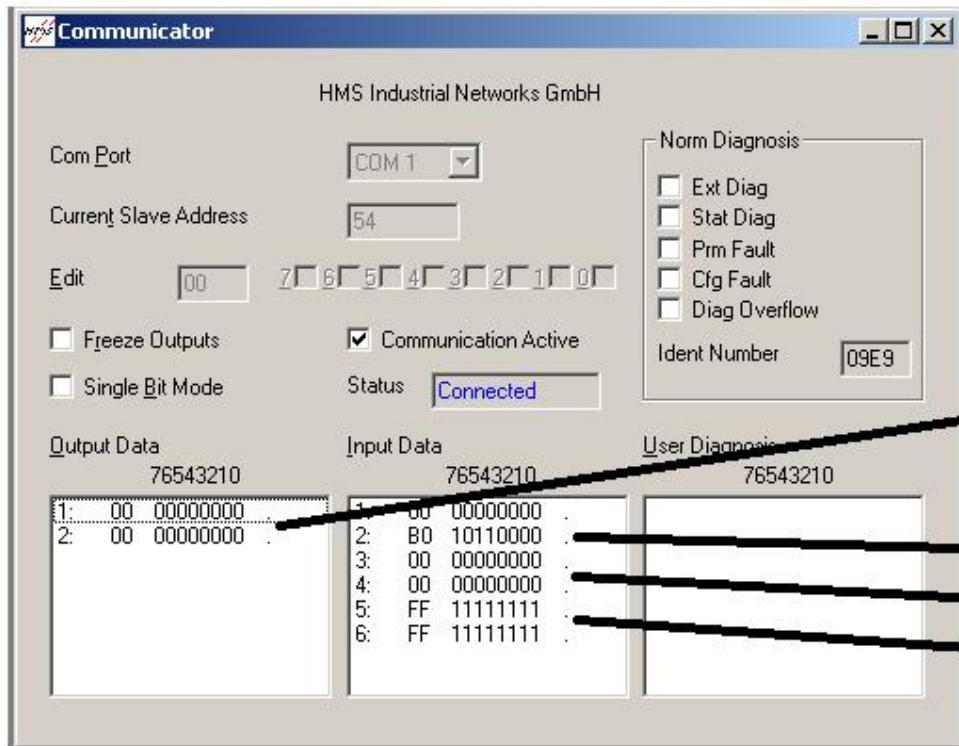
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ZM205 Options – ProfiBus



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ZM205 Options – ProfiBus



Outout data is to E1020A and changing any of the bits will cause the E1020A to tare off

Input data from E1020A is 3 x words
Word 1 in the pictur represents a weight of 17.6kg
Word 2 is stability all 0's = stable all 1's = unstable
Word 3 is healthy status all 1's is good an example of under range is 11111111 10111110

ZM201 vs ZM300

IP Rating	66	69K
Gore vent	no	yes
Annunciator Desc	panel	display graphics
Navigation arrows	larger	smaller
Large TN display	yes (ABS)	no
# of Load Cell	4	6
Division Size	.00001 to 50	.000001 to 500
Units of measure	2	4 (lb, kg, g, oz & lb-oz)
Custom Unit	1	4
Display update rate max	10	20
# of Protocols	3	5
Print Formats	10	40
Bytes per print format	250	1000
Baud rate max	19200	115200

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ZM201 vs ZM300

COM 1 CTS/RTS	no	yes
Ethernet Connections	1	5
Accumulator Channels	1	10
USB Host	no	yes no USB printer drivers
ID Entry	no	ZM303
Audit trail	CAT2	CAT3 no printing in ZM201
Archive report	no	yes
FTP	no	yes
Transaction memory	no	yes USB transfer
Ethernet/IP	no	yes
Modbus TCP	no	yes
DHCP default	OFF	ON > OFF in next rev

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ZM201 vs ZM300

Power supply	20W	65W
Numeric Tare entry	yes	ZM301 yes in next rev

ZM201 notes

SMA	does not support Set & Get level 2 commands
Options	no Wireless, Analog Output, RS485, USB-Device
Setpoints	no active above/below selection
Counting	dribble sample mode only
Checkweighing	latch mode only
Batch	3 Ingredient only : no preact, 2-speed, fill/discharge
Remote Display	Basic only – no 350IS
Checkweigher Units	Porex plug installed for shipping
Panel Mount	Barrel plug to 2 terminal screw lug for DC power input

ZM 200 Series Training

The End

Any Questions?

Thank you for attending!

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