5100

Digital Indicator

Communications Manual

For use with Software Versions 3.0 and above

Table of Contents

1. Introduction

This manual details the extended communications protocol of the 5100.

A simple direct protocol that mimics the pressing of the front panel keys is described in the reference manual.

The extended protocol allows for complete calibration and control of a multi-drop network of up to thirty-two 5100 units. This protocol is used by the Viewer98 program to calibrate and configure the 5100 units. Use the TEST page as a convenient terminal to test the 5100 communications.

This manual lists all of the commands for the extended protocol in alphabetical order. In practice only a small subset of these commands would be used to control operational parameters.

The command summary at the end of the manual groups commands into related functions.

2. Connection of the 5100 Network

2.1 RS232 Connection
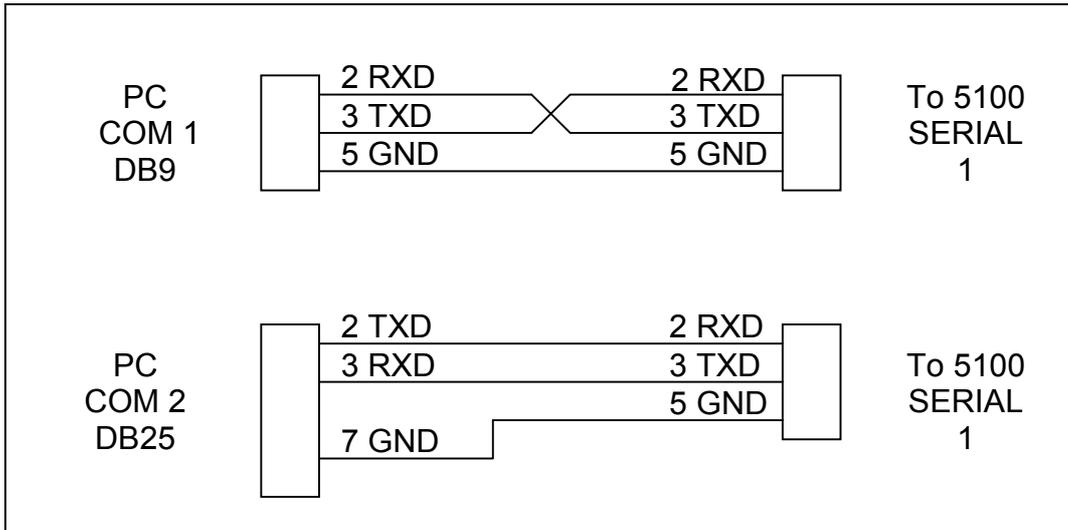
Figure 1: Connection of a single 5100 unit to an IBM PC either using COM1 or COM2 on the PC.

2.2 RS485/RS422 Connection
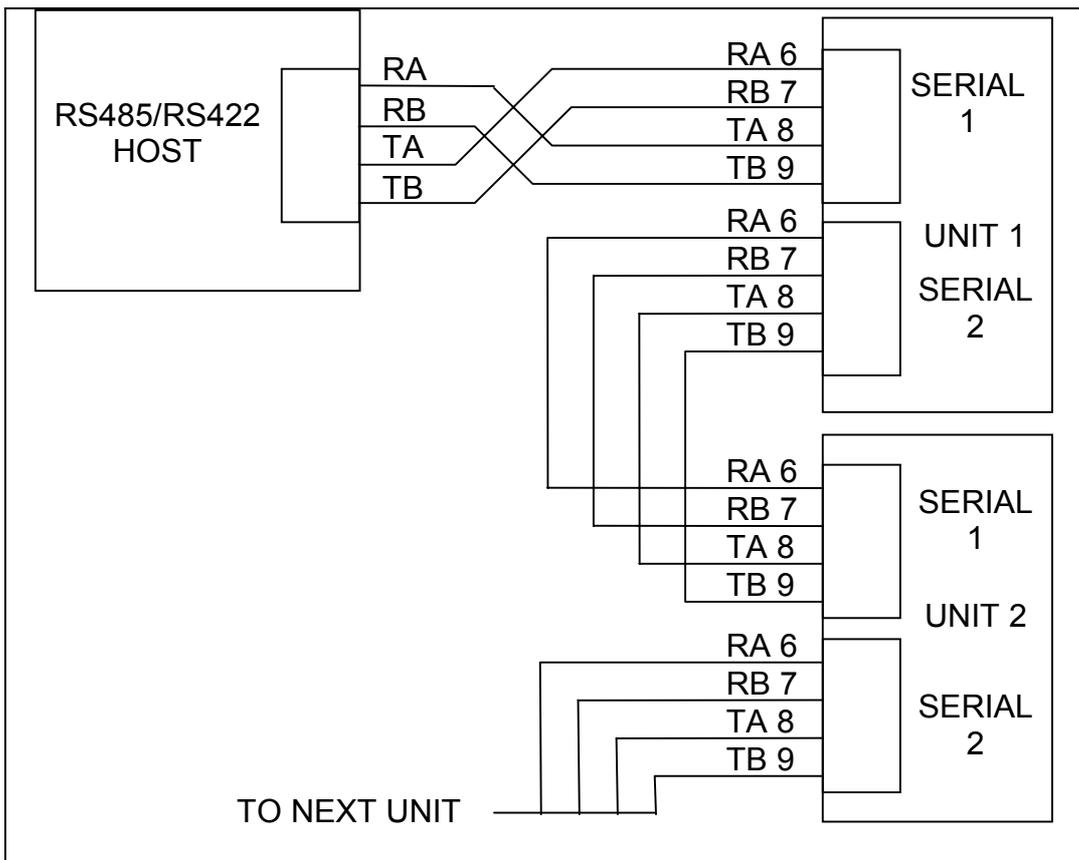
Figure 2: Connection of a RS485/RS422 network.

3. Command Overview

3.1 Commands and Queries

A command consists of three ASCII-characters (eg IDN).

A query consists of four ASCII characters and ends with a question mark (e.g. IDN?).

3.2 Responses

The 5100 responds with 0*CRLF* to indicate that a command has been accepted or ?*CRLF* to indicate that the command was either not understood or could not be performed.

Specific queries cause the 5100 to respond with the data requested by the query. (e.g. The 5100 would respond with 4 *CRLF* to a ADR? Query if it was setup with address 4)

3.3 Parameters

A command or query can be followed by one or more parameters.

Parameters are either numeric (e.g. 3000) or strings (e.g. "Fred").

String parameters are delimited by quote characters ("" ASCII 34). They are taken literally so that "AbC d" is not the same as "abcd".

Numeric parameters are variable and leading and trailing spaces are ignored. As a result 003 03 and 3 are identical.

Parameters are separated by the comma sign (',' ASCII 44).

Parameters may be left out completely so that it is possible to change one parameter without altering the others. For example IAD1,,2; will change the position of the decimal point only.

3.4 Termination

Termination characters are sent to define the end of a command, query or response.

Permissible termination characters are ';' (ASCII 59), *LF* (ASCII 10), *CRLF* (ASCII 13 10), *LFCR* (ASCII 10 13). E.g. ADR?; is the same as ADR? *CRLF*

The 5100 always uses *CRLF* as the termination of its responses.

3.5 Trade Counter:

All trade relevant functions are guarded by the trade counter. There is no difference in changing settings via the communications interface or via the front panel. If the counter reaches 60000 the 5100 operation is blocked and it must be returned to the factory.

Note that the 5100 does not check to see if new data is different from the old data before incrementing the Trade Counter, so sending IAD1,6000 will increment the counter even if the 5100 is setup with a fullscale of 6000 kg already.

It is possible to block all changes to trade relevant parameters by setting a Full Setup Passcode. If such a passcode has been set trade parameters can only be changed via the serial port after a PCD command has been sent with the correct passcode.

4. Command Details

4.1 ADR   SET ADDRESS

Set the address of a unit.

General

No. of parameters	2
Save changes.	with TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Address	0 .. 31	31
2	Serial Number	"0000001" .. "9999999"	"xxxxxxx" factory set

Each 5100 must be assigned a unique address to enable the implementation of a multi-drop network.   This address can be set using the digital setup menus as described in the Reference Manual. It is also possible to use the network itself to set the unit addresses. The ADDRESS COMMAND is used to assign the unit address via the communications network,

Before the address of a unit can be changed the unit must be selected to respond to commands. The SELECT COMMAND (see Sect 4.39 pg 33) is used to select a unit.   If the current address of the unit is known use this to select the unit, if not issue the S99; command to select all units.   To distinguish between units of the same address use the serial number parameter of the ADDRESS COMMAND. The serial number is unique to each unit and only the unit with the matching serial number will respond to the ADDRESS COMMAND. If neither the current address nor serial number of the units is known, turn off all the units in the network and then turn on one unit at a time. The combination of S99; and ADR command will then allow each unit to be configured.

Example 1:

Change address of unit from 1 to 2

S01;		Select unit 1
ADR2;	0 *CRLF*	Set address to 2
TDD1;	0 *CRLF*	Save change
S02;		Select new unit 2
IDN?;	WE,"WE2110","123456",P50 *CRLF*	Ask for ID

Example 2:

Two units with unknown addresses are configured using their serial numbers.

S99;		
ADR01,"123456";	0 *CRLF*	Unit with serial no. "123456" gets address 01
ADR02,"123457";	0 *CRLF*	Unit with serial no. "123457" gets address 02
S01;TDD1; S02;TDD1;	0 *CRLF* 0 *CRLF*	Save addresses against power loss
S01;		Select the new unit 1
IDN?;	"","123456","V1.5","5100" *CRLF*	Ask for ID

4.2 AFT   Auto Output Format

Alter the format string for the auto transmit output.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Format String (up to 20 chars)	"String"	""

Example:

S01;		Select unit 1
AFT?;	""*CRLF*	Current format is null
PRS1,,,,,6;	0 *CRLF*	Set Ser2 to auto transmit using the auto format string.
AFT" \201\210 \211";	0 *CRLF*	New auto output would look like: 127.8 kg G
TDD1;	0 *CRLF*	save settings.

See Reference Manual for details on the auto format string.

4.3 ASF   SET FILTERING

Set the filtering characteristics of a unit.

General

No. of parameters	2
Save changes.	with TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range		Default
1	Number of consecutive readings to average	0 … 9 10 11 12 13 14	1 … 10 25 50 75 100 200	9
2	Anti-Jitter Setting	0 1 2	off fine coarse	0

Example:

S01;		Select unit 1
ASF?;	9,0*CRLF*	Query filtering setting
ASF4,1;	0 *CRLF*	Changed to a 5 reading average with fine anti-jitter setting.
TDD1;	0 *CRLF*	Save new settings.

4.4 BAT   BATCH CONTROL

Allows remote control of batching and running status of batching to be read.

General

No. of parameters	6
Save changes.	-
Increment Trade Counter	-

Parameter Details

Parameter	Description	Range		Default
p1	Reply type	1	Start	-
		2	Pause	
		3	Abort Batch	

Query Details

Parameter	Description	Range	
r1	Batching Status	0	Idle
		1	Running
		2	Paused
r2	Current Recipe	0	Not Running
		1..99	Current Recipe
r3	Current Material being Filled	0	Not Filling
		1..20	Current Material
r4	Material Target being Filled	0.. Fullscale	
r5	Status of all 24 setpoints	"000000" to "FFFFFF" (output 1 is rightmost eg "000001")	

Example:

Command	Reply	Result
REC		(See REC command instructions to select recipe and proportion before starting the batch)
BAT?;	0,0,0,0,"000000" *CRLF*	Batching idle
BAT1;	0 *CRLF*	Start batch with current recipe
BAT?	1,5,1,1000,"000001" *CRLF*	Batching running, Recipe 5 Material 1 : 1000 kg Output 1 active
BAT2;	0 *CRLF*	Pause Batch
BAT?;	2,5,1,1000,"000000" *CRLF*	Batching paused
BAT1;	0 *CRLF*	Continue Batching
BAT?;	1,5,2,500,"000002" *CRLF*	Batch Running Recipe 5 Material 2: 500 kg Output 2 active

4.5 BDR   SET BAUD RATE.

Set the communication parameters, baud rate, parity etc.

General

No. of parameters	4
Save changes.	with TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range		Default
1	Baud Rate	1	300	
		2	600	
		3	1200	6
		4	2400	
		5	4800	
		6	9600	
		7	19200	
2	Parity	0	none	
		1	odd	0
		2	even	
3	Data Bits	7,8		8
4	Stop Bits	1,2		1
5	Termination Resistors	0	OFF	0
		1	ON	

Example:

S01;		Select unit 1
BDR?;	6,0,8,1,0 *CRLF*	Query baud rate setting
BDR4,1,7,1,1;	0 *CRLF* (Note that the reply is sent using the new settings)	Settings changed to 2400 baud, odd parity, 7 data bits, 1 stop bit, termination on.
TDD1;	0 *CRLF*	Save new settings.

4.6 CDL   SET ZERO.

Set the zero dead load cancellation. This is analogous with pressing the ZERO key on the front of the instrument.

General

No. of parameters	0
Save changes.	At input
Increment Trade Counter	no

If the Setzero operation is not possible due to the value of the current weight reading or due to instability the 5100 will return '?'.

Example:

S01;		Select unit 1
CDL;	0 *CRLF*	Zero dead load set successfully.
	< load disturbed>	
CDL;	? *CRLF*	Setting of zero dead load not possible due to motion, error or dead load range.

4.7 CLK   SET CLOCK

Set the time and date.

General

No. of parameters	6
Save changes.	At input
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Hour	0..23	-
2	Minute	0..59	-
3	Second	0..59	-
4	Date	1..31	-
5	Month	1..12	-
6	Year*	1998..2098	-

Example:

S01;		Select unit 1
CLK?;	9,20,10,16,2,1999 *CRLF*	Query current time & date
CLK10,0,0,17,2,2001;	0 *CRLF*	Change to 10 am 23/6/2001
CLK10,0,0,17,2,01;	0 *CRLF*	Same as above

- The Year may be set either in 2 digit or 4 digit format. The instrument will convert this to a 4 digit year automatically. E.g. 2/2/1 is converted to 2/2/2001.

4.8 COF   SET OUTPUT FORMAT.

Set the output format of the MSV? Query.

General

No. of parameters	1
Save changes.	with TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Format setting	0..11	6

Binary Formats

Format	Data	Order
0	4 Byte (binary) CRLF	MSB before LSB(=00h)
2	2 Byte (binary) CRLF	MSB, LSB
4	4 Byte (binary) CRLF	LSB(=00h) before MSB
6	2 Byte (binary) CRLF	LSB, MSB
8	4 Byte (binary) CRLF	MSB before LSB (=Status)

ASCII Formats

Format	Parameter 1		Parameter 2		Parameter 3	
1 & 3	Weight (8)					*CRLF*
5 & 7	Weight (8)	,	Address (2)			*CRLF*
9 & 10	Weight (8)	,	Address (2)	,	Status (3)	*CRLF*
11	Weight (8)	,	Address (2)	,	Extended Status (3)	*CRLF*

Values in brackets signify the number of characters in the fixed length response.

The weight format is the sign (space or minus), followed by 7 digits 0..9 including the decimal point if used.

The binary formats are useful for PLC communications in applications where conversion of the ASCII weight string is not possible. The binary outputs can generally be used directly by the PLC.

STATUS Details

Status	Description	Bit	Comment
001	Overload	0	Weight reading out of range overload or underload
002	Standstill	1	
004	Gross	2	
008	Range 2 active	3	Only with multi-range or multi-interval
016	Output 1 active	4	
032	Output 2 active	5	
064	Output 3 active	6	
128	Output 4 active	7	
256	Centre of Zero	8	This status bit is only available in the extended status - Format 11 only.

Note that the status bits are added together, for example a status of 6 (4+2) means the weight reading is a Gross value with no motion, range 1, and all limit values are inactive.

Example 1:

S01;		Select unit 1
COF?;	3 *CRLF*	Query format
MSV?;	-00001.0 *CRLF*	Query weight reading.
COF9;	0 *CRLF*	Change to format 9
TDD1;	0 *CRLF*	save new setting
MSV?;	-00001.0,01,006 *CRLF*	Query weight reading.

Example 2: Use of Binary format for PLC use

Initialisation		
S01;		Select unit 1
COF8;	0 *CRLF*	Set format 8
TDD1;	0 *CRLF*	Save format setting
PLC Operation		
MSV?;	*CRLF*	Query weight reading using the new format. In this example the weight is a stable gross reading of 1000 kg. COF 8 replies with < 24 bits of weight><8 bit status><CRLF> the hexadecimal values of the returned data are <00><01><E8><06><0C><0A> but this data is not printable directly.

4.9 CWT   SET CALIBRATION WEIGHT.

Set the calibration weight to be used for span calibration. This must be set before using the LWT; span calibration command.

General

No. of parameters	1
Save changes.	with TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Calibration Weight	2% - 100% of full scale weight. *(Send IAD? to read full scale setting)*	3000

Example:

S01;		Select unit 1
CWT?;	3000 *CRLF*	Query calibration weight setting
CWT4000;	0 *CRLF* *(Note that weight is sent without any decimal point. So 400.0 kg is send as 4000 not 400.0)*	Change calibration weight to 4000.
TDD1;	0 *CRLF*	Save new setting.

4.10 ENU   SET UNITS

Set the units of weight to be displayed and printed.

General

No. of parameters	1
Save changes.	with TDD1
Increment Trade Counter	yes

Parameter Details

Parameter	Description	Range		Default
1	Weight units	0	none	
		1	g	
		2	kg	2
		3	lb	
		4	t	

Example:

S01;		Select unit 1
ENU?;	2 *CRLF*	Query units setting.
ENU1;	0 *CRLF*	Change units to grams
TDD1;	0 *CRLF*	Save new setting.

4.11 ESR? QUERY STATUS

Query the error status of the instrument.

General

No. of parameters   1

Parameter Details

Parameter	Description	Range	Default
1	select type of status information	0..1	0

The 5100 contains both current and latched error status flags. The latched errors are only cleared by resetting the unit (RES command or power off). The status string is 4 hexadecimal characters representing the 16 error bits.

Error	Description
0001	The power supply voltage is too low. (check supply)
0002	The power supply voltage is too high. (check supply)
0004	The load cell excitation voltage is too low. (check scale/supply)
0008	The load cell excitation voltage is too high. (check scale/supply)
0010	The temperature is outside of allowable limits. (check location)
0020	Scale build is incorrect. The number of graduations has been set < 100 or > 100000.(fix up scale build)
0040	The positive sense line is not connected. (check connection)
0080	The negative sense line is not connected. (check connection)
0100	The digital setup information has been lost. (re-enter setup)
0200	The calibration information has been lost. (re-calibrate)
0400	The factory information has been lost. (service)
0800	The EEPROM memory storage chip has failed (service)
2000	The Internal clock chip has failed. (service)
8000	The EPROM memory storage chip has failed. (service)

The status bits are additive. For example if a condition is detected where the power supply voltage is low, resulting in a reduction of excitation voltage, the resulting status setting will be 0005 (0001 + 0004). 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)

ESR? Example:

S01;		Select unit 1
ESR?;	0000 *CRLF*	No current errors.
ESR?1;	00C0 *CRLF*	Positive and Negative Sense lines were not connected at sometime in the past.

4.12 FNC   FUNCTION KEY SETTING

Alter the role of the front panel function key.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range		Default
1	Function Setting	0	None	0
		1	Start	
		2	Pause	
		3	Batch	
		4	Auto/Manual	
		5	Manual Hold	
		6	Peak Hold	
		7	Livestock Hold	
		8	Count	
		9	Show Total	

Example:

S01;		Select unit 1
FNC?;	0 *CRLF*	Function Key set to 'No Function'.
FNC3;	0 *CRLF*	Set function to .
TDD1;	0 *CRLF*	save setting.

4.13 FOP   FORCE OUTPUT

Use this command to force a 5100 output either on or off. This is only available for 5100 outputs that are setup with no other function. Use the query to obtain the state of the first six 5100 outputs.

General

No. of parameters	6
Save changes.	-
Increment Trade Counter	-

Parameter Details

Parameter	Description	Range
1	Output 1	0 for off, 1 for on
2	Output 2	
3	Output 3	
4	Output 4	
5	Output 5	
6	Output 6	

Example:

S01;		Select unit 1
FOP?;	0,0,0,1,0,0 *CRLF*	Output 4 is on the others are off
FOP,,1;	0 *CRLF*	Drive Output 3 on
FOP,,0;	0 *CRLF*	Drive output 3 off

4.14 IAD   SET SCALE BUILD

Set the scale build parameters including max1,e1,max2,e2,decimal point etc.

General

No. of parameters	5
Save changes.	With TDD1
Increment Trade Counter	Yes

Parameter Details

Parameter	Description	Range		Default
1	Range	1..2		1
2	Nominal Load (max1 or max2)	100 .. 999999		Range 1: 3000 Range 2: 6000
3	No. of right side digits. (decimal point position)	0..5		0
4	Resolution (e1 or e2)	1 2 3 4 5 6 7	1 2 5 10 20 50 100	Range 1: 1 Range 2: 2
5	X10 mode	0 1	off on	0

Note that the full scale weight of the instrument is set to Nominal Load 1 for single range installations, and Nominal Load 2 for dual-range and dual-interval installations. In single range installations Nominal Load 2 is not used.

Example:

S01;		Select unit 1
IAD?1;	1,3000,0,1,0 *CRLF*	
IAD1,4000,1,2,0;	0 *CRLF*	max1 = 4000, e1 = 2 with 1 digit after decimal point on range 1. x10 mode is off.
TDD1;	0 *CRLF*	save setting.

If IAD? is issued without the range parameter then the returned data is range 1 for single range setup or range 2 for dual interval or dual range setup. In this way it is possible to query the maximum load without the need to issue a WMD? Command to determine the weighing mode.

4.15 ICR   SET MEASUREMENT RATE

Set the fundamental measurement frequency of the instrument.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	yes

Parameter Details

Parameter	Description	Range	Default
1	Measurement Rate in Hz.	15-60	50

Example:

S01;		Select unit 1
ICR?;	50 *CRLF*	Query current measurement rate
ICR60;	0 *CRLF*	Change to 60 Hz
TDD1;	0 *CRLF*	save setting.

4.16 IDN   SET IDENTIFICATION

Set the unit identification string.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Identification string. (15 bytes max).	" string "	"WE2110"
2	Serial Number string	"000000" .. "999999"	factory set, unique to each unit
3	Version string	P50 - P59	

Note that only the identification string may be changed. The serial number and version are fixed at the factory and are available for information only by using the IDN? Query.

Example:

S01;		Select unit 1
IDN?;	WE"WE2110","123456",P52H*CRLF*	Query current identification.
IDN"Site A";	0 *CRLF*	Change identification string to "Site A"
TDD1;	0 *CRLF*	save setting.

4.17 LBT   BUTTON LOCK SETTINGS

Set the operation status of each of the 4 front panel buttons.

General

No. of parameters	2
Save changes.	With TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range		Default
1	Button	0 1 2 3	ZERO TARE GROSS/NET PRINT	0
2	Operation	0 1 2	LOCK NORMAL IMMEDIATE	1

Operation of each of the 4 front panel buttons may be set independently. NORMAL is obviously the normal function of the button. LOCK means that the button is locked and its' normal operation is blocked. IMMEDIATE allows for the button function to operate without waiting for stable readings.

Example:

S01;		Select unit 1
LBT0?;	1 *CRLF*	ZERO is currently set to NORMAL Operation
LBT0,0;	0 *CRLF*	Block operation of the ZERO button
TDD1;	0 *CRLF*	save setting.

4.18 LDW   CALIBRATE ZERO DEAD WEIGHT

It is possible to calibrate the zero dead weight either with no load on the scale base or the calculated mV/V signal may be entered directly.

General

No. of parameters	0 (1 if using direct mV/V cal)
Save changes.	With TDD1
Increment Trade Counter	yes

a) Calibration with Weight

This type of calibration is used with Weighing Modes 1,2&3 (See WMD command).

The calibration process takes some time to complete. As a result it is necessary to monitor the calibration process to determine when it is finished. To do this issue a LDW? Query. Following is a list of the possible calibration status responses.

Calibration Status

Status Value	Description
0	Calibration finished successfully
1	Calibration in process (Busy)
101	Error Zero too high (> 2 mV/V), Calibration aborted.
102	Error Zero too low (<-2 mV/V), Calibration aborted.

Example:

S01;		Select unit 1
LDW;	0 *CRLF*	Start zero calibration.
LDW?;	1 *CRLF*	Query status of the zero calibration process
LDW?;	1 *CRLF*	Still busy
LDW?;	0 *CRLF*	Zero calibration finished
TDD1;	0 *CRLF*	Save setting.

b) Direct mV/V calibration

When using direct mV/V calibration the mV/V signal level is entered directly.

Parameter Details

Parameter	Description	Range	Default
1	Dead load signal in mV/V. 20000 = 2.0 mV/V	-20000..20000	0

Example:

S01;		Select unit 1
VAL?;	5076*CRLF*	Current reading is 0.5076 mV/V
LDW5076;	0 *CRLF*	Set zero dead load to 0.5076mV/V.
LDW?;	5076*CRLF*	Zero dead load is 0.5076mV/V
TDD1;	0 *CRLF*	save setting.

4.19 LIC   LINEARISATION

This command gives access to the multi-point linearisation functions of the 5100.   A special query LIC? is available to verify the linearisation correction.

General

No. of parameters	2
Save changes.	With TDD1
Increment Trade Counter	yes

Parameter Details

Parameter	Description	Range	Default
1	Linearisation Point	1..5	1
2	Test Weight Value	0..999999	-

Query Details

Parameter	Description	Range
1	Percentage of Full Scale reading	-100..100
2	Correction (in weight units x10)	-100000 .. 100000

To clear one of the Linearisation points leave the test weight value off.

Example: Scale Build is max1 = 500.0 kg,   e1 = 0.1 kg

S01;		Select unit 1
LIC1;	0 *CRLF*	Clear Linearisation Point 1.
LIC?1;	0,0 *CRLF*	No correction for point 1
MSV?;	120.5 *CRLF*	
LIC1,1200;	0 *CRLF*	Set Linearisation Point 1 to correct for the current test weight of 1200 kg. *(Note that weight is sent without any decimal point. So 400.0 kg is sent as 4000 not 400.0)*
LIC?1;	24,-50 *CRLF*	Current linearisation is approx. -5.0 kg at 24% of fullscale reading.
TDD1;	0 *CRLF*	Save setting.

4.20 LIM   MATERIAL SETTINGS

This command gives access to information stored for each of the 20 materials.

General

No. of parameters	4
Save changes.	At input
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Material No.	1..20	1
2	Material Name (6 chars max)	"string"	-
3	Material Delay	0..200	10
4	Material Jog time	1..200	5

Material delay and jog settings are in tenths of a second (i.e. 20 = 2.0 seconds). A material delay of zero, forces the batching sequence to pause waiting for operator input.

Example:

S01;		Select unit 1
LIM?1;	"Mat 01",10,5*CRLF*	Current Material 1 settings.
LIM1,"Cement",1,6;	0*CRLF*	Material 1 label changed to "Cement", with a delay of 0.1 seconds and a jog time of 0.6 seconds

4.21 LIR RECIPE SETTINGS

Set recipe ID and numeric Tare value for a recipe.

General

No. of parameters	3
Save changes.	At input
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Recipe No.	1..99	1
2	Recipe ID (6 chars max)	"string"	-
3	Numeric Tare	0..Fullscale	0

Example:

S01;		Select unit 1
LIR?1;	1,"REC 01",0 *CRLF*	
LIR1,"20MPa";	0 *CRLF*	Set recipe ID to "20Mpa".

4.22 LIS   GENERAL SETPOINT SETTINGS

Set the general operation parameters for batching operation.

General

No. of parameters	12
Save changes.	With TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range		Default
1	Automatic Inflight Adjustment	0 .. 100%		0
2	Finish Pulse Time	1..200		10
3	No. Jogs per set	1..99		1
4	Jog Off time	1..200		10
5	Feeder Sequence control (one feeder at a time)	0 1	Off On	0
6	Show Batch Information At start.	0 1 2	None Batch No. Targets	1
7	Delay (1 second delay after Tare etc.)	0 1	Off On	1
8	Pause on Error	0 1	Off On	1
9	Automatic Start	0 1	Manual Automatic	0
10	Show Weight Remaining To target.	0 1	Normal Remaining	0
11	Tolerance Setting (Action when out of tolerance detected)	0 1 2	Ignore Beep Pause	0
12	Auto Clear (Clear operating parameters at the end of the batch)	0 1 2	None Proportion Recipe 1	0

Example:

S01;		Select unit 1
LIS?;	0,10,1,10,0,1,1, 1,0,0,0,0*CRLF*	Get Current Settings.
LIS50,5,4,5,0, 0,0,0,1,1,1,0;	0*CRLF*	Change settings to: 50% inflight adjustment 0.5 seconds of finish time 4 jogs per set with 0.5 seconds off time Multiple feeders active, Don't show batch number No fill start delays, No Error checking, Automatic restart, Show weight remaining to target, Beep when out of tolerance, No auto clear of parameters.
TDD1;	0 *CRLF*	save setting.

4.23 LIT   SET TARGET VALUE

Set Target value for a particular material in a particular recipe.

General

No. of parameters	3
Save changes.	At input
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Recipe No.	1..99	1
2	Material No.	1..20	1
3	Target Value	0..Fullscale	0

Target values do not include any decimal point. Eg. for 100.0kg use 1000 as a target value.

Example:

S01;		Select unit 1
LIT?2,1;	1000 *CRLF*	Target value for Recipe 2, material 1.
LIT2,1,1500;	0 *CRLF*	Set target value to 1500.

4.24 LIV   SETPOINT SETTINGS

Set the parameters for each of the 25 setpoints.

General

No. of parameters	9
Save changes.	With TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range		Default
1	setpoint number	1..25		1
2	Pre-flight Weight	0 .. 999999		0
3	Tolerance Weight	0 .. 999999		0
4	Type	0	None	0
		1	Active	
		2	Total	
		3	Dump	
		4	Finish	
		5	Fill	
		6	Tolerance	
		7	Run	
		8	Pause	
		9	Wait	
		10	Error	
		11	Motion	
		12	Zero	
		13	Material 1	
		..		
		32	Material 20	

Parameter	Description	Range		Default
5	Data source	1 2 3 4	Gross Net Prelim Reading	1
6	Switching direction	1 2	Over Under	1
7	Correction	0 1 2	None Auto Jog Auto Inflight	0
8	Logic	1 2	Active High Active Low	1
9	Alarm	0 1 2 3	Off Single Dual Continuous	0

Example:

S01;		Select unit 1
LIV?1;	1,0,0,0,1,1,0,1,0 *CRLF*	Query setpoint 1 parameters
LIV1,100,10,1 3,2,1,1,1,0;	0 *CRLF*	Change to: Preflight = 100 hysteresis = 10 Material 1,Net weight Over direction switching, Auto Jog, Active high logic, alarm off,
TDD1;	0 *CRLF*	Save setting.

4.25 LOG? RECIPE & MATERIAL LOGS

Queries the recipe and material usage logs via remote access. Logs can also be read and/or cleared via this command.

General

No. of parameters	2
Save changes.	-
Increment Trade Counter	-

Query Details

Parameter	Description	Range		Default
p1	LOG type	0	Material Usage	0
		1	Recipe Log	
p2	Material or	1..20	Material Number	1
	Recipe Number	1..99	Recipe Number	

LOG?0,n : Material Usage Log for Material n

Parameter	Description
r1	Number of Items
r2	Total Material Weight

LOG?1,n : Recipe Log

Parameter	Description
r1	Number of Batches
r2	Total Material Batched
r3	Total Batching Time in 10ths of seconds (100 = 10 seconds)
r4	Total Absolute Batching Error Weight

Example:

Command	Reply	Result
LOG0,5?;	12,15674 *CRLF*	The stats for material 5 are 12 batches with a total weight used of 15674 kg.
LOG?1,10;	7,11923,1567,15 *CRLF*	Recipe 10 statistics are: 7 batches with a total weight of 11923kg. Time taken is 156.7 seconds and the absolute batching error was 15 kg.

4.26 LWT   CALIBRATE SPAN

It is possible to calibrate the span either with test weights on the scale base or the calculated mV/V span signal may be entered directly.

General

No. of parameters	0 (1 if using direct mV/V calibration)
Save changes.	With TDD1
Increment Trade Counter	Yes

a) Calibration with Weight

The calibration process takes some time to complete. As a result it is necessary to monitor the calibration process to determine when it is finished. To do this, issue a LWT? Query. Following is a list of the possible calibration status responses.

Calibration Status

Status Value	Description
0	Calibration finished successfully
1	Calibration in process (Busy)
103	Error Span too Low (< 0.1mV/V), Calibration aborted.
104	Error Span too high (> 3.0 mV/V), Calibration aborted.
105	No Zero calibration

Example:

S01;		Select unit 1
LWT;	0 *CRLF*	Start span calibration.
LWT?;	1 *CRLF*	Query status of the span calibration process
LWT?;	1 *CRLF*	still busy
LWT?;	0 *CRLF*	Span calibration finished
TDD1;	0 *CRLF*	Save setting.

b) Direct mV/V calibration

When using direct mV/V calibration (weighing mode 4) the mV/V span signal level is entered directly.

Parameter Details

Parameter	Description	Range	Default
1	Span signal in mV/V. 20000 = 2.0 mV/V	0..30000	20000

Example:

S01;		Select unit 1
LWT15000;	0 *CRLF*	Set span to 1.5 mV/V.
LWT?;	15000*CRLF*	Span is 1.5000 mV/V
TDD1;	0 *CRLF*	save setting.

4.27 MSV? QUERY MEASURED WEIGHT VALUE

Query weight readings.

General

No. of parameters	2
Save changes.	-
Increment Trade Counter	-

Parameter Details

Parameter	Description	Range		Default
1	Type of reading	1 2 3 4 5 6 7	Displayed weight Gross weight Net weight No. of items Total Weight No. Pieces Peak weight	1
2	Number of consecutive readings	0..60000 (0 means continuous output)		1

Example:

S01;		Select unit 1
COF3;	0 *CRLF*	set output format 3
MSV?;	00200.0 *CRLF*	Query displayed weight
MSV?2;	00400.0 *CRLF*	Query gross weight
MSV?2,4;	00400.0 *CRLF* 00400.1 *CRLF* 00400.2 *CRLF* 00400.3 *CRLF* *CRLF*	Query the next 4 consecutive gross weight readings.
MSV?,0	00400.0 *CRLF* 00400.1 *CRLF* 00400.2 *CRLF*	Enable continuous output
STP;		Stop continuous output

Note that the *CRLF* is sent after each reading for the ASCII formats but not for the binary formats. With the binary formats a single *CRLF* is sent at the end of the response regardless of the number of readings requested.
To stop continuous output send a STP; command. During continuous output the 5100 will not respond to other commands.
The format of data returned from the MSV? command is controlled by the COF setting. See the COF command for details on the available formats.

4.28 MTD   MOTION SETTINGS

Alter the Motion Option settings.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	Yes

Parameter Details

Parameter	Description	Range		Default
1	Motion Setting	0	OFF	1
		1	0.5d in 1 sec	
		2	1.0d in 1 sec	
		3	2.0d in 1 sec	
		4	5.0d in 1 sec	
		5	0.5d in 0.5 sec	
		6	1.0d in 0.5 sec	
		7	2.0d in 0.5 sec	
		8	5.0d in 0.5 sec	
		9	0.5d in 0.2 sec	
		10	1.0d in 0.2 sec	
		11	2.0d in 0.2 sec	
		12	5.0d in 0.2 sec	

Example:

S01;		Select unit 1
MTD?;	1 *CRLF*	Current Motion detection is 0.5 divisions in 1 second.
MTD2;	0 *CRLF*	Set Motion detection to 1.0 divisions in 1 second.
TDD1;	0 *CRLF*	Save setting.

4.29 PCD   ENTER PASSCODE

Enter the Full passcode to unlock access to trade specific settings.

General

No. of parameters	1
Save changes.	-
Increment Trade Counter	No

The FULL passcode is used to control access to trade sensitive parameters. If this passcode is used it also blocks communications access to these same parameters. Settings may be read but not written to without first entering the correct passcode via the PCD command.   PCD? Is used to query whether access is currently blocked.   To lock unit again issue PCD without the passcode.

Parameter Details

Parameter	Description	Range	Default
1	Passcode	1..999999	-

Example:

S01;		Select unit 1
PCD?;	1 *CRLF*	Unit is locked
PCD,1234;	0 *CRLF*	Passcode 1234 has been accepted.
IAD,,,,1;	0 *CRLF*	Put unit in x10 mode.
PCD;	0 *CRLF*	Lock unit again.

4.30 PCE   SET COUNTING SAMPLE

Set the sample size and weight for a particular recipe.

General

No. of parameters	3
Save changes.	At Input
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Recipe No.	1..99	1
2	Sample Quantity	1..20000	-
3	Sample Weight	0..fullscale	-

Example:

S01;		Select unit 1
PCE?1;	100,1000 *CRLF*	Current sample is 1000 for 100 pieces.
PCE1,50,1256;	0 *CRLF*	Recipe 1 sample set to 1256 for 50 pieces

4.31 PFT   Printed Ticket Output Format

Alter the format string for the printed ticket output. This is the output format used when ticket printing is selected via the PRS command.

General

No. of parameters	1
Save changes.	With TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Format String (up to 50 chars)	"String"	""

Example:

S01;		Select unit 1
PFT?;	""*CRLF*	Default format active.
PFT" Weight = \W \E";	0 *CRLF*	New printed ticket would look like: Weight = 127.8 kg G *CRLF*
TDD1;	0 *CRLF*	save setting.

See Reference Manual for a full list of escape sequences for the format string.

4.32 PRS PRINTER\SERIAL 2 SETTINGS

General

No. of parameters	7
Save changes.	With TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range		Default
1	Mode of Operation	0	OFF	0
		1	AUTO LOW	
		2	PRINT	
		3	SINGLE	
		4	PLCA	
		5	PLCB	
2	Printing Function	0	None	1
		1	Single	
		2	Double	
		3	Ticket	
		4	Custom	
3	Printing Mode	1	Manual	1
		2	Auto	
		3	Total	
		4	Auto Total	

Parameter	Description	Range		Default
4	Columns of Space	0..20		0
5	Rows of Space	0..10		0
6	Auto Transmit Format	1	Auto A	1
		2	Auto B	
		3	Auto C	
		4	Auto D	
		5	Auto E	
		6	Custom	
7	Auto Transmit Source	1	Displayed Reading	1
		2	Gross Weight	
		3	Net Weight	
		4	Total Weight	
		5	Full	

Example:

S01;		Select unit 1
PRS?;	0,1,1,0,0,1,1 *CRLF*	Currently Serial 2 is OFF.
PRS2,4,1,5,2,1,1;	0 *CRLF*	Set for manual custom ticket printing with 5 columns of space to the left of the ticket and 2 rows of space after.
TDD1;	0 *CRLF*	save setting.

4.33 PRT PRINT

Force the instrument to print using serial 2.   The printed output data is buffered (up to 1024 characters) and is made available via the PRS?1 query. This makes it possible to recover all printed data from a network of 5100 instruments even if there are no printers actually installed.

General

No. of parameters	2
Save changes.	-
Increment Trade Counter	-

Parameter Details

Parameter	Description	Range		Default
1	Reply type	0	Normal reply	0
		1	Reply with details of printout	
2	Format String (up to 250 chars)	"String"		-

Query Details

Parameter	Description	Range
1	Last Printed ID number Or " contents of serial 2 transmission"	0..999999 " text "

Example:

Command	Reply	Serial 2 Output	
S01;			Select unit 1
PRS2,1,,0,0;	0 *CRLF*		Select Single Line printout with no space
PRT;	0 *CRLF*	000127 10/02/2000 10:30:05 124.6 kg G	Force unit to print using the printer port exactly the same as pressing the print key.
PRT?;	127 *CRLF*		Return Print ID number = 127
PRT?1;	"00127 10/02/2000 10:30:05 124.6 kg G\013\010"		The exact contents of the serial 2 transmission. Control characters are send as \xxx representing the ASCII code of the character. A maximum of 100 characters is returned with each query.
PRT?1;	""		No more data available
PRT1;	128,10,31,15, 10,02,1999,1 50.7 *CRLF*	000128 10/02/1999 10:31:15 150.7 kg G	Same as PRT; but the ID, date, time and weight are returned as part of the reply.
PRT,"Weight is \G\E";	0 *CRLF*	Weight is 175.7 kg G	Formatted weight printout defined by the format string.

4.34 PST   SET PRINTER HEADERS

Set the 2 line header for printed tickets.

General

No. of parameters	2
Save changes.	With TDD1
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Line number	1..2	1
2	Line contents	" string up to 20 chars "	" "

PST Example:

S01;		Select unit 1
PST?1;	" Weight " *CRLF*	Query line 1 data
PST?2;	" Ticket " *CRLF*	Query line 2 data
PST1,"Joe Bloggs Pty Ltd";	0 *CRLF*	Change line 1
PST2,"ph 3312 1234";	0 *CRLF*	Change line 2
TDD1;	0 *CRLF*	save setting.

4.35 RBT   Remote Button Settings

Setup the function of each of the 4 remote inputs or artificially force the execution of the function.

General

No. of parameters	3
Save changes.	With TDD1
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	Input number	1..4	1

2	Operation*	0	None	0
		1	Zero	
		2	Tare	
		3	Gross/Net	
		4	Print	
		5	Blank	
		6	Lock	
		7	Show Total	
		8	Clear Total	
		9	Undo M+	
		10	Start	
		11	Pause/Abort	
		12	Batch function	
		13	Interlock	
		14	Dump Enable	
		15	Auto/Manual	
		16	Jog	
		17	Single Tx Serial 1	
		18	Single Tx Serial 2	
		19	Manual Hold	
		20	Peak Hold	
		21	Livestock Hold	
		22	Counting	
		23..26	Recipe Select 1 to 4	
		27	Manual Dump	
3	Duration of key press	0	Short Press	0
		1	Long Press	

* if parameter 2 is omitted the function of the remote button is executed as if the remote input itself was exercised. This may be used to implement the extended features available with external keys without the need to actually install the accessory card and physical buttons. Parameter 3 allows both long and short key presses to be simulated.

Example:

S01;		Select unit 1
RBT?1;	0*CRLF*	Get current operation of input 1
RBT1,12;	0*CRLF*	Change input 1 to "Batch Start" function
TDD1;	0 *CRLF*	save setting.
RBT1;	0 *CRLF*	Simulate "Batch" key press
RBT1,1;	0 *CRLF*	Simulate long press of "Batch" key which aborts the current batch.

4.36 REC   SET CURRENT RECIPE

Set the current recipe number and proportion.

General

No. of parameters	2
Save changes.	At Input
Increment Trade Counter	No

Parameter Details

Parameter	Description	Range	Default
1	Recipe No.	1..99	1

2	Recipe Proportion (0.1 to 1000.0%)	1..10000	1000

Example:

S01;		Select unit 1
REC?;	1,1000 *CRLF*	Current settings are Recipe 1 at 100.0 %.
REC2;	0 *CRLF*	Set Recipe 2 (changing recipe clears proportion to 100.0% by default)
REC1,500;	0 *CRLF*	Set Recipe 1 at 50.0%

4.37 RES   RESET

Use this command to simulate a power-on reset.

General

No. of parameters	0
Save changes.	-
Increment Trade Counter	-

Example:

S01;		Select unit 1
RES		Reset unit.

4.38 STP   STOP CONTINUOUS TRANSFER

Stop continuous weight transmission started by MSV?,0; command.

General

No. of parameters	0
Save changes.	-
Increment Trade Counter	-

Example:

S01;		Select unit 1
MSV?,0;	00400.0 *CRLF* 00400.1 *CRLF* 00400.2 *CRLF* ...	Start continuous data transmission.
STP		Stop continuous data transmission.

4.39 Sxx   SELECT UNIT

The Sxx command is used to select one or more units with which to communicate.

S00 to S31 selects a single unit with the matching address 00 to 31.

S96 to S99 have special functions:

S96: de-select all units.

S97 & S98: All units are selected but none reply to commands. This mode is very useful for blanket commands for an entire network of units.

S99 selects all units and all respond. S99 is useful when a single unit is connected to the network as it is possible to select this unit regardless of its address setting.

Example:

S01;		Select unit 1
MSV?;	00400.0 *CRLF*	Query current weight
S02;		Select unit 2
MSV?	00623.5 *CRLF*	Query current weight.
S96;		De-select all units

4.40 TAR   TARE

Force a TARE operation.

General

No. of parameters	0
Save changes.	At input
Increment Trade Counter	no

This command is exactly the same as pressing the TARE key on the front of the instrument except that the 5100 does not wait for no motion. If the current weight reading is not stable the 5100 will return '?' and ignore the TAR command.

Example:

S01;		Select unit 1
MSV?;	00400.0 *CRLF*	Query current weight
TAR;	0 *CRLF*	TARE
MSV?;	00000.0 *CRLF*	Query current weight reading.
MSV?1	00400.0 *CRLF*	Query gross weight

4.41 TAS   GROSS / NET

Select Gross or Net weight display.

General

No. of parameters	1
Save changes.	At input
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range		Default
1	Gross or Net	0	net	-
		1	gross	

Example:

S01;		Select unit 1
MSV?;	00200.0 *CRLF*	Query current weight
TAS?;	0 *CRLF*	unit is in net mode
TAS1;	0 *CRLF*	Switch to Gross weight
MSV?;	00400.0 *CRLF*	Query current weight
TAS?;	1 *CRLF*	unit is in gross mode

4.42 TAV   SET TARE VALUE

Set a numeric tare value directly.

General

No. of parameters	1
Save changes.	At input
Increment Trade Counter	no

Parameter Details

Parameter	Description	Range	Default
1	TARE value	0 .. full scale	-

Example:

S01;		Select unit 1
MSV?2;	00300.0 *CRLF*	Query net weight
TAV?;	1000 *CRLF*	Tare value is 100.0
TAV2000;	0 *CRLF*	Set Tare value to 200.0
MSV?2;	00200.0 *CRLF*	Query net weight
TAV?;	2000 *CRLF*	Tare value is 200.0

4.43 TDD   LOAD/SAVE SETUP

Save or restore instrument settings.

General

No. of parameters	1
Increment Trade Counter	yes (TDD0 only)

Parameter Details

Parameter	Description	Range	
1	Command	0	Load ROM default values
		1	Save current settings
		2	Reload previous settings

Example:

S01;		Select unit 1
IDN"Site A"	0 *CRLF*	Set ID string
TDD1;	0 *CRLF*	Save settings

4.44 VAL? mV/V value query

If the instrument is operating in direct mV/V mode (see WMD command) this query returns the current mV/V signal strength.   The returned value is such that 20000 = 2.0 mV/V.

General

No. of parameters	0
Save changes.	-
Increment Trade Counter	-

Example:

S01;		Select unit 1
VAL?;	5097*CRLF*	Current mV/V signal strength is 0.5097 mV/V.

4.45 WMD SET WEIGHING MODE

Set the weighting mode of the instrument. This selects between single range, dual range and dual interval weighing modes.

General

No. of parameters	2
Save changes.	With TDD1
Increment Trade Counter	yes

Parameter Details

Parameter	Description	Range		Default
1	Weighing mode	1 2 3 4	single range dual range dual interval direct mV/V	1
2	Trade mode	0 1	Trade Industrial	0

Use the WMD command to setup the weighing mode of the instrument. This setting is a fundamental scale build parameter and should be used along with the IAD and ICR commands before the unit is calibrated.

Example:

S01;		Select unit 1
WMD?;	1,0 *CRLF*	Query current weighing mode
WMD2,1;	0 *CRLF*	change to dual range, industrial mode
WMD?;	2,1 *CRLF*	weighing mode is dual range, industrial
TDD1;	0 *CRLF*	save settings

4.46 ZST   ZERO SETTINGS

Set the various options associated with zero balance.

General

No. of parameters	4
Save changes.	With TDD1
Increment Trade Counter	depends on parameter

Parameter Details

Parameter	Description	Range		Default	Trade Counter
1	Zero on Startup	0 1	OFF ON	0	No
2	Zero Tracking	0 1 2 .. 12	OFF 0.5d in 1sec 1.0d in 1 sec .. 5.0d in 0.2 sec	0	Yes
3	Zero Range	1 2 3 4	-20% .. 20% -100% .. 100% -2% .. 2% -1% .. 3%	3	Yes
4	Zero Dead Band	0..100000		0	Yes

Example:

S01;		Select unit 1
ZST?;	0,0,3,0 *CRLF*	Query current zero settings
ZST1;	0 *CRLF*	Change to zero on startup
ZST,,,10;	0 *CRLF*	Change Zero Dead Band to 10
ZST?;	1,0,3,10 *CRLF*	Query new settings
TDD1;	0 *CRLF*	save settings

5. COMMAND SUMMARY

5.1 Set Communication Parameters

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IDN	Set unit identification	17
Sxx	Select unit for communication	33

5.2 Set Scale Build

Command	Description	Page
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WMD	Select weighing mode	36
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ICR	Set measurement frequency.	17
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5.3 Calibration

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CWT	Set calibration weight	13
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VAL?	MV/V signal strength query	35

5.4 Set Scale Options

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5.5 Batching Settings

Command	Description	Page
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LOG?	Query Recipe & Material Usage Logs	24
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5.6 General Commands

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PRT	Force print from serial 2	30
TAR	Tare unit	34
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5.7 Queries

Command	Description	Page
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5.8 Test Commands

Command	Description	Page
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5.9 Common Commands

Command	Description	Page
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COF	Set MSV Output Format	11
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