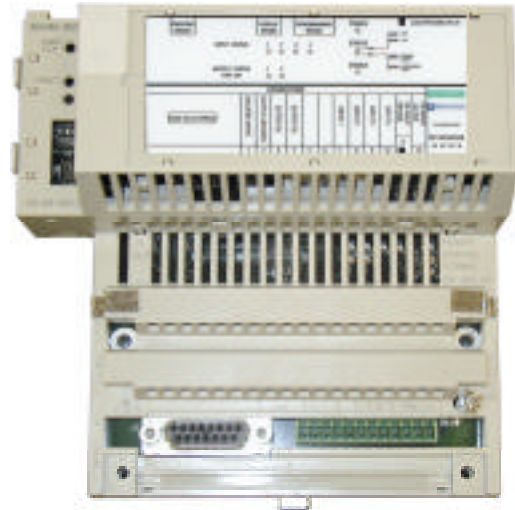


ISP Momentum Weighing Module Programming Guide



Version 2.1, September 2001



1. Module Configuration

The 170-ISP-001-0x, ISP Weighing base supports 32 words of input data and 32 words of output data. It should be mapped as 32 contiguous input words and 32 contiguous output words. The input words are used to report the real time status of the module and for the response to commands issued to the module. The output words are used to issue commands to the module, and to make parametric changes.

The following tables describe the input and output word usage. These tables show the typical mapping for an Momentum M1 PLC attached to the module. In this case, all input words are “Traffic Copped” to a bank of contiguous 3x input registers in the PLC, and output words are “Traffic Copped” to a contiguous bank of 4x holding registers. It is also possible to use Modbus Plus to “Peer Cop” the module. In this case, the input registers are typically “Peer Copped” to a bank of 4x holding registers, rather than 3x input registers.

1.1 Input Words

Input Word	PLC Register	Description
Input Word 1	(Register 3x)	Error/Status
Input Word 2	(Register 3x+1)	Data on measured value
Input Word 3	(Register 3x+2)	Gross Weight – Low Word*
Input Word 4	(Register 3x+3)	Gross Weight – High Word*
Input Word 5	(Register 3x+4)	Net Weight - Low Word*
Input Word 6	(Register 3x+5)	Net Weight – High Word*
Input Word 7	(Register 3x+6)	Tare Value - Low Word*
Input Word 8	(Register 3x+7)	Tare Value - High Word*
Input Word 9	(Register 3x+8)	Flow Rate – Low Word*
Input Word 10	(Register 3x+9)	Flow Rate – High Word*
Input Word 11	(Register 3x+10)	Zero Offset - Low Word*
Input Word 12	(Register 3x+11)	Zero Offset - High Word*
Input Word 13	(Register 3x+12)	Reserved
Input Word 14	(Register 3x+13)	Reserved
Input Word 15	(Register 3x+14)	Language/Units
Input Word 16	(Register 3x+15)	Values Checksum (of Words 1-16)
Input Word 17	(Register 3x+16)	Command Checksum (of Words 17-32)
Input Word 18	(Register 3x+17)	Status
Input Word 19	(Register 3x+18)	Data 0 In
Input Word 20	(Register 3x+19)	Data 1 In
Input Word 21	(Register 3x+20)	Data 2 In
Input Word 22	(Register 3x+21)	Data 3 In
Input Word 23	(Register 3x+22)	Data 4 In
Input Word 24	(Register 3x+23)	Data 5 In
Input Word 25	(Register 3x+24)	Data 6 In
Input Word 26	(Register 3x+25)	Data 7 In
Input Word 27	(Register 3x+26)	Data 8 In
Input Word 28	(Register 3x+27)	Data 9 In
Input Word 29	(Register 3x+28)	Data 10 In
Input Word 30	(Register 3x+29)	Data 11 In
Input Word 31	(Register 3x+30)	Data 12 In
Input Word 32	(Register 3x+31)	Data 13 In

2. Values are in REAL (32-bit floating point) format

1.1 Output Words

Input Word	PLC Register	Description
Output Word 1–16	(Register 4x to 4x+15)	Reserved
Output Word 17	(Register 4x+16)	Token
Output Word 18	(Register 4x+17)	Command
Output Word 19	(Register 4x+18)	Data 0 Out
Output Word 20	(Register 4x+19)	Data 1 Out
Output Word 21	(Register 4x+20)	Data 2 Out
Output Word 22	(Register 4x+21)	Data 3 Out
Output Word 23	(Register 4x+22)	Data 4 Out
Output Word 24	(Register 4x+23)	Data 5 Out
Output Word 25	(Register 4x+24)	Data 6 Out
Output Word 26	(Register 4x+25)	Data 7 Out
Output Word 27	(Register 4x+26)	Data 8 Out
Output Word 28	(Register 4x+27)	Data 9 Out
Output Word 29	(Register 4x+28)	Data 10 Out
Output Word 30	(Register 4x+29)	Data 11 Out
Output Word 31	(Register 4x+30)	Data 12 Out
Output Word 32	(Register 4x+31)	Data 13 Out

1.2 Input Word Details:

For all words Bit 15 is defined as the MSB and bit 0 is the LSB.

Input Word 1 Error/Status:

Bit	Name	Description
0	Run	Active high = run mode
1	System Error	Active high = system error
2	Predefined Tare	Active high = Predefined Tare in use
3	Zero Tracking	Active high = Zero Tracking is active
4	Calibrated	Active high = Module is calibrated
5	High Res	Active high = Module display is high resolution mode
6	Over Threshold	Active high = Weight measurement exceeds overload threshold
7	Under Threshold	Active high = Weight measurement below underload threshold
8	Forced Calibration	ActiveHigh = Calibration was forced
9.. 13	Rev Bits 0..4	This group of bits provides change notification to all connected clients (PLC, ISPMom S/W, HMI, etc.). Bits 9..13 form a 5 bit counter with the MSB in Bit 13 and the LSB in Bit 9. Whenever the unlocked or locked configuration data is changed (e.g. changing units, calibration, etc.) the counter is incremented.
14	Calibrating	Active High = Module is in Calibration mode
15	Locked	Active High = Module is in locked mode

Input Word 2 Data on measured value:

Bit	Name	Description
0	Q1 Active	Active high = Discrete output Q1 active
1	Q2 Active	Active high = Discrete output Q2 active
2	Reserved	
3	Reserved	
4	X1	Active high = Discrete input 1 active
5	X2	Active high = Discrete input 2 active
6	X3	Active high = Discrete input 3 active
7	X4	Active high = Discrete input 4 active
8	Reserved	
9	Reserved	
10	Printer Offline	Active High = Printer Offline or not present
11	Printer Busy	Active High = Printer Busy
12	Reserved	
13	Reserved	
14	Zero	Active high = Weight measurement is within _ scale division of zero
15	Stable	Active high = Weight measurement is stable

Input Words 3-4 Gross Weight:

Input Words 3 and 4 contain the gross weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format, with the low order word first.

Input Words 5-6 Net Weight:

Input Words 5 and 6 contain the net weight measurement. The net weight is equal to the gross weight minus the tare weight. The format of the weight measurement data is 32-bit floating point IEEE format, with the low order word first.

Input Words 7-8 Tare Value:

Input Words 7 and 8 contain the tare weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format, with the low order word first.

Input Words 9-10 Flow Rate:

Input Words 9 and 10 contain the flow rate measurement. The format of the weight measurement data is 32-bit floating point IEEE format, with the low order word first.

Input Words 11-12 Zero Offset:

Input Words 11 and 12 contain the zero offset value. The zero offset is the present cumulative offset from the original calibrated zero balance condition. This value is updated automatically if zero tracking is enabled, and is updated manually with the Reset Zero command (command #15). The zero offset is cleared (reset to zero) whenever the calibration procedure is implemented. . The format of the zero offset value data is 32-bit floating point IEEE format, with the low order word first.

Input Word 13 Reserved

Input Word 14 Reserved

Input Word 15 Language/Units:

Input Word 15 contains language and weight measurement unit information.

The low byte indicates the units of weight measurement as follows:

Units (Low Byte)

Value	Selection
0	kg
1	g
2	t (metric ton)
3	lb
4	oz
5	TN
06 – FF	Invalid data

The high byte indicates the language selected.

Language (High Byte - for display and ISPMom s/w)

Value	Selection
0	Reserved
1	English
2	French
3	German

Input Word 16 Checksum:

Input Word 16 is the checksum for the Words 1 - 15. It is the 2's compliment of the signed sum (modulo 65536) of words 1 through 15. The contents of this register may be used to verify that a valid data set has been sent from the Weighing Module. When the checksum is added to the sum (modulo 65536) of words 1 through 15 the result should be zero (modulo 65536).

Input Word 17 Checksum of Words 18-32:

Input Word 17 is a checksum for Input Words 18 - 32 (Command Response Registers). The checksum is the signed sum (modulo 65535) of registers 18 through 32 minus the token of the active command. Thus the checksum may be used to verify both the integrity of the data transfer as well as to verify that the message corresponds to the correct token (and therefore the correct command). When the checksum is added to the active token value (modulo 65536) the result should be zero (modulo 65536).

Input Word 18 Status:

Input Word 18 is the status of the last command issued to the weighing module. The data it contains is the error status bit information.

Bit

0	Reserved	
1	Error	Active high = Error processing command (see error codes)
2..15	Reserved	

NOTE: If the error bit of input word 18 is set, then the specific error code is found in word 19. Refer to section 1.4.2 of this document for error code descriptions.

Input Words 19 – 32 Data Words 0 – 13

Input Words 19-32 are used to return data for commands issued to the Weighing module. See Command Descriptions in section 1.4.1 below.

NOTE: If the error bit of input word 18 is set, then the specific error code is found in word 19. Refer to section 1.4.2 of this document for error code descriptions.

1.3 Output Word Details:

For all words Bit 15 is defined as the MSB and bit 0 is the LSB.

Output Words 1 – 16 Reserved: (Values will be ignored by module.)

Output Word 17 Token:

Output Word 17 is a 16-bit token. The Weighing Module scans this token in order to determine if a new command is ready from the PLC. The weighing Module will process the next 15 Output Words whenever the token changes. A token value of 0 is a non-valid token.

Output Word 18 Command:

Output Word 18 is the command to the Weighing module. It is presented as a 16-bit command number. The possible command values are enumerated in the following section.

Output Words 19 - 32 Data Words 0 - 13:

Output Words 19 – 32 are used as data words for the command issued to the Weighing module. The value of these words is dependent on the command being issued, as explained in the following section.

1.4 Commands:

Note: In order to write a command and its associated data to the weighing module, the token must also be changed and written. Typically, the token can be incremented between successive commands, with the exception of wrapping around to 0, which is a non-valid token. The command response is returned in Input Words 17 – 32. Input Word 17 contains a check sum of all returned words minus the token. Adding Input Words 17 – 32 with the token should yield a result of 0 (modulo 65536) once the command has been processed.

Summary of Commands

Decimal	Hex	Command Function
00	0000	No Command
01 – 02	0001 – 0002	Reserved
03	0003	Set Zero / Dead Weight
04	0004	Calibrate
05	0005	Reserved
06	0006	Set Machine Constants 1
07	0007	Get Machine Constants 1
08	0008	Set Machine Constants 2
09	0009	Get Machine Constants 2
10	000A	Set Locked Data
11	000B	Get Locked Data
12	000C	Set Non Locked Data
13	000D	Get Non Locked Data
14	000E	Reserved
15	000F	Reset Zero
16	0010	Reserved
17	0011	Read Serial Number
18	0012	Write Print Text
19	0013	Read Print Text
20 – 33	0014 – 0021	Reserved
34	0022	Print
35 - 36	0023 – 0024	Reserved
37	0025	Set Time Date
38	0026	Get Time Date
39	0027	Reserved
40	0028	Set Tare Weight
41	0029	Clear Tare Weight
42	002A	Get Firmware Revision
43	002B	Set Input Mapping
44	002C	Get Input Mapping

1.4.1 Command Descriptions:

Command #00 - No Command:

Command #01 - #02 - Reserved

Command #03 - Set Zero/Dead Weight:

The Set Zero command is used to calibrate the zero balance point for the weighing module. The Set Zero command initiates the calibration procedure. After writing the Set Zero command, the weight data is invalid until the calibration procedure is completed. Command 4, Set Calibrate, is required in order to complete calibration of the system, and must be performed following command 3. A minimum of 60 seconds must be allowed following the set zero command for the zero calibration to complete.

Data Word	Name	Data Type	Range
0	Always3	Word	3
1	Always100	Word	100
2 – 13	Word2 – Word13	Word	0

Command #04 - Set Calibrate:

The Set Calibrate command is used to calibrate the weighing module / load cell system at a known user specified weight. This command also sets the Maximum Range for the application, the units of weight measurement, stability parameters and scale division granularity. A minimum of 60 seconds must be allowed following the calibrate command for the calibration to complete. The Data Words are as follows:

Data Word	Name	Data Type	Range
0	Always3	Word	3
1	Always100	Word	100
2 - 3	Calibration Weight	Float (32-bit)	See Below
4 – 5	Max Range	Float (32-bit)	See Below
6	Units	Word (see table)	See Below
7	Stability Extent	Word (see table)	See Below
8	Stability Time	Word (see table)	See Below
9	Scale Division	Word (see table)	See Below
10 – 13	Word10 – Word 13	Word	0

Data word 0 must be 3.

Data word 1 must be 100.

Command Descriptions (continued)

Data words 2 and 3 set the calibration weight in 32-bit IEEE floating point format, low word high word respectively. The calibration weight limits are; 2% of max range <= calibration weight <= max range.

Data words 4 and 5 set the Maximum Range for the application, in 32-bit IEEE floating point format, low word high word respectively. Maximum range must be greater than 0.05.

Data Word 6 - Units

Value	Selection
0	kg
1	g
2	t (metric ton)
3	lb
4	oz
5	TN

Data Word 7 - Stability Extent

Value	Selection
0	2 * _ scale division
1	3 * _ scale division
2	4 * _ scale division
3	6 * _ scale division
4	8 * _ scale division

Data Word 8 - Stability Time

Value	Selection
0	0.4 second
1	0.5 second
2	0.7 second
3	1.0 second

Command Descriptions (continued)

Data Word 9 - Scale Division

Value	Scale Division
0	0.001
1	0.002
2	0.005
3	0.01
4	0.02
5	0.05
6	0.1
7	0.2
8	0.5
9	1
10	2
11	5
12	10
13	20
14	50
15	100
16	200
17	500
18	1000
19	2000
20	5000

Data words 10 through 13 are not used and must be set to zero.

- Command #05 - Reserved**
- Command #06 - Set Machine Constants #1:**
- Command #07 - Get Machine Constants #1:**
- Command #08 - Set Machine Constants #2:**
- Command #09 - Get Machine Constants #2:**

These commands are used to save and force the calibration information for the weighing module. The calibration data can be saved by executing commands 7 and 9 – Get Machine Constants #1/#2. A previously saved set of calibration data may be forced into a module by executing commands 6 and 8 – Set Machine Constants #1/#2. When saving or forcing calibration data, both areas (#1 and #2) should be saved or forced, and all data words must be used. This can be useful in situations where it appropriate to save the calibration data and force either a new module with the same calibration data or to restore the previous calibration. All data words must be used, and are as follows:

Data Word	Name	Data Type	Range
0 – 13	Word0 – Word13	Word	Same as set calibrate

Command Descriptions (continued)

Command #10 - Set Locked Data:
Command #11 - Get Locked Data:

Data Word	Name	Data Type	Range
0	Units	Word (see table)	0 – 5
1	Scale Division	Word (see table)	0 – 14
2	Overload Threshold	Word (see table)	0 – 2
3	Locked Word	Word (see table)	Bit Pattern
4	Filter Coefficient	Word (see table)	0 – 8
5	Stability Extent	Word (see table)	0 – 4
6	Stability Time	Word (see table)	0 – 3
7	Zero Extent of Maximum Range	Word (see table)	0 – 1
8	Sample Rate	Word (see table)	0 – 2
9 – 13	Word9 – Word 13	Word	0

Data Word 0 - Units

Value	Selection
0	kg
1	g
2	t (metric ton)
3	lb
4	oz
5	TN

Data Word 1 - Scale Division

Value	Scale Division
0	0.001
1	0.002
2	0.005
3	0.01
4	0.02
5	0.05
6	0.1
7	0.2
8	0.5
9	1
10	2
11	5
12	10
13	20
14	50
15	100
16	200
17	500
18	1000
19	2000
20	5000

Command Descriptions (continued)

Data Word 2 - Overload Threshold

Value	Overload Threshold
0	+ 9 divisions
1	+ 2% of maximum range
2	+ 5% of maximum range

Data Word 3 - Locked Word

Bit	Selection
0	Active High = High Resolution mode
1	Not used – Must be 0
2	Active High = Zero Tracking Enabled
3 - 15	Reserved

Data Word 4 - Filter Coefficient

Value	Filter Selection
0	No Filtering
1	FIR-1
2	FIR-2
3	FIR-3
4	FIR-4
5	FIR-5
6	FIR-6
7	FIR-7
8	FIR-8

Data Word 5 - Stability Extent

Value	Selection
0	2 * _ scale division
1	3 * _ scale division
2	4 * _ scale division
3	6 * _ scale division
4	8 * _ scale division

Data Word 6 - Stability Time

Value	Selection
0	0.4 second
1	0.5 second
2	0.7 second
3	1.0 second

Data Word 7- Zero Extent of Maximum Range

Value	Selection
0	± 2% of Maximum Range
1	± 5% of Maximum Range

Command Descriptions (continued)

Data Word 8 - Sample Rate

Value	Selection
0	5 ms
1	10 ms
2	20 ms

Command #12 - Set Non-Locked Data:

Command #13 - Get Non-Locked Data:

Data Word	Name	Data Type	Range
0 – 1	Low Flow Cut Off Threshold	Float (32-bit)	0 <= HFCOT <= maximum range
2 – 3	High Flow Cut Off Threshold	Float (32-bit)	0 <= HFCOT <= maximum range
4 – 5	Predefined Tare Value	Float (32-bit)	
6	Flow Calculation	Word (see table)	0 – 5
7	Flow Time	Word (see table)	0 – 7
8	LF Mask Time	Word (see table)	0 – 15
9	Non Locked Word	Word (see table)	Bit Pattern
10	Language	Word (see table)	0 – 2
11	Tare Units	Word (see table)	0 – 5
12 – 13	Auto Tare*	Float (32-bit)	

* Only returned with Command #13, Get Non-Locked Data

Data Word 6 - Flow Calculation

Value	Number of Samples for Calculation
0	2
1	4
2	8
3	16
4	32
5	64

Command Descriptions (continued)

Data Word 7 - Flow Time

Value	Selection
0	5 ms
1	10 ms
2	20 ms
3	50 ms
4	100 ms
5	200 ms
6	500 ms
7	1 s

Data Word 8 - Low Flow Mask Time

The Low Flow Mask Time is the delay before calculating flow. It may range from 0 (no delay) to 1.5 seconds. Data Word 8 represents the value in tenths of seconds (i.e. 15 = 1.5 s).

Value	Selection
0	0
1	0.1 s
...	...
15	1.5 s

Data Word 9 - Non-Locked Word

Bit	Selection																								
0	Active High = Thresholds Active																								
1	Active High = Decreasing Threshold																								
2	Active High = Use Predefined Tare																								
3	Q1 and Q2 Active (0 = Q1 active only)																								
4	Synchronize TOD w/ PC clock flag																								
5	Print in 24 hour mode																								
6 – 7	Reserved																								
8	Printer attached																								
9	Printer port uses 7 data bits (0 = 8 bits)																								
10	Printer port uses 2 stop bits (0 = 1 bit)																								
11 – 12	Printer port Parity Selection																								
	<table border="1"> <thead> <tr> <th>B12</th> <th>B11</th> <th>Parity</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>None</td> </tr> <tr> <td>0</td> <td>1</td> <td>Odd</td> </tr> <tr> <td>1</td> <td>0</td> <td>Even</td> </tr> <tr> <td>1</td> <td>1</td> <td>Mark</td> </tr> </tbody> </table>	B12	B11	Parity	0	0	None	0	1	Odd	1	0	Even	1	1	Mark									
B12	B11	Parity																							
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13 – 15	Printer port Baud Rate Selection																								
	<table border="1"> <thead> <tr> <th>B15</th> <th>B14</th> <th>B13</th> <th>Baud Rate</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>19,200</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>9,600</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>4,800</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>2,400</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1,200</td> </tr> </tbody> </table>	B15	B14	B13	Baud Rate	0	0	0	19,200	0	0	1	9,600	0	1	0	4,800	0	1	1	2,400	1	0	0	1,200
B15	B14	B13	Baud Rate																						
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0	0	1	9,600																						
0	1	0	4,800																						
0	1	1	2,400																						
1	0	0	1,200																						

Command Descriptions (continued)

Data Word 10 - Language (for display and ISPMom s/w)

Value	Selection
0	Reserved
1	English
2	French
3	German

Data Word 11 - Tare Units

Value	Selection
0	kg
1	g
2	t (metric ton)
3	lb
4	oz
5	TN

Command #14 - Reserved

Command #15 - Reset Zero:

The Reset Zero command is used to remove small offsets from the zero balance condition due to such things as drift over time and temperature, mechanical wear, deformation, stiction or residual mass at the load cell. The Reset Zero command will be executed only if the present weight measurement is stable, it is within the zero range as set by data word 7 of the Set Locked Data command (10), and there is no tare weight (the tare weight is zero). Data words 0 through 13 are not used and must be set to zero.

Command #16 - Reserved

Command #17 - Read Serial Number:

Command 17 is used to retrieve the serial number of the Weighing module. The serial number is returned as a packed ASCII string, with the first ASCII character in the low order byte of the first data word (Data Word 0). The string is terminated with a NULL character (value of 0).

Data Word	Name	Data Type	Range
0 – 13	Word0 – Word13	Word	Packed ASCII Values

Command #18 - Write Print Text:

Command Descriptions (continued)

Command #19 - Read Print Text:

Commands 18 and 19 are used to write and read the text formatting information. The total buffer length is 234 characters minus one character that must be a NULL terminator (value of 0). The buffer is accessed as 9 16-bit blocks, with each block being 13 words or 26 characters in length. The buffer is a packed ASCII string, with the first ASCII character in the low order byte of each data word. To access the entire buffer these commands must be executed multiple times with the appropriate block number in Data Word 0. The string is terminated with a NULL character (value of 0).

Data Word	Name	Data Type	Range
0	Block Number	Word	0 – 8
1 – 13	Word1 – Word13	Word	Packed ASCII Values

Command #20 - #33 - Reserved

Command #34 - Print:

Command 34 is used to initiate a print command on the Weighing module's attached ring adapter. The ring adapter must be present, and a printer must be attached to the printer port for this command to succeed. All data words are not used and should be set to zero.

Command #35 - #36 - Reserved

Command #37 - Set Time Date:

Command #38 - Get Time Date:

Commands 37 and 38 Set and Get the real time clock in the Weighing module's attached ring adapter card. The ring adapter must be present, and batteries must be installed if the data is to be retained after a loss of power. The time and date are settable and retrievable via these commands. Time is in 24 hour format and years are 4 digit (i.e. 2000 rather than 00). The data words are as follows:

Data Word	Name	Data Type	Range
0	Hours	Word	0 – 23
1	Minutes	Word	0 – 59
2	Seconds	Word	0 – 59
3	Months	Word	1 – 12
4	Days	Word	1 – 31
5	Years	Word	1999 – 9999
6 – 13	Word6 – Word13	Word	0

Command #39 - Reserved

Command #40 - Set Tare Weight:

Command 40 is used to set the tare weight. When this command is issued, the current weight measurement (whatever weight is presently on the scale) becomes the tare weight if the weight measurement is stable and within the limits $0 \leq \text{tare weight} < \text{maximum range}$. All data words are not used and must be set to zero.

Command Descriptions (continued)

Command #41 - Clear Tare Weight:

Command 41 is used to clear the tare weight. When command 41 is issued, the tare weight is reset to zero. All data words are not used and must be set to zero.

Command #42 - Get Firmware Revision:

Command 42 is used to retrieve the firmware revision of the Weighing module.

Data Word	Name	Data Type	Range
0	Product Code 0 = DSP; 1 = Ring	Word	0 – 1
1	Major Revision	Word	
2	Minor Revision	Word	
3	Year	Word	1 - 9999
4	Month	Word	1 – 12
5	Day	Word	1 – 31
6	Number of Subsystem Revisions	Word	
7 – 13	Word7 – Word13	Word	

Command #43 - Set Input Mapping:

Command #44 - Get Input Mapping:

Commands 43 and 44 are used to set and get the mapping for the discrete inputs. The data words are used as follows:

Data Word	Name	Data Type	Range
0	Input 1 Map	Word	0 – 4
1	Input 2 Map	Word	0 – 4
2	Input 3 Map	Word	0 – 4
3	Input 4 Map	Word	0 – 4
4 – 13	Word4 – Word 13	Word	0

Each discrete input can be mapped to one of the following functions by setting the appropriate Input Mapping parameter to the value shown in the following table:

Value	Function
0	Inactive
1	Set Tare
2	Clear Tare
3	Reset Zero
4	Print

1.4.2 Command Error Codes

Error Code	Description
0	No errors
1	Unexpected parameters
2 - 5	Not Used
6	EEPROM error
7	EEPROM checksum error
8	Reserved
9	Module is locked! Edit rejected
10 - 13	Not Used
14	Command executing
15	Undefined command
16	Not Used
17	Units range error
18	Stability Extent range error
19	Stability Time range error
20	Scale division range error
21	Filter range error
22	Zero Extent range error
23	Sample Rate range error
24	Flow Calculation range error
25	Flow Time range error
26	Mask Time range range
27	Language range error
28	Negative Tare not allowed
29	Auto Tare operation failed
30	Set Zero/dead weight operation failed
31	Calibration Failed
32	Not used
33	Reset Zero out of range
34	Tare value must be zero
35	Scale/weight not stable
36 - 42	Not used
43	Unable to resolve calibration
44	Input Mapping range error
45	Print Ticket Block range error
46	Time Date range error
47	Thresholds Active, Edit of Non-Locked Data rejected
48	Edit locked active error
49	Tare greater than maximum range
50	Not used
51	Predefined Tare not zero
52	Zero extent exceeds 2%
53	Cutoff High out of Range
54	Cutoff Low out of Range
55	Cutoff High exceeds Cutoff Low
56	Cutoff Low exceeds Cutoff High
57	Set Zero not Established
58	Overload Threshold out of Range

Command Error Codes (continued)

Error Code	Description
59	Calibration Weight Range Error
60	Calibration Maximum Range Range Error
61	Calibration Weight Exceeds Range Error
62	Calibration Units Range Error
63	Calibration Stability Extent Range Error
64	Calibration Stability Time Range Error
65	Calibration Scale Divisions Range Error
66	Machine1 Maximum Range Range Error
67	Machine1 Weight Range Error
68	Machine1 Weight Exceeds Range Error
69	Machine2 Maximum Range Range Error
70	Machine2 Slope not Positive
71	Machine2 Weight Range Error
72	Machine2 Weight Exceeds Range Error

1.4.2.1 Unexpected parameters

This error indicates that the module has received unexpected parameters within the data words of a command. An example of this could be a non-zero value in a command register that is expected to be zero.

1.4.2.2 Reserved

1.4.2.3 Reserved

1.4.2.4 Not Used

1.4.2.5 Not Used

1.4.2.6 EEPROM error

This error indicates a hardware fault in the non-volatile EEPROM memory of the module.

1.4.2.7 EEPROM checksum error

This error indicates a hardware fault in the non-volatile EEPROM memory of the module.

1.4.2.8 Reserved

1.4.2.9 Module is locked - Edit rejected

This error occurs when a command is issued that attempts to modify the locked data or the machine constants of the module when the module is in the locked mode (i.e. input word #1 bit #15 is active).

Command Error Codes (continued)

1.4.2.10 Not Used

1.4.2.11 Not Used

1.4.2.12 Not Used

1.4.2.13 Not Used

1.4.2.14 Command executing

Command executing error occurs if a new command is issued to the module before the module has completed execution of the previous command.

1.4.2.15 Undefined command

Undefined command error occurs if the module receives a command number that it does not recognize as valid. (i.e. command # “-102”)

1.4.2.16 Not Used

1.4.2.17 Units range error

Units range error occurs if the value sent to the module in the data word containing the units definition is outside of the allowed range defined in the commands section of this document. For example, data word #0 of the Set locked data command is units. If the value of this word is outside of the allowed range (0 – 5), this error will occur.

1.4.2.18 Stability Extent range error

Stability extent range error occurs if the value sent to the module in the data word containing the stability extent definition is outside of the allowed range defined in the commands section of this document. For example, data word #5 of the Set locked data command is stability extent. If the value of this word is outside of the allowed range (0 – 4), this error will occur.

1.4.2.19 Stability Time range error

Stability time range error occurs if the value sent to the module in the data word containing the stability time definition is outside of the allowed range defined in the commands section of this document. For example, data word #6 of the Set locked data command is stability time. If the value of this word is outside of the allowed range (0 – 3), this error will occur.

1.4.2.20 Scale division range error

Scale divisions range error occurs if the value sent to the module in the data word containing the scale divisions definition is outside of the allowed range defined in the commands section of this document. For example, data word #1 of the Set locked data command is scale divisions. If the value of this word is outside of the allowed range (0 – 20), this error will occur.

Command Error Codes (continued)

1.4.2.21 Filter range error

Filter range error occurs if the value sent to the module in the data word containing the filter coefficient selection is outside of the allowed range defined in the commands section of this document. For example, data word #4 of the set locked data command is filter coefficient selection. If the value of this word is outside of the allowed range (0 – 8), this error will occur.

1.4.2.22 Zero Extent range error

Zero extent range error occurs if the value sent to the module in the data word containing the zero extent definition is outside of the allowed range defined in the commands section of this document. For example, data word #7 of the Set locked data command is zero extent. If the value of this word is outside of the allowed range (0 – 1), this error will occur.

1.4.2.23 Sample Rate range error

Sample rate range error occurs if the value sent to the module in the data word containing the sample rate selection is outside of the allowed range defined in the commands section of this document. For example, data word #8 of the set locked data command is filter coefficient selection. If the value of this word is outside of the allowed range (0 – 2), this error will occur.

1.4.2.24 Flow Calculation range error

Flow calculation range error occurs if the value sent to the module in the data word containing the flow calculation selection is outside of the allowed range defined in the commands section of this document. For example, data word #6 of the set non-locked data command is flow calculation selection. If the value of this word is outside of the allowed range (0 – 5), this error will occur.

1.4.2.25 Flow Time range error

Flow time range error occurs if the value sent to the module in the data word containing the flow time definition is outside of the allowed range defined in the commands section of this document. For example, data word #7 of the set non-locked data command is flow time selection. If the value of this word is outside of the allowed range (0 – 7), this error will occur.

1.4.2.26 Mask Time range error

Mask time range error occurs if the value sent to the module in the data word containing the LF mask time definition is outside of the allowed range defined in the commands section of this document. For example, data word #8 of the set non-locked data command is LF mask time selection. If the value of this word is outside of the allowed range (0 – 15), this error will occur.

1.4.2.27 Language range error

Language range error occurs if the value sent to the module in the data word containing the language definition is outside of the allowed range defined in the commands section of this document. For example, data word #10 of the set non-locked data command is language selection. If the value of this word is outside of the allowed range (1 – 3), this error will occur.

1.4.2.28 Negative Tare not allowed

This error occurs if an attempt is made to take a negative gross weight as the tare. This applies both for automatic push-button tare and predefined tare. The limits for tare weight are $0 \leq \text{tare} < \text{maximum range}$.

Command Error Codes (continued)

1.4.2.29 Auto Tare operation failed

This error occurs if the command to take the tare weight is not accepted by the module. The most likely cause for this is that the weight is not stable. In order for the tare command to be successful, the weight must be stable, and $0 \leq \text{tare} < \text{maximum range}$.

1.4.2.30 Set Zero/Dead Weight operation failed

This error occurs if the set zero/dead weight command is not executed successfully by the module. The most likely cause for this is that the weight is not stable. In order for the set zero command to be successful, the weight must be stable. NOTE: Set zero may take up to one minute to successfully execute.

1.4.2.31 Calibration Failed

This error occurs if the calibration command is not executed successfully by the module. The most likely cause for this is that the weight is not stable. In order for the calibrate command to be successful, the weight must be stable. NOTE: Calibrate may take up to one minute to successfully execute.

1.4.2.32 Not Used

1.4.2.33 Reset Zero out of range

This error occurs if the reset zero command (command #15) is attempted when the gross weight is outside the zero range as set by data word 7 of the Set Locked Data command (10). For example, if zero extent of range is set to 2%, and maximum range is 100kg, then an attempt to reset a gross weight of 5kg would generate this error.

1.4.2.34 Tare value must be zero

This error occurs if the reset zero command (command #15) is attempted when there is a non-zero tare weight in the system. The reset zero command is accepted only for gross weight.

1.4.2.35 Scale/weight not stable

This error occurs if the reset zero command is not executed successfully by the module due to an unstable weight. In order for the reset zero command to be successful, the weight must be stable.

1.4.2.36 Not Used

1.4.2.37 Not Used

1.4.2.38 Not Used

1.4.2.39 Not Used

1.4.2.40 Not Used

1.4.2.41 Not Used

1.4.2.42 Not Used

Command Error Codes (continued)

1.4.2.43 Unable to resolve calibration

This error will occur if the actual weight on the scale at the time that the calibrate command is issued does not produce an internal measurement deflection large enough to resolve the calibration. The most likely cause of this error is that the standard weight was inadvertently not placed on the scale prior to issuing the calibrate command. This error will also occur if the weight measurement deflection is in a negative direction.

1.4.2.44 Input Mapping range error

Input mapping range error occurs if the value sent to the module in the data word containing the input mapping definition for a given input is outside of the allowed range defined in the commands section of this document. For example, data words #0 - #3 of the set input mapping command are the input functional mappings for the four discrete inputs. If the value of any one of these words is outside of the allowed range (0 – 4), this error will occur.

1.4.2.45 Print Ticket Block range error

Print ticket block range error occurs if the value sent to the module in the data word containing the print block selection is outside of the allowed range defined in the commands section of this document. For example, data word #0 of the write print text command is print block selection. If the value of this word is outside of the allowed range (0 – 8), this error will occur.

1.4.2.46 Time Date range error

Time date range error occurs if any of the values sent to the module in the data word containing the date/time definition are outside of the allowed range defined in the commands section of this document. For example, data word #2 of the set time/date command is second definition. If the value of this word is outside of the allowed range (0 – 59), this error will occur.

1.4.2.47 Thresholds Active, Edit of Non-Locked Data rejected

This error will occur if an attempt is made to change the values of any of the following while threshold checking is active: bits 1 and 3 of data word #9 of set non-locked data command, data words 0,1,2,or 3 of set non-locked data command.

1.4.2.48 Edit locked active error

This error will occur if a set locked data command is issued to the module while threshold checking is enabled (active).

1.4.2.49 Tare greater than range

This error will occur if an attempt is made to take an automatic tare when the gross load on the scale is greater than or equal to the maximum range. The limits for tare weight are $0 \leq \text{tare} < \text{maximum range}$. This error will also occur if the predefined tare value sent in the non-locked data command is greater than or equal to maximum range.

1.4.2.50 Not Used

1.4.2.51 Predefined tare not zero

This error will occur if an attempt is made to activate a predefined tare when there is a non-zero gross load on the scale. (bit #2 of data word #9 in set non-locked data is used to activate predefined tare. There must be a gross weight indication of zero in order for the activation request to be accepted)

Command Error Codes (continued)

1.4.2.52 Zero extent exceeds 2%

This error occurs if an attempt is made to change the zero extent of range from +/-5% to +/-2% when there is an existing zero offset in the zero offset memory greater than 2%. Existing zero offsets are cleared via calibration.

1.4.2.53 Cutoff high out of range

Cutoff high out of range error occurs if the value sent to the module in the data word containing the high flow cutoff definition is outside of the allowed range defined in the commands section of this document. For example, data words #2,3 of the set non-locked data command are high flow cutoff definition. If the value of these words is outside of the allowed range ($0 \leq \text{HFCOT} \leq$ maximum range), this error will occur.

1.4.2.54 Cutoff low out of range

Cutoff low out of range error occurs if the value sent to the module in the data word containing the low flow cutoff definition is outside of the allowed range defined in the commands section of this document. For example, data words #0,1 of the set non-locked data command are low flow cutoff definition. If the value of these words is outside of the allowed range ($0 \leq \text{LFCOT} \leq$ maximum range), this error will occur.

1.4.2.55 Cutoff high exceeds low

If the weighing direction for threshold checking is set up for the increasing direction (bit #1 of data word #9 of set non-locked data command inactive low), then the high flow cutoff must be less than or equal to the low flow cutoff. This error is generated if the value sent to the module in the set non-locked data command for cutoff high is greater than the value sent for cutoff low.

1.4.2.56 Cutoff low exceeds high

If the weighing direction for threshold checking is set up for the decreasing direction (bit #1 of data word #9 of set non-locked data command active high), then the low flow cutoff must be less than or equal to the high flow cutoff. This error is generated if the value sent to the module in the set non-locked data command for cutoff low is greater than the value sent for cutoff high.

1.4.2.57 Set zero not established

This error will occur if a calibrate command is issued prior to a successful set zero command execution. If a calibrate command is issued after a successful set zero, but the calibrate command is not successful, additional attempts to issue the calibrate command may be made without re-issuing the set zero command.

1.4.2.58 Overload threshold out of range

Overload threshold out of range error occurs if the value sent to the module in the data word containing the overload threshold selection is outside of the allowed range defined in the commands section of this document. For example, data word #2 of the set locked data command is overload threshold selection. If the value of this word is outside of the allowed range (0 – 2), this error will occur.

Command Error Codes (continued)

1.4.2.59 Calibration weight range error

Calibration weight range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #2,3 of the Set Calibrate command are calibration weight. If the value of these words is less than 2 % of maximum range, this error will occur.

1.4.2.60 Calibration maximum range range error

Calibration maximum range range error occurs if the value sent to the module in the data word containing the calibration maximum range definition is outside of the allowed range defined in the commands section of this document. For example, data words #4,5 of the Set Calibrate command are calibration maximum range. If the value of these words is outside of the allowed range (Maximum range must be greater than 0.05), this error will occur.

1.4.2.61 Calibration weight exceeds range error

Calibration weight exceeds range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #2,3 of the Set Calibrate command are calibration weight. If the value of these words is greater than maximum range, this error will occur.

1.4.2.62 Calibration units range error

Calibration units range error occurs if the value sent to the module in the data word containing the calibration units definition is outside of the allowed range defined in the commands section of this document. For example, data word #6 of the Set Calibrate command is units. If the value of this word is outside of the allowed range (0 – 5), this error will occur.

1.4.2.63 Calibration stability extent range error

Calibration stability extent range error occurs if the value sent to the module in the data word containing the calibration stability extent definition is outside of the allowed range defined in the commands section of this document. For example, data word #7 of the Set Calibrate command is stability extent. If the value of this word is outside of the allowed range (0 – 4), this error will occur.

1.4.2.64 Calibration stability time range error

Calibration stability time range error occurs if the value sent to the module in the data word containing the calibration stability time definition is outside of the allowed range defined in the commands section of this document. For example, data word #8 of the Set Calibrate command is stability time. If the value of this word is outside of the allowed range (0 – 3), this error will occur.

1.4.2.65 Calibration scale divisions range error

Calibration scale divisions range error occurs if the value sent to the module in the data word containing the calibration scale divisions definition is outside of the allowed range defined in the commands section of this document. For example, data word #9 of the Set Calibrate command is scale divisions. If the value of this word is outside of the allowed range (0 – 20), this error will occur.

Command Error Codes (continued)

1.4.2.66 Machine1 maximum range range error

Machine1 maximum range range error occurs if the value sent to the module in the data word containing the maximum range definition is outside of the allowed range defined in the commands section of this document. For example, data words #10,11 of the Set machine constants 1 command are maximum range. If the value of these words is outside of the allowed range (Maximum range must be greater than 0.05), this error will occur.

1.4.2.67 Machine1 weight range error

Machine1 weight range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #6,7 of the Set machine constants 1 command are calibration weight. If the value of these words is less than 2 % of maximum range, this error will occur.

1.4.2.68 Machine1 weight exceeds range

Machine1 weight exceeds range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #6,7 of the Set machine constants 1 command are calibration weight. If the value of these words is greater than maximum range, this error will occur.

1.4.2.69 Machine2 maximum range range error

Machine2 maximum range range error occurs if the value sent to the module in the data word containing the maximum range definition is outside of the allowed range defined in the commands section of this document. For example, data words #8,9 of the Set machine constants 2 command are maximum range. If the value of these words is outside of the allowed range (Maximum range must be greater than 0.05), this error will occur.

1.4.2.70 Machine2 slope not positive

Machine2 slope not positive error occurs if the value sent to the module in the data word containing the calibration slope is ≤ 0 . For example, data words #2,3 of the Set machine constants 2 command are calibration slope. If the value of these words is less than or equal to zero, this error will occur.

1.4.2.71 Machine2 weight range error

Machine2 weight range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #6,7 of the Set machine constants 2 command are calibration weight. If the value of these words is less than 2 % of maximum range, this error will occur.

1.4.2.72 Machine2 weight exceeds range

Machine2 weight exceeds range error occurs if the value sent to the module in the data word containing the calibration weight definition is outside of the allowed range defined in the commands section of this document. For example, data words #6,7 of the Set machine constants 2 command are calibration weight. If the value of these words is greater than maximum range, this error will occur.