ModWeigh

FEATURES

- **Modbus communications (independent RS232 and RS485 ports)**
- **USB Host & Device (memory stick & PC)**
- **Field software upgrades**
- **12-24Vdc power supply**
- **Overall accuracy better than 0.01%**

MD2,MP2 INDICATOR

- **IP54 Facia**
- **2.8" (70mm) colour LCD**
- **320 x 240 pixels**
- **Polyester film tactile keypad**
- **4-20mA output, 1 digital input & 2 digital outputs**

MO3 I/O for MP2

- **4 Digital inputs**
- **4 Digital outputs**
- **4-20mA input (or 0-10V)**
- **4-20mA output**

MD1,MP1 INDICATOR

- **IP65 Facia**
- **4.3" (109mm) colour LCD**
- **480 x 272 pixels**
- **Silicone tactile keypad**

MT1 TRANSMITTER

- **Size 136 x 66 x 50mm**
- **Optional removable P-Module holds calibration settings**

MT3 TRANSMITTER

- **Size 136 x 66 x 50mm**

MR1 I/O

- **Size 136 x 66 x 30mm**
- **8 Digital inputs**
- **8 Digital outputs**
- **4-20mA input (or 0-10V)**
- **4-20mA output x 2**
- **Pulse output**

INCLUDES

- Installation
- Setting up principles
- Setup Summary
- I/O Function Table
- Operation
- Alarms

APPLIES TO

- MW64A - Batch Weigher P-Module
- MT1,MT3 - Transmitters
- MD1,MD2 - Display
- MP1,MP2 - Processor
- MR1 - Remote IO
- Software v6.09 onwards

fill gate

loadcells

WEIGH HOPPER

dump gate

MD1,MP1

MD2,MP2

MT1

MT3

MR1
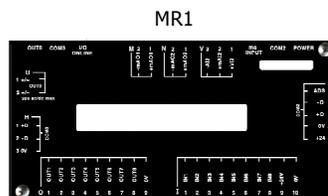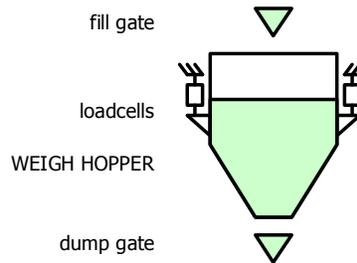
AVAILABLE DOCUMENTATION

PRODUCT	DESCRIPTION	DOCUMENTATION
MW61	Weigher Instrument	Technical Information Instruction Manual
MW64	Batch Weigher Instrument	Technical Information Instruction Manual
MW65	Process Weigher Instrument	Technical Information Instruction Manual
MW93	Weight Change Instrument	Technical Information Instruction Manual
MW94	Impact Flowmeter Instrument	Technical Information Instruction Manual
MW95	Belt Weigher Instrument	Technical Information Instruction Manual
MW96	Weighfeeder Instrument	Technical Information Instruction Manual

As we are continuously improving our products, changes to this specification may occur without notice.

(Document Details: g0 g1 g2 g3 g4 g5 g6 g7 g8 g9 g10 g11 g12 g13 g14 g15   MT1,MT3,MD1,MD2,MP1,MP2))

Contents

INTRODUCTION
Features

Basic

Units & Resolution

The units for each variable type (weight etc.) can be selected from a list of metric and imperial units. The resolution of each variable type can be adjusted, this alters the count by e.g 100kg displayed in 0.2kg increments.

OIML Design

The instrument is designed to OIML standards.

Language Support

Support is available for the following languages: English, Chinese, Korean, German, Spanish, French, Italian and Polish.

Inputs

Digital Inputs INx

The digital inputs are programmable to a range of function including 'acquire zero', 'print' etc.

Corner Adjustment (MT1 only)

The input sensitivity can be individually adjusted for up to 4 loadcells, allowing differences in loadcell sensitivities to be corrected.

Four Loadcell Inputs (MT1 only)

Separate inputs are available for 4 loadcells allowing the signal of each to be monitored sperately. This provide an aid for load balancing across loadcells and also for fault finding.

Signal Filtering

Filtering for the weight can be adjusted to get the optimum compromise between reduction of plant vibration and response speed.

Internal Signals

Limits

The high and low limits have adjustable setpoints which may be programmed to operate on any internal signal.

Event Collection

Process events are collected for operation with external equipment (PLCs etc.)

Memory Storage

Allows a group of settings to be stored or recalled from memory. This can be used for example to store settings for different products. There are 20 memory locations with up to 4 settings in each.

Outputs

Analog I/O Scaling

The analog output range can be adjusted over the full 0 to 20mA range. The output will drive to a slight negative mA, allowing a live zero to be achieved when using a 0 to 20mA range. A voltage output is easily produced by connecting a resistor to the output.

In addition the analog output signal is selectable to come from any internal signal in the instrument e.g weight, flowrate etc.

Digital Outputs OUTx

The digital outputs are programmable to operate from any internal signal. These signals include the digital input states, status conditions (running, paused etc) and any fault conditions that are detected. This makes it easy connect into other systems.

Communications & Display

Comms

RS232 and RS485 ports are available. These are used to connect ModWeigh units together and also to connect to other systems. The protocol is either ASCII output for example to drive a printer or Modbus for interactive communications. Baud rates and node addresses are programmable.

USB host and device ports are available. This allows for example PC and USB flash drive connectivity. It can be used to update the units software, for data logging and for recording of the units settings.

Printouts & Macros

Printouts can be triggered by a key press or set up to occur at set times during the day or week. Data may also be output continuously for data collection purposes. Data is output on the COM1 RS232 port. The content of the printouts is fully programmable using Macros.

Macros are programs used to customise printouts, but can also be used to perform arithmetic calculations. The Macro language also contains conditional terms for more advanced programming.

Display Customisation

Locks may be set to prevent unauthorised use of the operator keys and restrict entry to the operator menu. The keys are individually lockable and optionally a passcode can be used to allow authorised operators to use the keys. Alternatively a confirmation of the key action can be requested.The operator MENU can be customised to make additional settings or signals available to the operator.

The contents of the main display can be set to suit any condition, from a comprehensive display showing all operating parameters to a simple display showing the basic signals.

Computer Connectivity

ModWeigh instruments can be connected to a computer withan RS232 connection. Data can be sent to the PC at a preset rate. The data sent can be set up using macros.

There is also a command line interface which allows any of the settings and data to be read or written.

IO Summary

	Digital Inputs (includes pulse input)	NAMUR pulse input option	Digital Outputs (includes pulse output)	Isolated Pulse Output	Isolated 4-20mA Inputs	Isolated 4-20mA Outputs	RS232	RS485	USB Host (Memory Stick)	USB Device (PC Cable)	Corner adjustment and balancing for 4 loadcells	Trade approvals (MW95, MW96)
MP2	1	✗	2	1	0	1	1	1	1	1	✗	✗
MP2,MO3	1+4	✗	2+4	1	1	1+1	1	1	1	1	✗	✗
MP1,MR1	1+8	✗	9	1	1	2	2	1	1	1	✗	✗
MD1,MT1,MR1	2+8	✓	1+9	1	1	2	2	2	1	1	✓	✓
MD2,MT1,MR1	2+8	✓	1+9	1	1	2	2	2	1	1	✓	✓
MD1,MT3	2	✗	1	0	0	1	2	1	1	1	✗	✗
MD2,MT3	2	✗	1	0	0	1	2	1	1	1	✗	✗
MD1,MT3,MR1	2+8	✗	8	1	1	3	2	1	1	1	✗	✗
MD2,MT3,MR1	2+8	✗	8	1	1	3	2	1	1	1	✗	✗

Specifications

Loadcell Input AI1

Input Range	±4 mV/V (0-20mV)
Excitation	5 Vdc ±20 %, 250 mA maximum current
Signal processing rate	100 Hz (response time setting≤ 0.5 s)
Input sensitivity	0.5 µV/division maximum
Zero range	±3 mV/V (±15 mV)
Zero drift	±0.02 µV+0.0005 % of deadload/°C typical
Span drift	±0.0005 %/°C typical
Non-linearity	‹0.002 % of FS
Input noise	0.15 µVp-p typical
Filtering	0.04 s to 32.0 s response time adjustable
Sense voltage range	1-5 V

Analog Input AI2

4-20mA input resistance	<60 Ω
0-10V input resistance	›100 kΩ
Isolation	galvanically isolated to 50Vac

Analog Outputs AO1 & AO2

Output range	0 to 20 mA (-0.2 mA to 21 mA, includes standard 4-20mA)

Maximum load	1000Ω
Resolution	0.4 µA
Response time	Loadcell response time setting + 20 ms
Voltage output	Use an external resistor to convert mA to volts.
	For example 500Ω gives 10 V at 20 mA.
Non-linearity	‹0.01 %
Drift	‹2 µA/°C.
Isolation	independently galvanically isolated to 50Vac
High voltage	› 8 V
Low voltage	‹ 4 V
Maximum voltage	32 V
Input load	4 kΩ approximate

Digital Inputs INx

High voltage	› 8 V
Low voltage	‹ 4 V
Maximum voltage	32 V
Input load	6 kΩapproximate
Input type	PNP output sensors

Digital Outputs OUTx

Max output current	$\Sigma\,I_{IOx}$ < 0.25 A
Output voltage	same as supply voltage

Communications COM1, COM2 & COM3

COM1 Interface	RS232
COM1 Handshake	CTS can be enabled
COM2/COM3 Interface	RS485
Baud rates	9600, 19200, 38400, 57600, 115200 (230400 on COM2)
Settings	8 data bits, no parity, 2 stop bits (8-N-2)
Protocol	Modbus RTU (MWBUS on COM2)

General

IP Rating	IP20 (MD1,MP1 facia IP65) (MD2,MP2 facia IP54)
Operating temperature	-10 to 45 °C
Supply voltage	10 to 28 Vdc
Power MT1	1.0 to 2.2 W + $P_{Tacho\ Excitation}$
Power MT3	1.0 to 2.2 W + $P_{Tacho\ Excitation}$
Power MR1	1.5 to 2.5 W + P_{OUTx}
Power MD1	1.8 W
Power MP1	1.8 to 3.0 W
Power MD2	1.4 W
Power MP2	1.4 to 3.1 W
Power MP2 + MO3	3.4 to 5.0 W + P_{OUTx} + $P_{Tacho\ Excitation}$
MP2 Restrictions	$P_{Loadcell\ Excitation}$ + P_{AO1} + P_{AO2} < 1.5 W
	I_{Supply} < 0.5 A

INSTALLATION

The instrumentation must be mechanically installed and then the electrical connections made. The important electrical connections are as follows.

Power supply connections: 24Vdc fused or current limited to 5A.

Communications: A shielded cable is recommended to connect units together with COM2. It can extend up to 500m. This leaves COM1 (RS232) free for other applications. For a cable length over 50m, MAT line terminators must be fitted at each end of the cable.

Loadcell connections: For cable runs less than 20m, a 4 wire connection should be adequate. For longer cable lengths, a 6 wire connection is recommended.

Some additional optional connections are as follows.

Dimensions

Following are the dimensions of the hardware items that make up the system.

The displays/processors are designed for panel mounting.

MD2 Display
MP2 Processor

PANEL cut out
138 x 67 mm
-0.0 + 1.0 mm

72mm

144mm

FACIA
144 x 72 mm

80mm

9mm

top view

approx. 400g
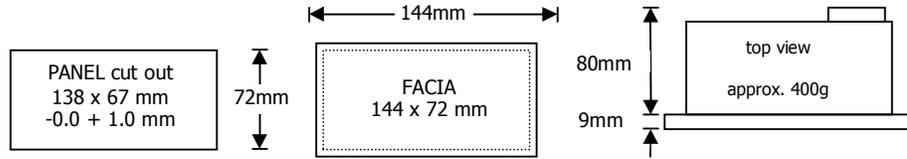
MD1 Display
MP1 Processor

PANEL cut out
186 x 92 mm
-0.0 + 1.0 mm

104mm

208mm

FACIA
208 x 104 mm

30mm

8mm

top view

approx. 450g

MT1 Transmitter

136mm

66mm

approx. 350g

50mm

8mm

20mm

optional DIN rail mount

MT3 Transmitter

136mm

66mm

approx. 350g

50mm

8mm

20mm

optional DIN rail mount

MR1 Remote IO

156mm

136mm

66mm 86mm

approx. 350g

8mm

20mm

optional DIN rail mount
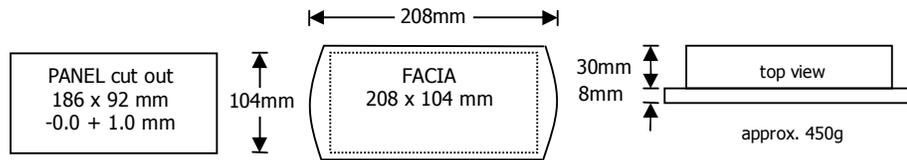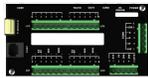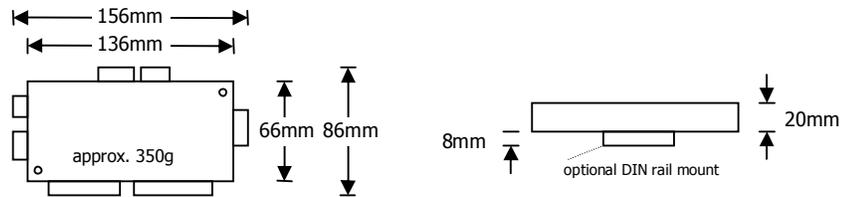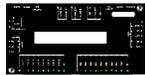
Connections

Connection Principles

ModWeigh instruments can be configured in many different ways to suit any given application.

The display is normally located to suit an operator. The transmitter can be located in the field to reduce field wiring or can be located with the display for a more conventional approach.

The I/O can conveniently be situated on a DIN rail in a cabinet.

Connection Diagram – MP2

Keep all wiring separated
from mains wiring

Use shielded cable where
indicated

MP2

Power/COM2		
24V	A1	
0V	A2	
+D	A3	
−D	A4	
IN0	A5	

POWER SUPPLY
+24V
0V

LOADCELL(s) optional sense for 6 wire connection

Loadcell

+EX	P1	
−EX/0V	P2	
+SIG	P3	
−SIG	P4	
+SEN	P5	
−SEN	P6	

COM1
RJ12 — RTS, TXD, 0V, RXD, 0V, CTS

MAD to PC/PLC
DB9F

2	TXD
3	RXD
4	DSR
5	SG
6	DTR
7	CTS
8	RTS

MAC

batch drive signal

I/O

+AO1	B1	
−AO1	B2	
+/~ OUT0	B3	
−/~ OUT0	B4	
OUT9	B5	slow drive
IN9	B6	stop
0V	B7	

TOTALISER
input
0V

24V

MAP to Printer
DB25M

2	RXD
3	TXD
4	CTS
6	DSR
7	SG
20	DTR

MO3 OPTION

Digital I/O

OUT1	C1	fast drive
OUT2	C2	running
OUT3	C3	dump/refill drive
OUT4	C4	limit 2 output
IN1	C5	stop key
IN2	C6	start key
IN3	C7	dump/refill
IN4	C8	batch wait
24V	C9	
0V	C10	

Analog

+AO2	D1	
−AO2	D2	gross weight
+VAI2	D3	
+mAAI2	D4	
−AI2	D5	

MR1

Digital Inputs

IN1	I1	stop key
IN2	I2	start key
IN3	I3	dump/refill
IN4	I4	batch wait
IN5	I5	dump/refill wait
IN6	I6	gates open
IN7	I7	reset total
IN8	I8	acknowledge alarms
24V	I9	
0V	I10	

Power/COM2

24V	K1	
0V	K2	
+D	K3	
−D	K4	
ADS	K5	

Address Select   **ADS**

	1	2	3	
24V	1	1	1	1k 4
0V	2	2	2	2k2 5
+D	3	3	3	4k7 6
−D	4	4	4	10k 7
ADS	5	5	5	22k 8
				47k 9
				100k 10

Digital Outputs

|		
OUT1	O1	fast drive
OUT2	O2	running
OUT3	O3	dump/refill drive
OUT4	O4	limit 2 output
OUT5	O5	limit 1 output
OUT6	O6	bulk drive
OUT7	O7	clamp close drive
OUT8	O8	alarm alert
0V	O9	

to
PC, PLC
or
ModWeigh Display
MD1,MD2

COM3

+D	H1	
−D	H2	
0V	H3	

Pulse Output

+/~ OUT0	U1	
−/~ OUT0	U2	

TOTALISER
input
0V

Analog Outputs

+mAO2	M1	
−mAO2	M2	gross weight
+mAO1	M3	
−mAO1	M4	batch drive signal

Analog Input 2

+VI2	V1	
+mAI2	V2	
−AI2	V3	

Connection Diagram – MP1

Keep all wiring separated
from mains wiring

Use shielded cable where
indicated

MP1 bus address set with
setting (Q2522).

MR1 bus address set with
ADS pin and must be same
as MP1.

Fit an MAT terminator to
each end of COM2 cable if
length exceeds 50m.

MP1

Power/COM2

24V	A1
0V	A2
+D	A3
−D	A4
IN0	A5

POWER SUPPLY

| +24V |
| 0V |

LOADCELL(s)
optional sense for 6 wire
connection

Loadcell

P1	+EX
P2	−EX/0V
P3	+SIG
P4	−SIG
P5	+SEN
P6	−SEN

COM1

RJ12
- RTS
- TXD
- 0V
- 0V
- RXD
- CTS

MAC

MAD to PC/PLC
DB9F

2	TXD
3	RXD
4	DSR
5	SG
6	DTR
7	CTS
8	RTS

MAP to Printer
DB25M

2	RXD
3	TXD
4	CTS
6	DSR
7	SG
20	DTR

MR1

Digital Inputs

stop key	I1	IN1
start key	I2	IN2
dump/refill	I3	IN3
batch wait	I4	IN4
dump/refill wait	I5	IN5
gates open	I6	IN6
reset total	I7	IN7
acknowledge alarms	I8	IN8
	I9	24V
	I10	0V

Power/COM2

24V	K1
0V	K2
+D	K3
−D	K4
ADS	K5

Address Select   ADS

	1	2	3		
24V	1	1	1	1	1k	4
0V	2	2	2	2	2k2	5
+D	3	3	3	3	4k7	6
−D	4	4	4	4	10k	7
ADS	5	5	5	5	22k	8
					47k	9
					100k	10

Digital Outputs

OUT1	O1	fast drive
OUT2	O2	running
OUT3	O3	dump/refill drive
OUT4	O4	limit 2 output
OUT5	O5	limit 1 output
OUT6	O6	bulk drive
OUT7	O7	clamp close drive
OUT8	O8	alarm alert
0V	O9	

COM3

to
PC, PLC
or
ModWeigh Display
MD1,MD2

H1	+D
H2	−D
H3	0V

Pulse Output

| +/~ OUT0 | U1 |
| −/~ OUT0 | U2 |

TOTALISER

| | input |
| 0V |

Analog Input 2

V1	+VI2
V2	+mAI2
V3	−AI2

Analog Outputs

+mAO2	M1	gross weight
−mAO2	M2	
+mAO1	M3	batch drive signal
−mAO1	M4	

Connection Diagram – MT1

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

For individual loadcell sensitivity adjustment, use terminals P, Q, R and S.

Display and transmitter can alternatively be connected COM1 to COM1 using an MAC cable.

MT1 bus address set with ADS pin or a setting.

MR1 bus address set with ADS pin and must be same as MT1.

Fit an MAT terminator to each end of COM2 cable if length exceeds 50m.

MD1,MD2

Power/COM2
24V	L1
0V	L2
+D	L3
–D	L4
ADS	L5

COM1 RJ12 — RTS, TXD, 0V / 0V, RXD, CTS

POWER SUPPLY
| +24V |
| 0V |

LOADCELL(s) optional sense for 6 wire connection

MT1

Loadcell 1
+EX	P1
–EX/0V	P2
+SIG	P3
–SIG	P4
+SEN	P5
–SEN	P6

Power/COM2
24V	J1
0V	J2
+D	J3
–D	J4
ADS	J5

COM1 RJ12 — RTS, TXD, 0V / 0V, RXD, CTS

Loadcell 2
+EX	Q1
–EX/0V	Q2
+SIG	Q3
–SIG	Q4
+SEN	Q5
–SEN	Q6

Loadcell 3
+EX	R1
–EX/0V	R2
+SIG	R3
–SIG	R4
+SEN	R5
–SEN	R6

Loadcell 4
+EX	S1
–EX/0V	S2
+SIG	S3
–SIG	S4
+SEN	S5
–SEN	S6

Tacho (I/O)
24V	T1
0V	T2
IN0	T3
IN9	T4
OUT9	T5

stop
slow drive

MAC

MAD to PC/PLC DB9F
2	TXD
3	RXD
4	DSR
5	SG
6	DTR
7	CTS
8	RTS

MAP to Printer DB25M
2	RXD
3	TXD
4	CTS
6	DSR
7	SG
20	DTR

MR1

Digital Inputs
stop key	I1	IN1
start key	I2	IN2
dump/refill	I3	IN3
batch wait	I4	IN4
dump/refill wait	I5	IN5
gates open	I6	IN6
reset total	I7	IN7
acknowledge alarms	I8	IN8
	I9	24V
	I10	0V

Power/COM2
24V	K1
0V	K2
+D	K3
–D	K4
ADS	K5

Digital Outputs
OUT1	O1	fast drive
OUT2	O2	running
OUT3	O3	dump/refill drive
OUT4	O4	limit 2 output
OUT5	O5	limit 1 output
OUT6	O6	bulk drive
OUT7	O7	clamp close drive
OUT8	O8	alarm alert
0V	O9	

Address Select   ADS

	1	2	3			
24V	1	1	1	1	1k	4
0V	2	2	2	2	2k2	5
+D	3	3	3	3	4k7	6
–D	4	4	4	4	10k	7
ADS	5	5	5	5	22k	8
					47k	9
					100k	10

COM3
+D	H1
–D	H2
0V	H3

to PC, PLC or ModWeigh Display MD1,MD2

Pulse Output
+/~ OUT0	U1
–/~ OUT0	U2

TOTALISER
| ⎍ input |
| 0V |

Analog Input 2
+VI2	V1
+mAI2	V2
–AI2	V3

Analog Outputs
+mAO2	M1	gross weight
–mAO2	M2	
+mAO1	M3	batch drive signal
–mAO1	M4	

Connection Diagram – MT3

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

Display and transmitter can alternatively be connected COM1 to COM1 using an MAC cable.

MT3 bus address set with ADS pin or a setting.

MR1 bus address set with ADS pin and must be same as MT3.

Fit an MAT terminator to each end of COM2 cable if length exceeds 50m.
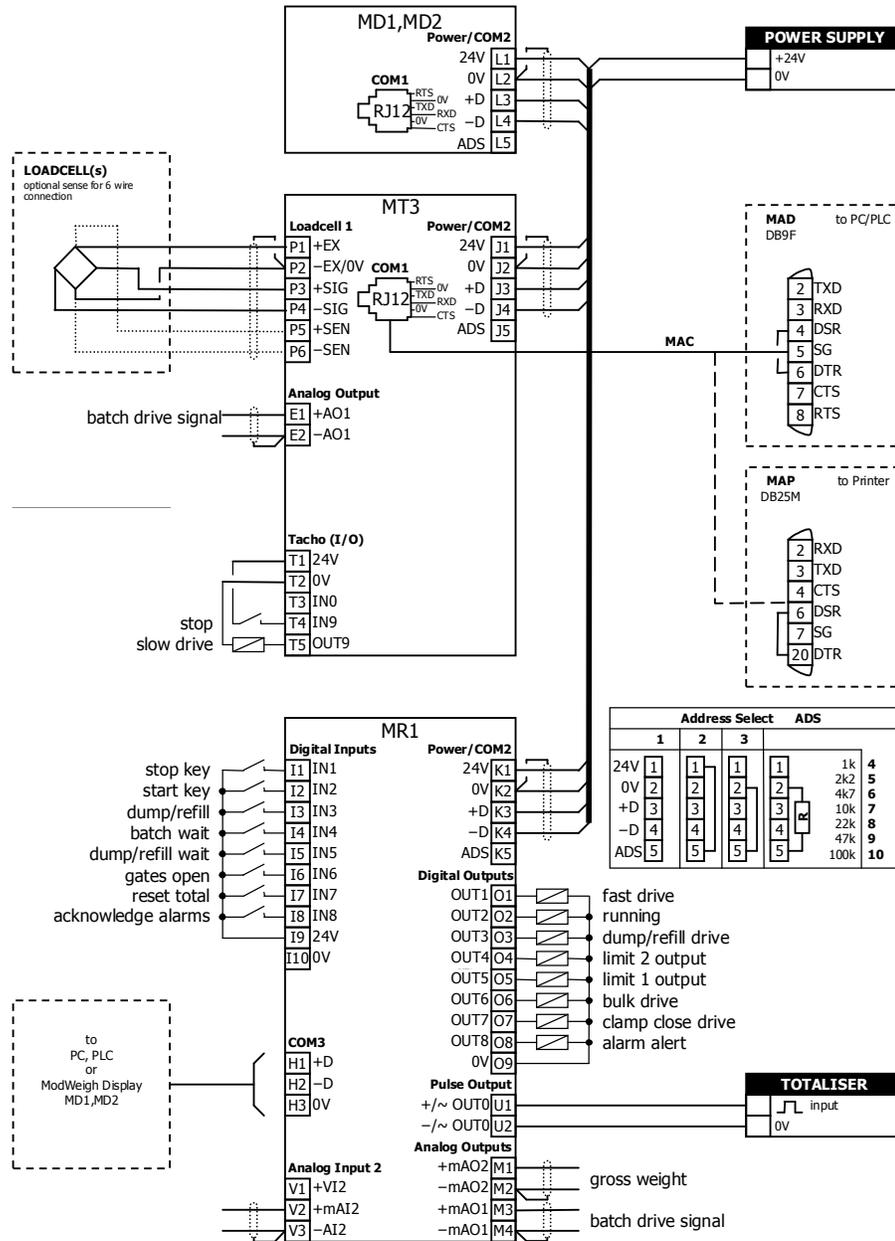
Loadcell Connections

The loadcell(s) may be wired directly to the loadcell terminals or connected together in the field with a junction box and connected to the ModWeigh unit with a single cable.

When connected to the terminals only a 4-wire connection is used, and digital corner adjustments are possible. (MT1 only)

When connected with one cable and a junction box no corner adjustments are possible. It is preferable to use a 6-wire connection as this eliminates voltage drop errors in long cables caused by cable resistance.

Loadcell 1

P1	+EX
P2	−EX/0V
P3	+SIG
P4	−SIG
P5	+SEN
P6	−SEN

LOADCELL(s)
optional sense for 6 wire
connection
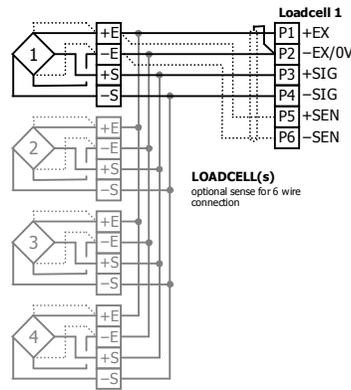
Loadcells Wired to Junction Box

For best accuracy use a 6-wire connection to controller

Loadcell 1

P1	+EX
P2	−EX/0V
P3	+SIG
P4	−SIG
P5	+SEN
P6	−SEN

Loadcell 2

Q1	+EX
Q2	−EX/0V
Q3	+SIG
Q4	−SIG
Q5	+SEN
Q6	−SEN

Loadcell 3

R1	+EX
R2	−EX/0V
R3	+SIG
R4	−SIG
R5	+SEN
R6	−SEN

MT1

Loadcell 4

S1	+EX
S2	−EX/0V
S3	+SIG
S4	−SIG
S5	+SEN
S6	−SEN
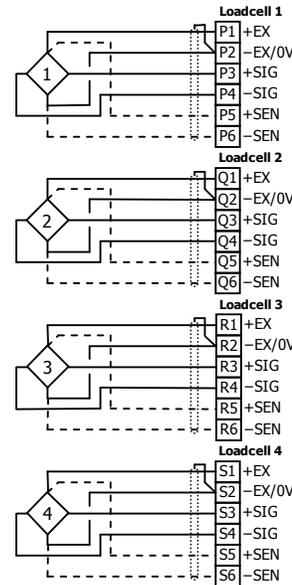
Loadcells Wired to Directly to Terminals

Allows corner adjustment and individual monitoring of loadcell outputs

Multidrop Systems

ModWeigh instruments can be connected using the COM2 RS485 bus. Up to 10 systems may be connected on the bus. A ModWeigh display can select any one of the systems on the bus to work with.

A multidrop connection can also be used with any other Modbus master device such as a PLC. If a non ModWeigh master is used on the bus, then the ModWeigh instruments are unable to communicate with one another. An external Modbus master can alternatively be connected to an RS232 COM1 port.

An MR1 unit cannot share the bus with a non ModWeigh master such as a PLC. A PLC could be connected using the COM3 port on the MR1.
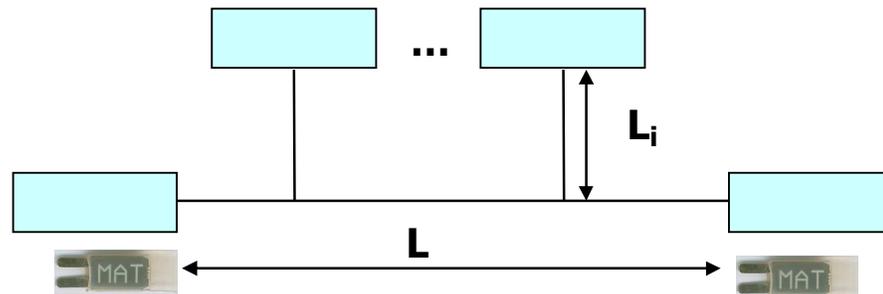
$$Li \leq \frac{40}{n} \, [m] \qquad L \leq 500 \, [m]$$

if D = MD1,MD2 Display, then $n \leq 10$
if D = PLC master, then $n \leq 32$

To connect in mutidrop use the RS485 connection COM2. The wiring should be made in a daisy-chain, with one instrument connected to the next. If a stub connection is used to a main cable as shown in the diagram, then make sure its length limit is adhered to.

Two MAT line terminators must be fitted, one at each end of the cable run.

The +D, -D and a 0V terminal must all be connected together through the data cable.

Setting the COM1 Modbus Address

Before a multidrop system will operate, the addresses in each of the ModWeigh units will need to be set differently. This can be done by wiring a link or resistor to the ADS terminal where available. See the table on the connection diagram. Alternatively the address setting can be changed in each unit using a display connected to its COM1.

The following procedure is used to set a units address.

1.   Press the Q key to access the setup menu.

2.   Key in the quick key code 2512 to select the 'COM1&2 modbus address' step.

3.   Press the EDIT key. (If editing is locked, key in the password 111 and press ENTER).

4.   Enter the desired address (1, 2 or 3 etc.) and press ENTER.

5.   Press and hold the BACK key to return to normal operation.

6.   Repeat for each of the units which are to be used on the bus.

When the multidrop system is then connected and powered, the display should be able to see each of the ModWeigh systems. This is done by pressing the SELECT key on the display.

Applications

Following are typical applications for the instrument.

Batch Out with Manual Refill (Bulk Bag Unloading)

Used to dispense a quantity of material from a bulk bag. The bulk bag feeds into a buffer hopper. The bag and hopper are both supported by loadcells and weighed. The material is dispensed using an auger attached to the buffer hopper with a flexible coupling to give isolation from the weighing system.
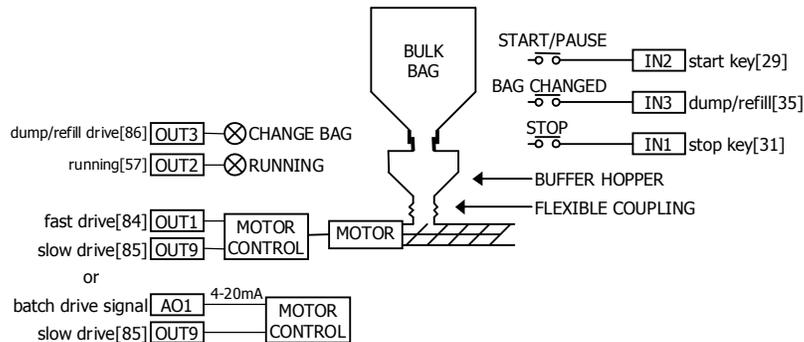
Quick Key	Description	Setting	Details
Q23211	batch setpoint	1300kg	set to desired batch weight
Q23213	slow cutoff	?kg	set to stop motor before setpoint to allow for overrun
Q23214	fast cutoff	?kg	set if using 2 speed filling control, set to weight before setpoint to turn of fast fill
Q23221	batching mode	5	batch out with manual refill
Q23241	low weight	20kg	must replace bag below this weight
Q23242	high weight	100kg	must not replace bag above this weight
Q23251	slow signal	20%	sets slow filling motor speed if using 4-20mA connection
Q23252	fast signal	100%	sets fast filling motor speed if using 4-20mA connection

The operator enters the desired weight to dispense (e.g. 1300kg) and presses START. If the weight is less than 100kg, a bag changes may be requested (the CHANGE BAG indicator will come on). After a bag is replaced, the operator presses BAG CHANGED (or the 'dump/refill' key). The 'fast drive' and 'slow drive' outputs control the auger speed to dispense the material until the requested batch weight has been reached. The motor can optionally be controlled with a 4-20mA speed signal (batch drive signal, AO1) and a run/stop signal (slow drive, OUT9).

SETTING UP

Setup

ModWeigh instruments must be calibrated for each specific application. The parameters stored are collectively known as the Setup.

Description

Press the Q key to access the setup menu.

The setup is divided into sections as shown in the following diagram.

SETUP		
Basic Settings		
AI1 AI2 IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 (Loadcell Calibration) Inputs	Internal Signals	AO1 AO2 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUT8 COM1 COM2 Outputs
(Macros) Communications & Display		
Information, Resets & Final Calibration		
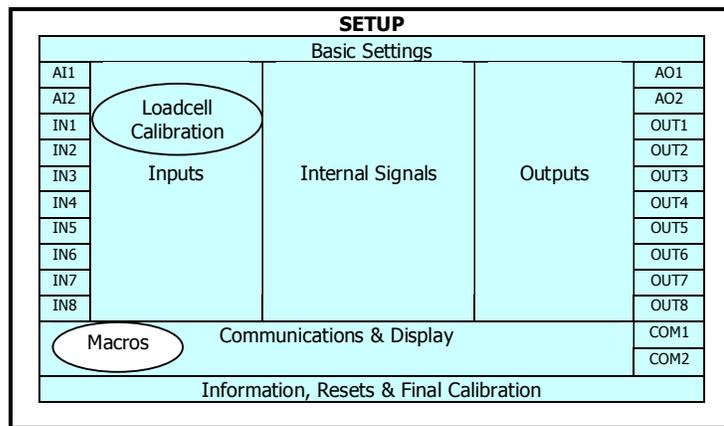
Setup Diagram

The Setup contains **Settings** and **Macros** which are described next.

Settings

Most of the setup for a system involves setting calibration constants which for example calibrate the loadcell input, the 4-20mA outputs and the operation of relays etc. These settings are simple numeric values.

Macros

Macros are used to store short programs which are used to construct text strings to output to the printer, perform arithmetic calculations and other special control functions. Macros are a collection of program segments which can call one another as subroutines. They have structured if/then/else statements and program looping constructs.

A macro is a sequence of numbers (bytes with values of 0 to 255).

Menus

All the setup parameters are contained within a menu structure which follows the setup sections.

Basic Settings

Inputs

Internal Signals

Outputs

Communications & Display

Information, Resets & Final Calibration

Factory Settings

Basic Settings

The basic settings are settings which generally must be set first and often affect other settings through the controller. For example, they set the engineering units and measuring range for the application.

Inputs

The inputs are settings and calibration which effect the basic inputs signals. For example the loadcell input, tacho input (where used) and digital inputs.

Internal Signals

This section contains the main calculations for the instrument. Most signals are here, for example the weight, zero weight, total weight etc. Much of the instruments configuration is done in this section.

Outputs

The output are settings and calibration which effect the basic output signals. For example the 4-20mA outputs and digital outputs. These change the calibration range and select the signal to appear on the digital outputs.

Communications & Display

This section sets the baud rates etc for the communications ports. It sets the key locks for the MD1,MD2 Display. It also contains the Macros for the instrument.

These settings are not available in 'B' model instruments.

Information, Resets & Final Calibration

This section contains information about the unit, including its serial number, the product type etc. These settings allow all the settings & macros to be reset back to their default values. The final calibration is also done here.

Factory Settings

The factory settings are used to calibrate the basic instrument in the factory. These are password protected and are not usually required once the instrument has left the factory.

Keypad

MD1,MP1 Keypad
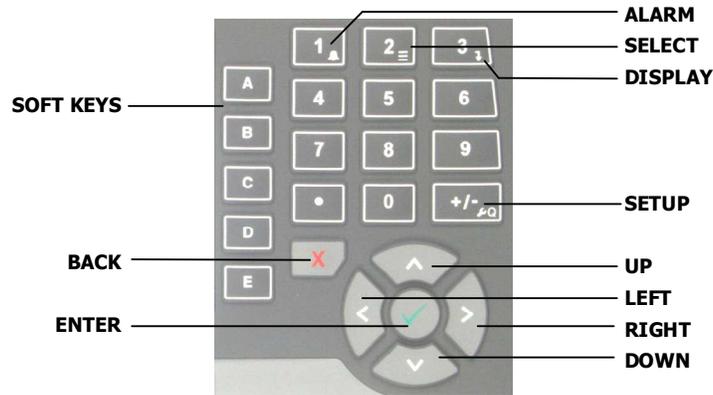
MD2,MP2 Keypad
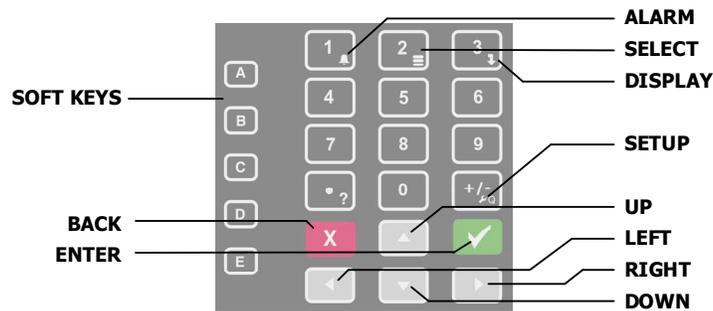
SOFT keys

The function of the 5 soft keys is indicated on the display.

ALARM key

Used to access the alarm list menu.

SELECT key

Used to select a system to display if more than one unit is connected on the network.

DISPLAY key

Allows the operator to select the display layout.

SETUP key

Press to view the setup menus.

ALPHANUMERIC keypad

Used to enter numerical data values.

UP and DOWN keys

Use these keys to move up and down a menu, or to increase or decrease a setting when editing is enabled.

LEFT and RIGHT keys

Used to step thorugh macros and the selection of some other items.

ENTER key

Use this key to move forwards through the menu, or to confirm a change to a setting.

BACK key

Use this key to move backwards through the menu, or to cancel a change to a setting. Hold the key to exit completely out of the menus and back to normal operation.

Displaying the Setup Menus

Press the SETUP key (Q) to display the setup menus.

Selecting a Menu Item

To the left of each menu item is a single digit. This is the Quick Key number. Simply key in this number to select the corresponding menu item. Items which have a + to the left will then display a sub-menu in the same format. Continue pressing Quick Keys to navigate to the desired setting. Refer to the Setup Summary for the sequence of Quick Keys to go directly to each setting.

Alternatively, repeatedly press the ENTER key to step through all the menus, sub-menus and settings in turn.

You can use the UP and DOWN keys to highlight a menu or sub-menu item, then press the ENTER key to continue from there. When viewing a setting, the UP and DOWN keys will move between the settings.
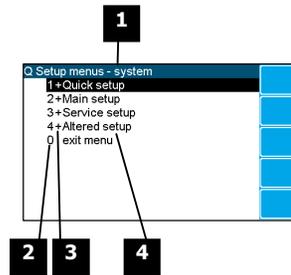
1   Menu name.

2   Quick Key number. Press key with same number to directly enter the named menu.

3   Menu item descriptor.

Element	Description
✚	Selecting this menu item will open a sub-menu.
(blank)	Selecting this menu item will display the corresponding setting, or will return from a sub-menu
!	The action described will be implemented directly either if the ENTER key is pressed when item is highlighted or when the item's Quick Key is pressed. (Quick Key number is the left most number shown in the item line)

4   Name of menu item.

Description of Menus

Quick setup

Quick setup menu contains the most important settings, and is a shortened version of the Main setup menu. Use the Quick setup menu for initial setup of the unit. In many applications, no further setup will be needed. The quick setup settings are marked with an asterix in the Setup Summary. (*****)

Main setup

Main setup menu contains all standard information and settings. Use this menu to view the units information (eg serial number), and adapt the unit for the application (eg change the speed demand output to 0 to 20mA). The main setup settings are listed in the Setup Summary.

Service

Service menu contains all standard settings as well as settings for advanced configuration and diagnostics. Use this menu if there are special application requirements, or if special diagnostics are required. This menu includes the Factory settings, for which certified equipment is required. These settings are not documented in this manual, contact the factory for further information.

Altered settings

Altered settings menu lists all settings that are different from the default. Use this menu to fill in the field settings on the Setup Summary

To Adjust A Setting

Press the EDIT key to allow changes to the selected setting.

If editing is locked, a password will be requested. For **Quick setup** and **Main setup**, the password is 111. For **Service setup** the password is 9713. For **Altered setup** there is no password as settings are display only.

Use the keypad and/or UP and DOWN arrow keys to increase or decrease the displayed setting. Some settings allow only one method, and some are display only.

Holding either key down will automatically continually increase or decrease the value.
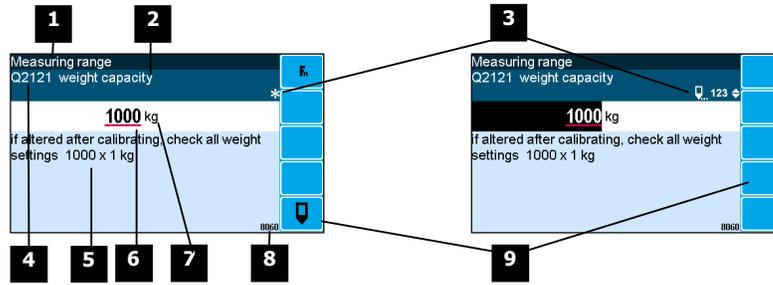
1   Menu item.

2   Setting name.

3   Gives information about the settings and indicates active keys or the preferred method of making a value change while editing.

Icon	Description
🔒	The setting is locked. Password must be entered to edit.
Q	The setting can only be viewed.
≠	The setting has been changed from the default.
✻	An important setting.
Q...	The setting is being edited.
123	Use numbered keys to change setting value.
↕	Use UP & DOWN keys to scroll through selection list.
on↕off	Use UP & DOWN keys to turn setting on or off.
◀▶	Use the arrow keys to move through the bits of a control or status register.

4   Sequence of quick-keys used to reach this setting. Not editable. The left-most digit identifies the current menu as follows: 1 for Quick setup, 2 for Main setup, 3 for Service setup, and 4 for Altered setup.

5   Hint line which reveals extra information about the setting.

6   Setting value. To change press EDIT key. If editing is locked, a password will be requested. Key in the password and press the ENTER key. The setting will become highlighted by a black back-ground. Key in changes then press ENTER key. For Quick setup and Main setup, the password is 111. For Service the password is 9713.

7   Engineering unit setting is displayed in.

8   Modbus address of this setting. Not editable.

9   Soft keys used with settings.

Icon	Description
Fn	Press Fn key for menu of special functions.
Q	Press EDIT key to edit the macro.
▶■	Use the soft key to start and stop an operation.

Macros

A macro is a list of numbers representing text characters and instructions codes. Each number is edited separately, and is entered either as a number using the numeric keys, or as an text character using the letter keys much like a cell phone. There are three data entry modes, instruction, lower case text and upper case text.

Macro Codes

Code	Description	
0	end of macro	Terminates execution of macro or returns from subroutine.
1 - 127	standard ASCII characters	Characters are sent out COM1 (RS232).
128 - 187	extended ASCII characters	

A	**Alternate Instructions**
	Used to encode printable characters (Unicode values 0 to 65536) outside the ASCII range.Sends the Unicode characters out COM1 with UTF8 encoding. Some characters can be used in the "system name macro" to appear on a ModWeigh display. arg0 and arg1 must be in the range 1 to 128.

A	Alternate Instructions	
188	ALT0 ‹arg1› ‹arg0›	UC = (arg0 - 1) + (arg1 - 1) × 128
189	ALT1 ‹arg1› ‹arg0›	UC = (arg0 - 1) + (arg1 - 1) × 128 + 16384
190	ALT2 ‹arg1› ‹arg0›	UC = (arg0 - 1) + (arg1 - 1) × 128 + 32768
191	ALT3 ‹arg1› ‹arg0›	UC = (arg0 - 1) + (arg1 - 1) × 128 + 49152

| R	Register Instructions		
192	NOP	no operation	
193	RECALL "register"	"register" is an ASCII Modbus address (8000 to 8992).	
194	RECALL ‹argument›	‹argument› / register	
		1 / weight	
		2 / gross weight	
		3 / net weight	
		4 / zero weight	
		5 / tare weight	
		6 / total weight	
		7 / running total	
		8 / peak weight	
		9 / flow rate	
		10 / belt speed	
		11 / current setpoint	
		12 / speed demand	
		13 / COM 2 modbus address	
		14 / print settings & macros	
		15 / product serial number	
		16 / flowrate raw	
		17 / temp 1	
		18 / temp 2	
		19 / perm 1	
		20 / perm 2	
		21 / P_Module serial number	
		22 / perm3	
		23 / perm4	
		24 / perm5	
		25 / temp3	
		26 / temp4	
		27 / temp5	
		28 / batch setpoint	
		29 / batched weight	
		30 / batch number	
		31 / last batched weight	
		32 / number to batch	
		101 / with address in VALUE	
		102 / default_value	
		103 / minimum_value	
		104 / maximum_value	
		105 / column	
		106 / memory	
		107 / register_number	
		108 / port	
		109 / slave_address	
		Other aruments are invalid and not all arguments available in all products.	
195	STORE "register"	"register" is an ASCII Modbus register (8000 to 8992).	
196	STORE ‹argument›	‹argument› selects register. See RECALL instruction.	
197	MENU ‹argument›	‹argument› / action	
		1 / start_menu	
		3 / next_quick	
		5 / next_service	
		6 / next_factory	
		7 / next_altered	
198	MACRO ‹argument›	‹argument› / action	
		1 / start_macro	
		2 / next_macro	
		3 / next_ altered _macro	

P	Print Instructions	
200	PRINT_VALUE	"format" is an ASCII format code of the form CcDdBb. c is the column width, d is the number of decimal places and b is the count by. Any one or combination of the three parts can be included. (e.g. C10d2b5 sets the column width to 10, the decimal places to 2 and the count by to 5; C10 sets column width to 10). The default is 0.
201	PRINT_NAME	
202	PRINT_UNITS	
203	PRINT_HINT	
204	PRINT_DATE	
205	PRINT_TIME	
206	PRINT_SECONDS	

P	Print Instructions	
207	PRINT_MENU_HEADING	‹column› is a number 1 to 99. Columns are numbered from 0.
208	PRINT_MENU_PATH	
209	PRINT_QUICK_KEY	
212	FORMAT "format"	
213	NEWLINE	‹macro› is number 1 to 99. If ‹macro› = 101, lists macro number in VALUE.
214	NEWPAGE	
215	TAB ‹column›	
218	LIST ‹macro›	
219	DUMP ‹macro›	

C	Calculation Instructions

Calculations are done on a stack in RPN (reverse polish notation). When a value is entered onto the stack with a RECALL or VALUE instruction, the other values on the stack are moved up first.
An instruction like ADD or MUL operates on the values in VALUE and Y and places the result in VALUE. Z is moved to Y and T is copied to Z.
The operation follows the values. e.g RECALL ‹weight› VALUE "2" MUL., this multiplies the weight by 2.
e.g. 2 + 3 x weight =
VALUE "2" VALUE "3" RECALL ‹weight› MUL ADD

STACK	RECALL or VALUE	ROLL	ADD, SUB, MUL, DIV, MOD
T	T lost	↻	copied
Z	↑	↓	↓
Y	↑	↓	↓
VALUE	↑	↺	RESULT (using VALUE & Y)

220	VALUE "number"	"number" is an ASCII number (e.g. 123.4) If there is no number, then the stack is pushed up.
221	ADD	VALUE = VALUE + Y
222	SUB	VALUE = VALUE + Y
223	MUL	VALUE = VALUE + Y
224	DIV	VALUE = VALUE + Y
225	MOD	VALUE = VALUE + Y
226	SWAP_VALUE&Y	VALUE and Y swapped
227	ROLL	stack rolled down
230	CLEAR_VALUE	VALUE is set to zero
231	CLEAR_ALL	VALUE, Y, Z and T all set to 0
232	INC_ VALUE	VALUE = VALUE + 1
233	DEC_ VALUE	VALUE = VALUE − 1
235	CHANGE_SIGN	sign of VALUE changed, plus and minus
236	ABS	absolute value of VALUE (e.g. ABS(-12.54) = 12.54)
237	INT	integer value of VALUE (e.g. INT(12.54) = 12)
238	FIX	fixed value of VALUE (e.g. INT(12.54) = 13)

L	Looping and Control Instructions					
239	DRIVE_BIT ‹bit›	**value**	**test**			
240	IF ‹condition›	1-150	See I/O Function Table			
241	IF_EVENT ‹event condition›					
242	NOT	**value**	**test**		**value**	**test**
243	AND ‹condition›	151	VALUE>=0		163	VALUE_ALTERED
244	OR ‹condition›	152	VALUE>0		164	VALUE_NOT_ALTERED
245	ELSE	153	VALUE=0		165	VALUE_VIEW_ONLY
246	END_IF	154	VALUE‹›0		166	DEC_temp1=0
247	SET_BIT ‹bit›	155	VALUE‹0		180	with_stack
248	CLEAR_BIT ‹bit›	156	VALUE‹=0		181	end_of_macro
249	TOGGLE_BIT ‹bit›	157	Y>=VALUE		182	end_of_menus
250	GOSUB ‹macro›	158	Y>VALUE		183	new_menu_heading
251	STOP	159	Y=VALUE		184	new_menu_path
252	STACK	160	Y‹›VALUE		185	macro_altered
253	LOOP	161	Y‹VALUE		186	clock_active
254	EXIT_WHEN ‹condition›	162	Y‹=VALUE			
255	END_LOOP					

operator	result
AND	true if both values are true
OR	true if either value is true

‹condition› is a logical expression made up of one or more values and operators evaluated from left to right. e.g. ‹IN3› OR NOT ‹IN4›

‹condition› = **value** [**NOT**] [**operator**] [**value**] [**NOT**] [**operator**]

NOT reverses the sense of the **value**, (e.g. true becomes false).

STACK stacks the current value. The stacked value is used with an operator followed by ‹with_stack›. DRIVE_BIT sets the bit to the value evaluated by the condition.

e.g. IF ‹IN1› AND ‹IN2› STACK ‹IN3› AND ‹IN4› OR ‹with_stack› DRIVE_BIT ‹user bit 1›

‹event condition› has a value of 1-150, and is true if the bit in the I/O Function table has changed since the "event macro" last ran.

‹bit› is a value from 1 to 187 from the I/O Function Table. Used Output Functions should not be set.

‹macro› is a macro number from 1 to 99. If macro = 101, calls subroutine number in VALUE.

The conditional and looping structures are as follows. Any sequence of instructions may be placed where *INST* appears.

IF ‹condition› *INST* ENDIF   IF_EVENT ‹event condition› *INST* ENDIF

IF ‹condition› *INST* ELSE *INST* ENDIF   IF_EVENT ‹event condition› *INST* ELSE *INST* ENDIF

IF ‹condition› *INST* DRIVE_BIT ‹bit›   IF_EVENT ‹event condition› *INST* DRIVE_BIT ‹bit›

LOOP *INST* EXIT_WHEN ‹condition› *INST* END_LOOP

Adjusting a Macro
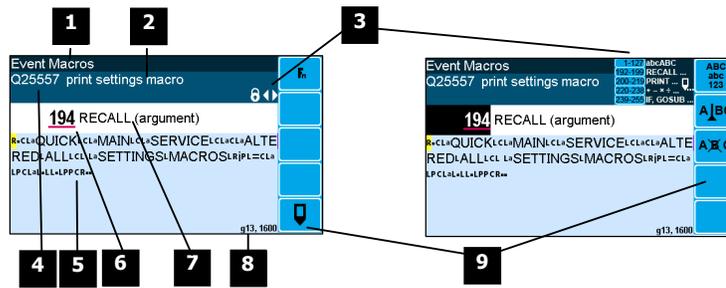
1 Menu item.

2 Setting name.

3 Gives information about the macro and indicates active keys or the prefered method of making a value change while editing.

Icon	Description
🔒	The macro is locked. Password must be entered to edit.
≠	The macro has been changed from the default.
◀▶	Use the 1 & 2 keys to move the cursor back and forth through the macro.
(keypad)	Shows which numeric keys are used to enter lower case letters.
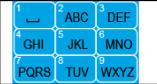
	Shows which numeric keys are used to enter upper case letters.
	Gives a guide to the range of values for text, register instructions, print instructions, calculation instructions and looping & control instructions.
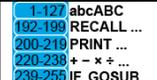
4 Sequence of quick-keys used to reach this macro. Not editable. The left-most digit identifies the current menu as follows: 1 for Quick setup, 2 for Main setup, 3 for Service setup, and 4 for Altered setup.

5 Shows the macro. ASCII characters are displayed normally, instruction codes are shown displayed as a small icon as shown below. A cursor highlights the code currently displayed.

Icon	Description
R	A register instruction like RECALL or STORE.
C	A calculation instruction like VALUE, ADD, MUL etc.
P	A print instruction, like PRINT_VALUE, PRINT_UNITS etc.
L	A looping or control instruction like GOSUB, IF, LOOP etc

6 Code value of the item at the cursor position. It is either as ASCII code value or an instruction code value.

7 Displays the ASCII character or instruction description for the code value displayed.

8 Modbus address of the macro. Not editable.

9 Soft keys used with macros.

Icon	Description
Fn	Press Fn key for menu of special functions.
	Press EDIT key to edit the macro.
ABC abc 123	Press this key to swap between numeric entry and text entry modes.
A BC	Press this key to insert codes at the cursor.
A B C	Press this key to delete the code at the cursor.

Software Updating

ModWeigh instrument software can be upgraded in the field to add new features and other improvements. The following diagram shows the setup required for this purpose.

Update with USB Drive

AutoUpdate Folder   USB Drive   ModWeigh unit
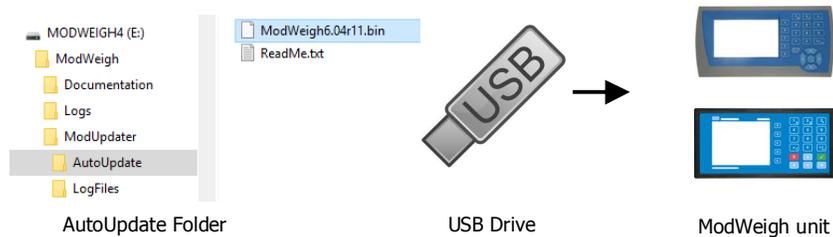
Updating Procedure

1. The USB drive needs to have three folders, ModWeigh, ModUpdater and AutoUpdate as shown.
2. Copy the ModUpdater binary file (ModWeigh6.XXrXX.bin) into the AutoUpdate folder.
3. When the USB drive is plugged into a compatible ModWeigh unit, update files will be copied.
4. Update files will be copied to all connected units.
5. The actual software update occurs after all files have been copied.

Update with a PC

| Windows™ PC | MAD | MAC | ModWeigh unit |
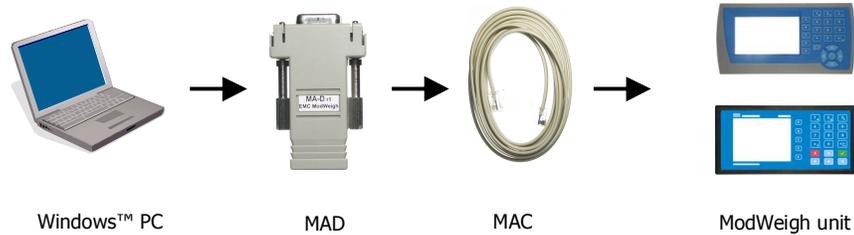
Updating Procedure

1. Copy the ModUpdater program (e.g. ModUpdaterv6.01r10.exe) onto a PC. The name contains the version number of the software to be installed.
2. Before starting, it may be advisable to record the settings in the unit if you wish to restore these after updating.
3. Connect the ModWeigh unit to an RS232 COM port of the computer. For this you must use the MAC cable and MAD adaptor.
4. Connect power to the ModWeigh unit, 24Vdc.
5. Double click on ModUpdater program.
6. The upgrade process should then begin. Following the instructions given, usually you can simply press ENTER at each stage.
7. Restore and/or check settings.

If this does not work, then turn the power off to the ModWeigh instrument and back on again as instructed by the ModUpdater program.

If you have any problems, you can contact your supplier.

SETTING UP GUIDE

This guide suggests how a system can be setup. Full details on each of the settings can be found in the 'Setup' sections following the guide.

Settings

To calibrate the system, you must access and adjust various settings in the unit. The settings are accessed using their **Quick Key** numbers.

Quick Keys

To Access A Setting

1. Press the Q key to access the setup menu.
2. Press the **Quick Key** number to go directly to the setting. The UP & DOWN keys can be used to go between sequential numbers.
3. To select another setting, repeat the above process.
4. Press and hold the BACK key to exit and return to normal operation.

To Adjust A Setting

1. Press the EDIT key.
2. If editing is locked, a password will be requested. Key in the password of 111 and press ENTER.
3. Use the keypad and/or UP and DOWN arrow keys to increase or decrease the displayed setting.
4. Holding either key down will automatically continually increase or decrease the value.
5. Press ENTER to accept the changes or BACK to revert to the previous setting.

Quick Keys Reference

The following table is a quick reference to common settings.

	Step	Quick Keys
	BASIC SETTINGS	
p25	Change the measuring range	212x
	INPUTS	
p26	Set the digital input terminal functions	221x
p26	Calibrate with weights	2232x
	INTERNAL SIGNALS	
	OUTPUTS	
p37	Change the 4-20mA output calibrations	241x
		242x
p38	Set the digital output terminal functions	243x

Step	Quick Keys
INFORMATION, RESETS & FINAL CALIBRATION	
p41 Set key locks or customise the display	256xx

Initial Setup

Engineering Units

By default the measuring units of the controller are;

- weight   kg

All settings must be entered using these measured units. The units can be changed if required.

Step	Quick Keys
p25 Select weight units	2112

Measuring Range

Set the measuring range to the largest value that will occur during normal operation. Most settings having the same units as one of the capacities are stored as a percentage of this capacity. If the capacity is changed, these settings will also change.

Step	Quick Keys
p25 Enter weight capacity	2121

Display Resolution

The display resolution for each engineering value can be changed if needed.

Step	Quick Keys
p25 Enter weight division	2131

SETUP – MW64A BATCH WEIGHER
Basic Settings

Basic Settings		
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Engineering units

These settings affect the engineering units that will be used for many other settings. The engineering units can be changed at any time. Note that you must enter settings in the same units as set here eg 750 g calibration weights must be entered as 0.75 kg if the weight units are kg.

Q2111	units metric/imperial [0=both, 1=metric, 2=imperial]	8042, g0	

Selects between metric units, imperial units or any if a mixture of metric and imperial units is required.

Q2112	weight units	8044[1]	kg=101

These are the engineering units that will be used for all weight settings except the totaliser (eg kg).

These are the engineering units that will be used for all flowrate settings (eg t/h).

Measuring range

If a signal exceeds the capacity setting, it will display as over-range. Therefore the range settings should be set larger than the maximum value that will occur during normal operation.

The measuring range affects the way many other settings are stored and displayed. These other settings are stored internally as a percentage of the relevant capacity. Once these capacities are set, the other settings, eg the analog output, will automatically work. Note that, in particular, the 'weight capacity' must be set before any other weight settings are entered.

[2]* Q2121	weight capacity (WCAP)	8060	1000 kg,t,g

Display resolution

The division settings affect to what resolution a signal is displayed. For most practical weighing systems, the total number of divisions will be within the range 500 to 5000.

Q2131	weight division	8070, g0	1 kg,t,g

Trade setup

Q2141	trade use check	8702, g7	🔍

Displays off if instrument is not suitable for trade use. Information on what needs changing for trade use is shown.

Q2142	calibration verification code	8714, g7	🔍

Whenever a setting is changed which may alter the trade calibration of the instrument, this value will change. It can be used to check if the calibration has been changed since this value was last recorded.

Q2143	calibration lock	8078, g7	off=0

When set to on, all settings which effect the trade calibration are locked.

Clock

The unit has a real time clock. The clock is used to date stamp printouts and can cause printouts (or other events) to occur at user set times during the day or week. The clock will run continue to run for a few days or weeks without power. The time is also shown in the top right corner of the display (if no alarms are present).

Q2191	clock enable	9910	0

Set to 0 to disable the clock or 1 to enable the clock. When disabled, time & date information is not shown on any printouts.

Daylight saving

Q21921	locality	9912	0

Selects the locality for daylight saving correction. Use the UP & DOWN keys to select a locality or set to 0 to disable daylight saving correction or set to CUSTOM to set your own correction dates. If CUSTOM is selected, the following three settings specify when the correction will be made.

Q21922	weekday & time for DST	9914	[3]

Selects the day of the week and time when the daylight saving correction will be made.

Q21923	start of daylight saving	9916	0

Selects the time of the year when daylight saving will start.

---

[1] Metric: 100=g, 101=kg, 102=t, Imperial: 110=oz, 111=lb, 112=tons

[2] * Appears in Quick Setup menu. These are the most important setting for this controller.

[3] Defaults to whatever the current setting is.

Q21924	end of daylight saving	9918	0

Selects the time of the year when daylight saving will end.

Q21925	daylight saving time (DST)	9920	0

Shows if daylight saving is on or off. If automatic daylight saving correction is off, then this setting may be used to move the clock forwards or backwards by one hour.

Set clock

Q21931	set date	9922	

Sets the date. For example to set 9 March 2021 enter 210309.

Q21932	set time	9924	

Sets the time in 24hour format.

Inputs

Basic Settings		
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Digital inputs

The following settings select the function of the digital inputs. The hint line shows (off) when there is no voltage present, and (on) when voltage is applied to the input.

The UP and DOWN keys can be used to select the function from the available list.

The list is shown in the **Instruction Manual** in the 'I/O Function Table'.

Q2211	IN1 function (& state)[4]	8170, g3[5]	stop key=31
Q2212	IN2 function (& state)	8172, g3	start key=29
Q2213	IN3 function (& state)	8174, g3	dump/refill=35
Q2214	IN4 function (& state)	8176, g3	batch wait=7
Q2215	IN5 function (& state)	8178, g3	dump/refill wait=8
Q2216	IN6 function (& state)	8180, g3	gates open=160
Q2217	IN7 function (& state)	8182, g3	reset total=32
Q2218	IN8 function (& state)	8184, g3	acknowledge alarms=45
Q2219	IN9 function (& state)	8186, g3	stop=1
Q2210	IN0 function (& state)	8190, g3	pause=3

Loadcell input (vessel weight)

Input settings

Q22311	AI1 response time [0.04 to 32]	8120, g1	0.50 s

The response time for the weight signal. A larger value will help reduce variations in the weight reading caused by vibrations or movement on the weighing system.

Q22312	lever ratio	8130, g1	1.0000

The lever ratio adjusts the weight reading during calibration. It is the ratio of calibration weight (test weight) to displayed weight (gross weight).

Q22313	4 or 6 wire connection	8128, g1	auto=0

Selects if the loadcell has a 4 wire or 6 wire connection to the instrument. If set to auto, it will power up in 6 wire mode, but switch to 4 wire mode if there is no sense voltage detected.

Q22314	loadcell scan	8168, g7	0

Set to 0 for normal operation. Selects the number of loadcells to be individually measured. Loadcell inputs P, Q, R, and S are multiplexed, measuring each one for the 'AI response time'. The individual signals are saved in 'AI1 signal P, Q, R & S'. The average signal is saved in 'AI signal'.

Calibration with weights

The basic procedure is to remove all weight from the weighing system and set the zero setting to 0.
Then a known weight is applied to the weighing system and the span setting adjusted to this weight.

---

[4] Hint line shows state as (on) or (off)
[5] See I/O Function Table page 47. Use negative numbers to reverse the signal sense eg 1=stop (stop when input is on), -1=NOT stop (stop when input is off).

* Q22321	AI1 zero (remove all weight & set to zero)	8910[6]	(shows weight) kg,t,g
* Q22322	AI1 span (apply weight & enter weight value)	8912[6]	(shows weight) kg,t,g

Calibrate loadcell

This is often the easiest method of calibration. It is useful to detect problems with the weighing mechanism which may not otherwise be shown using other calibration methods. It is also a quick method which can be used at anytime to check the loadcell and weighing system.

1. Press the Q key to access the setup menu.
2. Key in the quick key code 22321 to select the 'AI1 zero' step.
3.
4. Press the EDIT key. (If editing is locked, key in the password 111 and press ENTER).
5. Press the 0 key followed by ENTER and wait while the display shows 'Calibrating, please wait…'
6. Press ENTER twice to move to the 'AI1 span' step. (Or press the DOWN key).
7. Apply the known test weight.
8. Press EDIT and enter the value of the test weight followed by the ENTER key and wait while the display shows 'Calibrating, please wait…'.

   If possible, remove and apply the test weights several times checking the weight reading each time. Make sure the weight reading is within acceptable error limits. If not there may be a mechanical fault which should be fixed before proceeding with the calibration. Repeat the calibration process if necessary. (To return to the 'AI1 zero' step, press the UP key).
9. Press and hold the BACK key to return to normal operation.

Direct loadcell calibration

Q22331	loadcell capacity (sum of the capacity of all loadcells) [7]	8122	1000 kg,t,g

Set to be equal to the total capacity of all the loadcells in the weighing system. If there are two 50 kg loadcells, this setting should be 100 kg.

This setting can be adjusted even if the transmitter has been calibrated with test weights, and it will not alter the calibration. If set correctly, the 'system sensitivity' and 'deadload' settings will then show how the instrument has been calibrated.

Q22332	system sensitivity (average sensitivity of all loadcells)	8124	2.00000 mV/V

Shows the loadcell sensitivity (if the 'loadcell capacity' has been set correctly first).

If calibrating without test weights, set this value to the loadcell sensitivity. If there is more than one loadcell and if each loadcell has a slightly different sensitivity, use the average value. For example, if there are two loadcells with sensitivities 2.003 and 2.007 mV/V, set the 'system sensitivity' to 2.005 mV/V.

Q22333	deadload (dead weight on loadcells)	8126	1000 kg,t,g

Shows the approximate dead weight on the loadcell(s), provided the 'loadcell capacity' has been set correctly first.

If calibrating without test weights, then set this value to the weighing system's weight when there is no material load.

The loadcell can be calibrated using the loadcell(s) capacity and sensitivity supplied by the manufacturer. Using this method avoids the need to load and unload test weights onto the weighing system. If the system has already been calibrated using test weights, the actual dead load and loadcell sensitivity are displayed. These settings should not then be adjusted.

1. Press the Q key to access the setup menu.
2. Key in the quick key code 22331 to select the 'loadcell capacity' step.
3. Press the EDIT key. (If editing is locked, key in the password 111 and press ENTER).
4. Key in the total loadcell capacity followed by ENTER. This is normally the sum of all of the loadcell capacities (e.g. 4 x 100kg loadcells = 400kg total capacity).
5. Press BACK then 2 (or press the DOWN key) to move to the 'system sensitivity' step (QK 22332).
6. Key in the loadcell sensitivity followed by ENTER. This is normally the average of all of the loadcell sensitivities.
7. Press BACK then 3 (or press the DOWN key) to move to the 'deadload' step (QK 22333).
8. If you know or can estimate the deadload, key this in followed by ENTER. This value is the total weight of the mechanical components applied to the loadcell but excluding any material weight.
9. Press and hold the BACK key to return to normal operation.

---

[6] Entering a value initiates a calibration.

[7] WARNING: Altering loadcell capacity will NOT change the loadcell calibration, but will re-scale the system sensitivity and deadload values. Altering the system sensitivity or deadload values WILL change the loadcell calibration

If the deadload is unknown (as is usually the case), a loadcell zero should be performed.

1. Press the Q key to access the setup menu.
2. Key in the quick key code 22321 to select the 'AI1 zero' step.
3.
4. Press the EDIT key. (If editing is locked, key in the password 111 and press ENTER).
5. Press the 0 key followed by ENTER to initiate a zero calibration.
6. Press and hold the BACK key to return to normal operation.

Loadcell signals

These settings are used for diagnostics and fault detection on the loadcell input.

Q22351	AI1 signal	8700	🔍 mV/V

Displays the loadcell signal in mV/V.

Q22352	AI1 signal P	8710	🔍 mV/V
Q22353	AI1 signal Q	8712	🔍 mV/V
Q22354	AI1 signal R	8716	🔍 mV/V
Q22355	AI1 signal S	8718	🔍 mV/V

Displays each loadcell signal when scanning has been enabled. (refer to Q22314)

Q22350	loadcell check	8914, g7	off=0

Set to 1 (on) to measure mV/V signal of each loadcell.

Loadcell trim

These settings are used to trim the input gain of up to four loadcells. This can be used to correct for sensitivity differences when using 2, 3 or 4 loadcells. A typical application is corner adjustment of a platform scale.

Q22361	trim 1 [-1250 to 1251]	8132, g7	disabled =1251
Q22362	trim 2 [-1250 to 1251]	8134, g7	disabled =1251
Q22363	trim 3 [-1250 to 1251]	8136, g7	disabled =1251
Q22364	trim 4 [-1250 to 1251]	8138, g7	disabled =1251

The trim settings are set to 1251 when not in use, which sets the excitation voltages to their maximum.

Corner adjustment procedure:

1. Set trim 1 through to excitation 4 to the value 0.
2. Calibrate the scale (zero and span) with the test weights applied centrally.
3. Apply the test weight as close to loadcell1 as possible, adjust the setting 'trim 1' so that the weight reading corresponds to the test weight value.
4. Repeat for each of the remaining loadcells.

Current/Voltage input

When AI2 is available, a remote setpoint signal can be connected as either a current (eg 4 to 20mA) or as a voltage (eg 0 to 10V). The transmitter auto-detects whether the current or voltage input is active and uses the relevant calibration from the following settings.

Q2241	AI2 current low	8140, g2	4.000 mA

This is the low point of the analog signal (when using the current input) within the range 0 to 20 mA (typically set this variable to 4 mA).

Q2242	AI2 current high	8142, g2	20.000 mA

This is the high point of the analog signal (when using the current input) within the range 0 to 20 mA (typically set this variable to 20 mA).

Q2243	AI2 voltage low	8144, g2	0.000 V

This is the low point of the analog signal (when using the voltage input) within the range 0 to 10 V (typically set this variable to 0 V).

Q2244	AI2 voltage high	8146, g2	10.000 V

This is the high point of the analog signal (when using the voltage input) within the range 0 to 10 V (typically set this variable to 10 V).

Q2245	AI2 signal type	8148, g2[8]	1

This allows correct units and ranging to be applied to the AI2 signal. For example a setting of 1 converts the signal to a weight, a setting of 3 converts the signal to a flowrate.

Q2246	AI2 signal low	8150, g2[9]	0 kg,t,g

This is the signal that should correspond with the 'AI2 current low' or 'AI2 voltage low' point.

Q2247	AI2 signal high	8152, g2[9]	1000 kg,t,g

This is the signal that should correspond with the 'AI2 current high' or 'AI2 voltage high point.

---

[8] 0=general, 1=weight, 2=belt speed, 3=flowrate, 4=total, 5=belt loading, 6=length, 7=short length, 8=current, 9=voltage
[9] Signal units are determined by units of AI2 signal type

Q2248	AI2 current/voltage	8720, g2	🔍 mA or V

Displays the remote analog signal as a current or voltage.

Q2249	AI2 signal	8722, g2	🔍 kg,t,g

Displays the remote analog signal in engineering units.

Input options

Q2201	local/remote option	8188, g8	0

local/remote option	description
0	default
1	When in local mode, the run input function is disabled. When in remote mode, the start/stop key functions are disabled.

Internal Signals

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Weight

Basic weight

Q23111	gross weight	8740	🔍 kg,t,g

Displays the gross weight.

Q23112	tare weight	8222	0 kg,t,g

Set the tare weight.

Q23113	net weight	8742🔍	kg,t,g

Display of the current net weight (ie gross weight – tare weight).

Q23114	weight (gross or net weight depending on mode)	8744	🔍 kg,t,g

Displays the gross or net weight depending on the mode.

Weight zeroing

Q23121	zero range	8212	2.00 %

The maximum range as a percentage of the Weight Capacity over which a zero may be acquired. This restricts the operation of both an operator initiated zero (pressing the ZERO key) or an automatic zero when the zero tracking band is enabled.

Q23122	enable tracking zero [0=disable, 1=enable]	8214, g5	0

Enables or disables automatic zero tracking. If enabled, the weight reading is zeroed automatically if the motion indicator is off, the zero band indicator is on and the amount zeroed (since the last zero calibration) will stay within the zero range.

Q23123	zero band	8216, g5[10]	0.5 divs

Defines the zero band either side of zero. A setting of 0 sets a band of ± ¼ of a division. If set to 0.5kg, the zero band is between -0.5kg and +0.5kg This setting effects the automatic zero tracking if enabled.

Q23126	zero weight	8220	kg,t,g

Displays the amount of weight that has been zeroed out since the last zero calibration.

Weight motion

Q23131	motion detection band (set to 0 to disable) [0 to 50]	8230, g5[10]	3.0 divs

The weight is at in motion if it is outside the 'motion detection band' for longer than the 'motion detection time'.

Q23132	motion detection time [0.2 to 2]	8232, g5	1.0 s

The weight is at in motion if it is outside the 'motion detection band' for longer than the 'motion detection time'.

---

[10] Set in divisions of weight, the smallest weight increment as displayed when setting the weight capacity or weight divisions. [0.5 to 12]

Batching

Setpoints

Q23211	batch setpoint	8400	kg,t,g

Sets the batch weight. Set to 0 for continuous batching.

Q23213	slow cutoff	8398	kg,t,g

Sets the weight below the batch setpoint at which batching will stop.

For example if the batch weight is 100kg and the final end point is 2kg, batching will stop at 98kg.

Q23214	fast cutoff	8404	kg,t,g

Sets the weight below the batch setpoint at which the fast drive output will turn off. Fast filling is disabled when set to 'weight capacity', (press B4 to disable).

Q23215	bulk cutoff	8406	kg,t,g

Sets the weight below the batch setpoint at which the bulk drive output will turn off. Bulk filling is disabled when set to 'weight capacity', (press B4 to disable).

Batching setup

Q23221	batching mode	8370	0

Selects the operating mode for batching.

batching mode	description
0	batch in
1	batch in then dump
2	batch in – multi cycle
3	batch out
4	batch out with auto refill
5	batch out with manual refill
6	batch out – multi cycle

Batch in

The batching occurs by adding weight to the weigh vessel until the batch weight is reached. The material discharge can be controlled with the dump/refill drive output of the controller or for example by dropping the bag in a bagging system. A batch can not be started if the weight exceeds the 'high weight' setting.

Batch in then dump

After filling the weigh vessel to the batch weight, the dump output is activated to discharge the product.

Batch in – multi cycle

The batch weight may be set greater than the hopper capacity and the batch weight is reached by running multiple batch cycles automatically.

If the gross hopper weight is above the 'low weight' when starting, a 'hopper part full' error occurs.

A batch cycle consists of filling and dumping the hopper.

The 'high weight' sets the weight of each cycle. The three batch outputs will all operate together and turn off together at the bulk cutoff until the last batch cycle. The last two individual batch sizes are adjusted to ensure that the last batch size is not too small and that a normal dribble feed can occur.

Batch out

The desired batch weight is removed out of the weigh vessel. The 'low weight' sets the minimum gross weight to batch to. There must be sufficient material in the weigh vessel before the batch can be started.

If a refill is activated, the hopper is filled to the 'high weight'. Alternatively, the 'refill charge weight' sets what weight to add to the hopper (but limited so the gross weight will not exceed the 'high weight').

Batch out with auto refill

If there is not enough material to complete a batch, a refill will automaticlly occur at the start.

Batch out with manual refill

A manual refill may be requested during the batching process. One or two discharge operations will be required to complete the batch.

'Refill Manually' is displayed when is required. When the refill has been completed, it must be acknowledged by activating 'dump/refill' (key or input).

Batch out – multi cycle

The batch weight may be set greater than the hopper capacity and the batch weight is reached by running multiple batch cycles automatically. Similar to batch in – multi cycle.

Q23222	batch start operation	8372	0

Selects an operation at the start of a batch.

operation	description
0	no change
1	put into gross mode
2	put into net mode
3	tare at batch start
4	zero at batch start

Q23223	totalise option	8376	1

Sets what signal is totalised.

totalise option	description
0	totalising disabled
1	batched weight at batch end
	At the end of the batch, the batched weight is totalised. If batching in, the batched weight is the displayed weight at the end of the batch. If batching out, the batched weight is the difference in weight readings before and after the batch.
2	dumped weight at dump end (or refilled weight at refill end)
	At the end of a dump, the dumped weight is totalised. The dumped weight is the difference in weight readings before and after the dump.
	At the end of a refill (if in batch out mode), the refilled weight is totalised. The refilled weight is the difference in weight readings before and after the refill.

Q23224	motion bypass	8390	0

Normally a no motion condition is required at the start of a batch, the end of a batch, the start of a dump or refill and the end of a dump or refill. The motion bypass setting can disable the waiting at various parts of the cycle. This allows a batching cycle to run faster but does not allow an accurate weight reading to be taken at these points.

Motion Bypass is typically used for high speed batching systems.

It only applies to batch in modes.

motion bypass	description
0	off
1	before batch & after dump/refill (unless otherwise required)
2	after batch & before dump/refill (unless otherwise required)
3	everywhere (unless required)

The motion bypass is ignored at the start of a batch in the following conditions:

'Auto totalise' = 2.

A zero will occur (refer to the Batch tune settings).

The motion bypass is ignored at the end of a batch in the following conditions:

'Tolerance/jog mode' is enabled.

'Auto totalise' = 1.

A tune will occur (refer to the Batch tune settings).

Q23225	bag in place options	8394	0

Used in conjunction with the bag clamp logic.

bag in place options	description
0	disabled
1	start batch when bag in place, release clamp at end of batch if auto release = 1 (start key disabled)
2	release clamp at end of dump or during batch (if auto release = 1)

Q23226	batch simulate	8396	0

Set to enable simulating a batch weigh hopper.

option	description
0	disabled
1	slow gate speed (0.4s)
2	medium gate speed (0.2s)
3	fast gate speed (0.1s)
4	slow gate speed – surge hopper feed (0.4s)
5	medium gate speed – surge hopper feed (0.2s)
6	fast gate speed – surge hopper feed (0.1s)

The gate speed is the opening and closing time of the simulated flow control gates.

When simulation is on 'user bit1' inhibits the simulated filling drives and 'user bit2' inhibits the simulated 'dump drive'.

Batching weights

Q23241	low weight	8408	kg,t,g

Batch in (all)

During a dump process when the weight drops below this value (after the 'dump hold delay'), the dump/refill drive turns off.

Batch Out (all)

The controller will aim to always leave at least this weight of material in the hopper after a batch.

Q23242	high weight	8410	kg,t,g

Batch in & Batch in with dump

Sets the 'max gross weight to start'. If the gross weight exceeds this value when starting a batch, a 'hopper part full' alarm occurs.

Batch in – multi batch

Sets the 'batch cycle weight'.

Batch out

Batch out with auto refill

Batch out – multi cycle

Sets the 'refill end weight', the weight to end a refill (unless 'refill charge weight' is used).

Batch out with manual refill

Sets the 'max gross weight to start refill'. Refills will only be requested of the weight is below this value.

Q23243	refill charge weight	8412	kg,t,g

Batch in (all)

Not used.

Batch out (all)

Set to 0 to disable. Sets a weight to add to the hopper when refilling. An alternative to filling to a fixed gross weight value, the 'high weight'

Q23244	minimum batch weight	8418	kg,t,g

Sets the minimum allowable batch weight. A batch will not start if the Batch Setpoint is below this value. It is also used to check if a batch is complete at the end of multi cycle batching.

Analog drive

Q23251	slow signal	8280	20%

Adjusts the 4-20mA slow filling speed if used.

Q23252	fast signal	8282	100%

Adjusts the 4-20mA fast filling speed if used.

Q23253	bulk signal	8284	100%

Adjusts the 4-20mA bulk filling speed if used.

Q23254	batch drive signal	8768	🔍 %

This is the current filling speed set to one of the three signals above or 0% when batching is not operational. Used by an analog output to give a 4-20mA fill control signal.

Tolerance and jogging

Q23261	tolerance mode	8374	0

Enables under/over weight tolerance checking. Provides options for what to do when the weight is out of tolerance. Jogging pulses the slow drive to add more weight. Jogging is manual if the 'jog time' is 0 or automatic if a jog time is set.

options	description
0	disabled
1	set under/over weight
2	set under/over weight, jog on under weight
3	set under/over weight, jog on under weight, wait on over weight
4	set under/over weight, wait on over weight

When waiting on an over weight, activate the 'manual jog/continue' input to continue.

A manual jog is activated using the 'manual jog/continue' input. The slow drive will be on while the input is activated.

Q23262	under weight tolerance	8414	kg,t,g

Disabled if 'tolerance mode' = 0.

Q23263	over weight tolerance	8416	kg,t,g

Disabled if 'tolerance mode' = 0.

Q23264	jog time	8428	0.00s

When automatic jogging is used, the jog time sets the length of time to activate the 'slow drive' output for each jog. Time between jogs is set using the 'batch end delay'.

Set to 0 for manual jogging.

Q23265	max jogs	8392	10

Limits the maximum number of automatic jogs that can occur. If the weight is still under tolerance after this number of jogs, the unit will wait for the operator to manually jog or stop the batch.

Delays

Q23271	minimum slow time	8424	0.00s

The 'slow drive' output is held on for a minimum of this time. This allows for an overshoot of weight at the end of the fast fill, without the batch ending prematurely.

Q23272	batch end delay	8430	2.00s

A time delay after filling is completed before the weight is acquired.

Q23273	dump hold delay	8432	0.00s

A delay during dumping that the dump/refill drive remains on after the weight has dropped below the 'low weight'. Only applies to batch in modes.

Q23274	dump/refill end delay	8434	0.00s

A delay after the dump/refill drive turns off.

Timeouts

Q23281	motion timeout	8420	10.0s

At points during the batching, dumping or refilling sequence a no motion condition is required to acquire the weight prior to printing, totalising etc. The controller will either wait or continue after the timeout, see 'timeout options'.

If a timeout occurs, a prompt 'Wait: no motion' or 'Cont: no motion' will be displayed. If the timeout is set to a negative value, a 'motion timeout' alarm is raised instead.

Set to 0 to disable.

Q23282	batch no flow timeout	8422	0.0s

Used to detect no material flow during batching. During batching, the motion signal is monitored to check that the weight is changing and hence material is flowing. For no flow detection to work correctly, the motion band must be set appropriately. The controller will either wait or continue after the timeout, see 'timeout options'.

If a timeout occurs, a prompt 'Wait: no flow' or 'Cont: no flow' will be displayed. If the timeout is set to a negative value, a 'no filling during batch' alarm is raised instead.

Set to 0 to disable.

Q23283	batch gate timeout	8426	10.0s

At the end of a batch a wait occurs until the 'gates open' and 'fill gate open' signals are both off, indicating that the fill gate is closed. The controller will either wait or continue after the timeout, see 'timeout options'.

If a timeout occurs, a prompt 'Wait: gate open' or 'Cont: gate open' will be displayed. If the timeout is set to a negative value, a 'fill gate timeout' alarm is raised instead.

Set to 0 to disable.

Q23284	dump/refill gate timeout	8386	10.0s

At the end of a dump (or refill) a wait occurs until the 'gates open' and 'dump/refill gate open' signals are both off, indicating that the gate is closed. The controller will either wait or continue after the timeout, see 'timeout options'.

If a timeout occurs, a prompt 'Wait: gate open' or 'Cont: gate open' will be displayed. If the timeout is set to a negative value, a 'dump/refill gate timeout' alarm is raised instead.

Set to 0 to disable.

Q23285	dump/refill no flow timeout	8436	10.0s

Used to detect no material flow during a dump or refill. During a dump/refill, the motion signal is monitored to check that the weight is changing and hence material is flowing. For no flow detection to work correctly, the motion band must be set appropriately. The controller will either wait or continue after the timeout, see 'timeout options'.

If a timeout occurs, a prompt 'Wait: no flow' or 'Cont: no flow' will be displayed. If the timeout is set to a negative value, a 'no flow during dump/refill' alarm is raised instead.

Set to 0 to disable.

Q23289	timeout options	8388	0

Each of the above timeout settings can be set to give an operator prompt or an alarm. The timeout options allow the controller to be set to continue or wait after a promp or an alarm.

timeout option	action after prompt	action after alarm
0	wait	wait
1	wait	continue
2	continue	wait
3	continue	continue

Batch tuning

Q23291	zero frequency	8438	0

Sets after how many batches an auto zero will occur. Set to 0 to disable.

Q23292	tune frequency	8440	0

Sets after how many batches a tune will occur. Set to 0 to disable. A tune automatically adjusts the 'slow cutoff' and optionally the 'fast cutoff' after each batch to achieve a more accurate batch weight and faster batch timing.

Q23293	tune rate	8442	1

Sets how much to adjustment to make at each tune.

Q23294	tune limit	8444	kg,t,g

A tune will only occur if the batch weight error is less than this value.

Q23295	slow time target	8446	0.00s

A tune adjusts the 'fast cutoff' to bring the slow drive on time closer to this value. Set to 0 to disable 'fast cutoff' adjustment.

Q23296	tune target weight	8448	kg,t,g

An adjustment to allow the tuning to aim for a batch weight slightly higher than the set batch weight. Used to reduce under weight batches.

Batch monitoring

Q23201	batch number	8770	

A 3 digit batch count which increments after each batch.

Q23202	batched weight	8772	🔍 kg,t,g

The weight batched so far. Set to 0 at the start of a batch.

Q23203	last batched weight	8774	🔍 kg,t,g

Updated from the 'batched weight' when a batch is finished.

Q23204	batch info	8776	🔍

A summary of weights and flowrates during a batch.

Q23205	timing info	8778	🔍

A summary of timing and the batching rate while batching is in progress.

Totaliser

Q2344	total weight	8730, g6	0.00 kg,t,g

Displays the weight totaliser. The total is retained after a power failure.

Q2345	running total	8732, g6	0.00 kg,t,g

Displays a running weight total. This total is not reset by the RESET TOTAL operation.

Q2346	totaliser digits	8320, g6	6

Sets the number of digits the totaliser counts to.

Q2347	max pulse output rate	8318, g6	1Hz

Sets the maximum pulse output rate.

Limits

Limit 1

Q23511	limit 1 source (modbus address of signal)	8350, g7	

Set this to the modbus address of the signal that will be compared with the setpoint.

Q23512	limit 1 mode	8354, g7	high limit = 0

Sets the limit operating mode.

limit mode	description
0	high limit
1	low limit
2	outside band
3	inside band
4	fill control
5	empty control

Q23513	limit 1 delay	8352, g7	0.00 s

Sets a delay to activate or de-active the limit.

Q23514	setpoint 1	8330, g7	

Sets the limit value.

Q23515	setpoint 1 preact	8356	

Sets the preact value.

Limit 2

Q23521	limit 2 source (modbus address of signal)	8360, g7	
Q23522	limit 2 mode	8364, g7	low limit = 1
Q23523	limit 2 delay	8362, g7	0.00 s
Q23524	setpoint 2	8332, g7	
Q23525	setpoint 2 preact	8366	

Limit 3

Q23531	limit 3 source (modbus address of signal)	8340, g7	
Q23532	limit 3 mode	8344, g7	fill control = 4
Q23533	limit 3 delay	8342, g7	0.00 s
Q23534	setpoint 3H	8334	
Q23535	setpoint 3L	8346	

Events/Alarms/Faults

Various events can be triggered by the inputs (eg to capture the weight) or automatically when certain situations are detected by the transmitter. Each event has an ID and produces a value.

Q2361	event ID	8780, g8	🔍

ID of most recent event.

Q2362	event value	8782, g8	🔍

Value of most recent event.

Q2363	last alarm event	8784, g8	🔍

Value of most recent event.

Q2364	alarm list (press EDIT to view list of all possible alarms)	8920, g8	

Scroll through a list of all possible alarms.

Q2365	delay time [0.00 to 300.00]	8458, g8	0.00 s

A timer used by the macros.

Q2366	healthy options	8456, g8	0

Selects which faults control the healthy signal.

Q2368	captured weight	8786	🔍 kg,t,g

On the rising edge of a 'capture weight' input signal, the weight is captured and recorded here.

Q2369	fault options	8454	

Allows selected faults to not raise an alarm.

Memory Storage

Memory storage is used to save or recall a group of settings to memory. This can for example be used to save different settings that change for different products. The instrument can store up to 20 groups of settings.

Memory Setup

Q23811	memory usage	8680, g8	0

Selects how the memory will be used. Several preset choices are available or it may be set for a custom setup.

memory usage	description	default memory store name
0	disabled	
1	custom	
2	setpoint 1	PRODUCT
3	setpoints 1 & 2	PRODUCT
4	loadcell calibration	CALIBRATION
5	not used	
6	not used	

Q23812	data 1 source	8670, g8	0
Q23813	data 2 source	8672, g8	0
Q23814	data 3 source	8674, g8	0
Q23815	data 4 source	8676, g8	0

The four items above contain the addresses of settings that will be stored in the group memory. The addresses can only be set if the memory usage is set to 'custom'.

Q23810	memory store name	3600, g8	

This sets a name for the memory store. If a text name is entered, it will replace the word 'GROUP' in the following memory settings.

Memory Recall/Store

The following 3 settings are used to recall or store a group of settings and to set a name for each group. The groups are numbered from 0 to 19. Unless the memory usage is disabled, these settings will appear in the operator's MENU, accessed by pressing the MENU key.

Q23821	recall GROUP	8816, g8	0
Q23822	store GROUP	8814, g8	0
Q23823	edit GROUP name	3700, g8	

Edit Stored Memory

The following allow a group of stored settings to be altered without recalling them first. The 'GROUP to edit' is set to the group number 0 to 19, and the remaining steps used to edit the stored values.

Q23831	GROUP to edit	8818, g8	0
Q23832	GROUP name	3800, g8	
Q23833	data 1 source not used	8820, g8	0
Q23834	data 2 source not used	8822, g8	0
Q23835	data 3 source not used	8824, g8	0
Q23836	data 4 source not used	8826, g8	0

User data

Additional user data which for example may be used by macros.

The PERM settings are retained when the power is removed from the controller.

The TEMP settings are not retained when the power is removed from the controller.

Retained

Q23911	perm 1	8596, g13	0
Q23912	perm 2	8598, g13	0
Q23913	perm 3	8570, g13	0
Q23914	perm 4	8572, g13	0
Q23915	perm 5	8574, g13	0

Other data

Q23921	temp 1	8612, g13	0
Q23922	temp 2	8614, g13	0
Q23923	temp 3	8576, g13	0
Q23924	temp 4	8578, g13	0
Q23925	temp 5	8582, g13	0
Q23928	date	8830, g13	🔍

Displays the date in the form 'YYMMDD'.

Q23929	time	8832, g13	🔍

Displays the time in the form 'HHMM'.

Outputs

Analog output 1 (batch drive signal)

These variables select which signal should appear on the analog output and how it is to be scaled.

The speed demand varies from 0 to 100 % where 0 % means stopped and 100 % means maximum speed. This demand is converted to an analog signal for connection to the motor speed controller. As an example, a speed demand ranging from 0 to 100 % is to be converted to an analog signal ranging from 4 to 20 mA.

Q2411	AO1 source (modbus address of signal)	8520, g10 batch drive signal=8768

Set this to the address of the transmitter's signal that will be output via AO1.

Q2412	AO1 signal low	8522	0.0 **%**

This is the low point of the signal to corresponding to the 'AO1 current low' setting (typically set to 0).

Q2413	AO1 signal high	8524	100.0 **%**

This is the high point of the signal corresponding to the 'AO1 current high' setting (typically set to the capacity of the signal).

Q2414	AO1 current low	8526, g10	4.000 mA

This is the low point of the analog output signal within the range 0 to 20 mA (typically set to 4mA).

Q2415	AO1 current high	8528, g10	20.000 mA

This is the high point of the analog output signal within the range 0 to 20 mA (typically set to 20mA).

Q2416	AO1 current (can override output signal)	8800, g10	mA

Displays AO1 current. This setting may be altered to temporarily manually set the output current. This is useful to test the analog output. The output will return to normal after you exit from the settings.

Q2417	AO1 signal (can override output signal)	8804	**%**

Displays the signal currently being output. If this value is altered, the output is set to a value corresponding to the signal. This is useful to test the analog output. The output will return to normal after you exit from the settings.

Analog output 2 (gross weight)

These variables select which signal should appear on the analog output and how it is to be scaled.

Q2421	AO2 source (modbus address of signal)	8530, g10	gross weight=8740

Set this to the address of the transmitter's signal that will be output via AO2.

Q2422	AO2 signal low	8532	0.0 **WU**

This is the low point of the signal corresponding to the 'AO2 current low' setting (typically set to 0).

Q2423	AO2 signal high	8534	WCAP **WU**

This is the high point of the signal corresponding to the 'AO2 current high' setting (typically set to the capacity of the signal).

Q2424	AO2 current low	8536, g10	4.000 mA

This is the low point of the analog output signal within the range 0 to 20 mA (typically set to 4mA).

Q2425	AO2 current high	8538, g10	20.000 mA

This is the high point of the analog output signal within the range 0 to 20 mA (typically set to 20mA).

Q2426	AO2 current (can override output signal)	8802, g10	mA

Displays AO2 current. This setting may be altered to temporarily manually set the output current. This is useful to test the analog output. The output will return to normal after you exit from the settings.

Q2427	AO2 signal (can override output signal)	8806	**WU**

Displays the signal currently being output. If this value is altered, the output is set to a value corresponding to the signal. This is useful to test the analog output. The output will return to normal after you exit from the settings.

Digital outputs

The following settings select the function of the digital outputs. The hint line shows (off) when the output is at 0V, and (on) when it is at +V1.

The UP and DOWN keys can be used to select the function from the available list.

If the negative value of the output function is used, the signal sense is reversed. eg 16=motion (output on when weight is in motion), -16=NOT motion (output off when weight is in motion).

The list is shown in the 'Instruction Manual' in the 'I/O Function Table'.

Q2431	OUT1 function (& state)[11]	8550, g11[12]	fast drive=84
Q2432	OUT2 function (& state)	8552, g11	running=57
Q2433	OUT3 function (& state)	8554, g11	dump/refill drive=86
Q2434	OUT4 function (& state)	8556, g11	limit 2 output=81
Q2435	OUT5 function (& state)	8558, g11	limit 1 output=80
Q2436	OUT6 function (& state)	8560, g11	bulk drive=83
Q2437	OUT7 function (& state)	8562, g11	clamp close drive=87
Q2438	OUT8 function (& state)	8564, g11	alarm alert=63
Q2439	OUT9 function (& state)	8566, g11	slow drive=85
Q2430	OUT0 function (& state)	8568, g11	pulse output=48

Communications & Display

Basic Settings		
Inputs	Internal Signals	Outputs
Communications & Display		
Information, Resets & Final Calibration		

Comms port 1 - RS232

Q2511	COM1 baud rate (8 data, no parity, 2 stop)	8580, g12	19200

Sets the communications speed.

Q2512	COM1&2 modbus address [1 to 30]	8592, g12	1

modbus address.

Q2513	COM1 stop bits	18052, g12	0

stop bits	description
0	automatic (1 stop on receive, 2 bits for send)
1	1 stop bit
2	2 stop bits

Q2514	COM1 mode	18060, g12	0

COM1 mode	description
0	auto : use extended modbus
1	modbus : use standard modbus

Setting to modbus may speed up the select key in some situations where strict modbus protocols are required. For example Modbus gateways and convertors.

Q2515	COM1 handshake enable [0=disable, 1=enable]	8584, g12	0

When set to 1, hardware handshaking is enabled. Set to 0 to disable hardware handshaking.

Q2510	COM1 error count	8810, g12	🔍

Comms port 2 - RS485

Q2521	COM2 baud rate (8 data, no parity, 2 stop)	8590, g12	230400

Sets the communications speed.

Q2522	COM1&2 modbus address [1 to 30]	8592, g12	1

modbus address.

Q2523	COM2 stop bits	18054, g12	0

---

[11] Hint line shows state as (on) or (off)

[12] See I/O Function Table page 47. Use negative numbers to reverse the signal sense eg 16=motion (output on when weight is in motion), -16=NOT motion (output off when weight is in motion)

Q2524	COM2 mode	8838, g12	0

COM2 mode	description
0	auto : use mwbus – automatic fall back to modbus slave
1	modbus : use standard modbus

If this port is connected to an external modbus master, then this should be set to modbus.

Q2520	COM2 error count	8812, g12	🔍 Hz

Shows the operating mode (MWBUS or MODBUS). The 'cycle time' is the MR1 update rate. A list of device addresses on the bus is shown. Communications error counts are shown, which should usually read 0.

Comms port 3 - RS485 MR1

Q2531	COM3 baud rate (8 data, no parity, 2 stop)	8588, g12	115200

Sets the communications speed.

Q2533	COM3 stop bits	18056, g12	0

Interface registers

These registers are the recommended registers to use for extracting the basic signals from the transmitter via Modbus. The advantage of using these registers is that multi-register Modbus commands can be used to make the interface more efficient.

A control or status register contains 32 bits of on or off information. When one of these registers is displayed, a bit is selected by using the left and right arrow keys.

Registers 1

Q25411	gross weight	8000, g12
Q25412	net weight	8002, g12
Q25413	weight	8004, g12
Q25414	setpoint 1	8006, g12
Q25415	total weight	8008, g12
Q25416	flowrate	8010, g12
Q25417	control1 & control2	8012, g12
Q25418	control3 & status1	8014, g12
Q25419	status2 & status3	8016, g12
Q25410	IOx & faults	8018, g12

Registers 2

Q25421	no function	8020, g12
Q25422	no function	8022, g12
Q25423	no function	8024, g12
Q25424	no function	8026, g12
Q25425	speedC	8028, g12
Q25426	ratioC	8030, g12
Q25427	setpointC	8032, g12
Q25428	control2 & control3	8034, g12
Q25429	control1C & control1G	8036, g12
Q25420	IO Control	8038, g12

Printing & Macros

Q2551	print settings and macros[13]	8922, g13	0

Used to start a print out of the settings or of the macros. Select the number of the print out required.

number	printout
1	print quick settings
2	print main settings
3	print service macros
4	print altered settings
5	print altered macros
6	print all macros

---

[13] 0=press EDIT then use up & down keys to select printout, 1=print quick settings, 2=print main settings, 3=print service settings, 4=print altered settings, 5=print altered macros, 6=print all macros

Print options

Q25521	print continuous rate[14]	8610, g13	0

Sets the rate at the which the print continuous macro is run. Use the UP and DOWN keys to select the rate.

Q25522	disable macros [0=off, 1=on]	8616, g13	0

Disables all macros from running. This includes the system name macro.

Q25523	event print control	8586, g13	0

Controls what data is logged to the internal User Log File

control	description
1	None
2	AlarmLog
3	
4	BatchSummary
5	
6	BatchDetail

Q25524	key macro options	8508, g13	0

Sets the behaviour of some of the operator key functions such as START and STOP.

options	description
0 - 9	Preset options (fixed).
10-19	Behaviour maybe customised with the Key Macros. The default macros are the same as the preset options. e.g. If set to 10, the default Key Macro is the same as when the option is set to 0. Similarly 11 to 1, 12 to 2 etc.

Q25525	macro output select	8506, g13	0

Selects which port data from macros and 'event print control' is output. By default, data is output on the controllers COM1 (RS232) port.

Ports on other devices connected to the controller can be selected, including some RS485 ports and USB virtual comm ports.

Macros

Q25531	print macro	1000, g13

This macro is run when PRINT is activated.

Q25532	print total macro	1100, g13

This macro is run when PRINT TOTAL is activated.

Q25533	print remote macro	1200, g13

This macro is run when a digital input with the function print, is activated.

Q25534	print total remote macro	1300, g13

This macro is run when a digital input with the function print total, is activated.

Q25535	user function 1 macro	3200, g13
Q25536	user function 2 macro	3300, g13
Q25537	user function 3 macro	3400, g13

These macros run when the user function (in the operator menu) is activated.

Macro subroutines

Q25541	system name macro	2000, g4

This macro sets the units name. This name is displayed by the display to identify the unit.

Q25542	print key subroutine	2100, g13

A subroutine used by the print key macro.

Q25543	print total key subroutine	2200, g13

A subroutine used by the print total key macro.

Q25544	settings subroutine	2300, g13

A subroutine used by the print settings macro.

Q25545	macros subroutine	2400, g13

A subroutine used by then print settings macro.

Q25546	heading subroutine	2500, g13

A subroutine used by the several macros to identify the unit on the printout.

---

[14] 0=off, 1=100Hz, 2=50Hz, 3=20Hz, 4=10Hz, 5=5Hz, 6=2Hz, 7=1Hz, 8=2s, 9=5s, 10=10s, 11=30s, 12=1min, 13=2min, 14=5min, 15=10min

Q25547	information subroutine	2600, g13

A subroutine used by several macros to print information about the system.

Q25548	user subroutine 1	2700, g13

This macro is not used by default, and is free for the user to use.

Q25549	user subroutine 2	2800, g13

This macro is not used by default, and is free for the user to use.

Event Macros

Q25551	print continuous macro	1700, g13

This macro runs when the print continuous rate is not set to off.

Q25552	power up macro	1800, g13

This macro runs each time the controller powers up.

Q25553	times to print	1400, g13

This macro sets the times of the day and week when the print at times macro is run. This macro contains a list of times and optionally days of the week. Examples of how it may be set follows.

macro	print at times macro runs
0:00 8:00 12:00 20:00	At midnight, 8am, midday and 8pm
9:00 15:00 M-F; 12:00 SA	At 9am & 3pm Monday to Friday and 12pm Saturday
:30	At half past the hour, every hour

Time specifications are separated with a space or comma (,). A semicolon (;) is used to separate a group of specifications. The days of the week are identified using the following letters M, TU, WE, TH, F, SA, SU. Upper or lower case letters may be used.

Q25554	print at times macro	1500, g13

This macro runs at the times specified by the times to print macro.

Q25555	capture weight macro	3000, g13

This macro is run when an input set to the capture weight function is activated.

Q25556	event macro	3100, g13

This macro runs when any change is detected in the following registers. Control1, Control2, Control3, Status1, Status2, Status3 or IOx. (see the 'I/O Function Table' in the 'Instruction Manual'). This corresponds to the Input & Output Function 0 through 111. Exceptions to this are changes on the pulse input and/or pulse output bits 0, 96 & 104 when they are used.

In the macro, the IF_EVENT ‹condition› can be used to select an event to react to. The argument ‹condition› refers to the input/output function 0 to 111.

Q25557	print settings macro	1600, g13

This is the macro run when the print settings & macros is set.

Q25558	at 1Hz macro	1900, g13

This is the macro runs continuously every second.

Q25559	at 10Hz macro	2900, g13

This is the macro runs continuously 10 times per second.

Batching Macros

These macros run at various points through the batching process.

Q25561	start of batch macro	4500, g13
Q25562	end of batch macro	4600, g13
Q25563	before batch cycle macro	4700, g13
Q25564	after batch cycle macro	4800, g13

Key Macros

These macros determine the behaviour of some of the opertor key functions. See also the 'key macro options' (Q25524).

Q25571	start key macro	5000, g13
Q25572	pause key macro	5100, g13
Q25573	stop key macro	5200, g13
Q25574	start2 key macro	5300, g13
Q25575	stop2 key macro	5400, g13

Display (MD1,MD2,MP1,MP2)

Operator menu 1 locks

These settings allow operator menu items to be locked.

These settings allow functions assigned to the number keys to be locked (ie password protected, locked out entirely or confirmation of the action requested).

setting	lock function
0	Never locked
1	A pass code is required before the key may be used
2	The key is always locked and cannot be used
3	Confirmation of the key action is requested

Q25611	acquire zero lock	8620, g4[15]	0.02
Q25612	acquire tare lock	8622, g4[15]	0
Q25613	toggle net/gross mode lock	8624, g4[15]	0
Q25614	reset tare weight lock	8626, g4[15]	0
Q25615	totalise weight lock	8628, g4[15]	0
Q25616	reset total weight lock	8630, g4[15]	0
Q25617	reset peak weight lock	8632, g4[15]	0
Q25618	tare weight lock	8634, g4[15]	0
Q25619	operator menu 19 lock	8636, g4[15]	0

Operator menu 2 locks

Q25621	setpoint 1 lock	8638, g4[15]	0
Q25622	setpoint 2 lock	8640, g4[15]	0
Q25623	user function 1 lock	8642, g4[15]	0
Q25624	user function 2 lock	8644, g4[15]	0
Q25625	user function 3 lock	8646, g4[15]	0
Q25626	operator menu 26 lock	8682, g4[15]	0
Q25627	operator menu 27 lock	8684, g4[15]	0
Q25628	operator menu 28 lock	8266, g4[15]	0
Q25629	operator menu 29 lock	8268, g4[15]	0

Operator menu 3 locks

Q25631	operator menu 31 lock	8650, g4[15]	0
Q25632	operator menu 32 lock	8652, g4[15]	0
Q25633	operator menu 33 lock	8654, g4[15]	0
Q25634	operator menu 34 lock	8656, g4[15]	0
Q25635	operator menu 35 lock	8658, g4[15]	0
Q25636	operator menu 36 lock	8660, g4[15]	0
Q25637	operator menu 37 lock	8662, g4[15]	0
Q25638	operator menu 38 lock	8664, g4[15]	0
Q25639	operator menu 39 lock	8666, g4[15]	0

Operator menu 4 locks

Q25641	display select lock	8678, g4[15]	0
Q25642	Alarm Menu lock	8688, g4[15]	0

Display customisation

Q25651	identification line [0=off to 1=on]	8608, g4	1

Allows the top display line (identification line) to be turned off. This line shows the name of the transmitter currently in use, and optionally shows the time or current alarm number.

Q25652	main line options	8668, g14	1

Controls the main display.

Add up the numbers in the following table to change the display as described.

Value	Display	Description
4	112	show alarm number

Q25653	secondary line options	8648, g14	0

Controls the secondary line, below the main large display.

Add up the numbers in the following table to change the display as described.
The above two settings allow up to two additional settings to be added to the items displayed in the bottom line of the display. These items are selected during normal use with the DISPLAY key.

Q25656	menu sourceA	8604, g14	0
Q25657	menu sourceB	8606, g14	0
Q25658	menu sourceC	8594, g14	0

The above three settings allow up to three additional settings to be added to the operator menu. These items will appear in the menu shown when the MENU key is pressed during normal operation.

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[15] 0=never locked, 1=locked with pass code access, 2=always locked (pass code = 99)

Q25659	display select options	8678, g14	0

Controls the select line at the bottom of the display.

Add up the numbers in the following table to change the display as described.

Value	Description
1	permanently hide the whole line
2	hide the logo

Softkey customisation

These settings set the functions of each of the soft keys A, B, C, D and E.

Q25661	key A function & lock	8690, g4	5
Q25662	key B function & lock	8692, g4	17
Q25663	key C function & lock	8694, g4	32
Q25664	key D function & lock	8696, g4	15
Q25665	key E function & lock	8698, g4	29

Signal customisation

These settings allow the names and units of any signal to be changed.

Signal 1

Q256711	signal 1 source	18000
Q256712	signal 1 name	4000
Q256713	signal 1 type	18010

Signal 2

Q256721	signal 2 source	18002
Q256722	signal 2 name	4100
Q256723	signal 2 type	18012

Signal 3

Q256731	signal 3 source	18004
Q256732	signal 3 name	4200
Q256733	signal 3 type	18014

Signal 4

Q256741	signal 4 source	18006
Q256742	signal 4 name	4300
Q256743	signal 4 type	18016

Signal 5

Q256751	signal 5 source	18008
Q256752	signal 5 name	4400
Q256753	signal 5 type	18018

USB

The controller setup can be saved to a file on a USB drive. The setup may also be loaded from a saved file. User log files and system log files can also be saved to the drive.

Q2581	save setup	8938

Set to 1 to save the setup to a file on a USB drive. It is saved in a folder called ModWeigh\Setup. The file will be named 'AA PP SSSSS MM.csv, where AA is the modbuss address of the unit, PP is the product number, SSSSS is the units serial number and MM is the model of the unit.

The file is a comma separated list of settings, strings and memory storage which can be viewed as a spreadsheet.

Q2582	select 'load setup' file	8940

This allows a file to be selected to be loaded. The file must have a .csv extension and must be in a folder called Setup which itself must be in a folder called ModWeigh. To select a file, press the 'C' key to show a list of the files found.

Q2583	load setup	8942

Use the UP and DOWN keys to select what data to load from the selected file.

setting	lock function
1	exclude: strings, memory storage, loadcell calibration, totaliser, comms, calibration lock
2	load strings (macros)
3	load memory storage
4	load loadcell calibration

Q2584	save user log	8944	
Q2585	save system logs	8946	

Display settings

The following settings only appear in MP1,MP2.

Q25693	disable beeper	8518	0
Q25694	comms latency	8510	0 mS

Info, Resets & Final Cal

Basic Settings		
Inputs	Internal Signals	Outputs
Communications & Display		
Information, Resets & Final Calibration		

Product Information

These settings can only be viewed, and show important features of the transmitter.

Q2611	system name	8844[16]	🔍 Batch Weigher 1

Displays the name of the product. This is usually displayed on the top line of a ModWeigh display. It is created by the system name macro.

Q2612	product serial number	8852	🔍

Displays the serial number of the product

Q2613	software version number	8854	🔍

Displays the version number of the software currently installed in the product.

Q2614	CPU type	8858	🔍

Displays the CPU type.

Q2615	product key	8864	🔍

Displays the product key if it has been applied.

Q2616	P-Module serial number	8860	🔍

Displays the serial number of the P-Module.

Q2617	MR1 serial number	8862	🔍

Displays the serial number of the MR1 unit if connected.

Q2618	MO3 serial number	8866	🔍

Displays the serial number of the MO3 option if fitted.

Reset settings

Q2631	reset loadcell calibration (1=reset to defaults)	8950	0

Set to 1 to reset the loadcell calibration to the default.

Q2632	reset comms settings (1=reset to defaults)	8952, g12	0

Set to 1 to reset the comms settings back top their defaults.

Q2633	reset other settings (1=reset to defaults)	8954	0

Set to 1 to reset all user settings to the defaults. A Quick or Main setup is required next. Does not reset the loadcell calibration, comms settings or any of the macros.

Reset macros

Q2641	reset all macros (1=reset to defaults)	8956, g13	0

Set to 1 to reset all the macros to the defaults. Does not reset any settings.

Final calibration

Loadcell Calibration

Q2661	AI1 zero	8910	0
Q2662	AI1 span	8912	0

---

[16] Defined by the "system name macro" at Quick Key 25541

SETUP – DISPLAY
Basic Settings

Clock

The display has a clock whose data is sent to each transmitter connected to it. The clock is used to date stamp printouts and can cause printouts (or other events) to occur at user set times during the day or week. The clock will run continue to run for a few days or weeks without power. The time is also shown in the top right corner of the display (if no alarms are present).

Q92191	clock enable	9910	0

Set to 0 to disable the clock or 1 to enable the clock. When disabled, time & date information is not shown on any printouts.

Daylight saving

Q921921	locality	9912	0

Selects the locality for daylight saving correction. Use the UP & DOWN keys to select a locality or set to 0 to disable daylight saving correction or set to CUSTOM to set your own correction dates. If CUSTOM is selected, the following three settings specify when the correction will be made.

Q921922	weekday & time for DST	9914	17

Selects the day of the week and time when the daylight saving correction will be made.

Q921923	start of daylight saving	9916	0

Selects the time of the year when daylight saving will start.

Q921924	end of daylight saving	9918	0

Selects the time of the year when daylight saving will end.

Q921925	daylight saving time (DST)	9920	0

Shows if daylight saving is on or off. If automatic daylight saving correction is off, then this setting may be used to move the clock forwards or backwards by one hour.

Set clock

Q921931	set date	9922	

Sets the date. For example to set 9 March 2007, enter 070309.

Q921932	set time	9924	

Sets the time in 24hour format.

Communications & Display

Comms port 1 – RS232

Q92511	COM1 baud rate (8 data, no parity, 2 stop)	8580	19200
Q92512	COM1&2 modbus address [1 to 30]	8592	30
Q92513	COM1 stop bits	18052	0

Q92514	COM1 mode	18060, g12	0

COM1 mode	description
0	auto : use extended modbus
1	modbus : use standard modbus

Q92515	COM1 handshake enable [0=disable, 1=enable]	8584	0
Q92510	COM1 error count	8810	🔍

Comms port 2 – RS485

Q92521	COM2 baud rate (8 data, no parity, 2 stop)	8590	230400
Q92522	COM1&2 modbus address [1 to 30]	8592	30
Q92523	COM2 stop bits	18054	0

Q92524	COM2 mode	8838	0

---

[17] Defaults to whatever the current setting is.

COM2 mode	description
0	auto : use mwbus – automatic fall back to modbus slave
1	modbus : use standard modbus

Q92520	COM2 error count	8812	🔍

Display

Display settings

Q925692	disable touch	8514	1
Q925693	disable beeper	8518	0
Q925694	comms latency	8510	0 mS

May improve the select key performance for connections where there is a transport delay. For example wireless links, routers etc.

Q925695	master mode option		1

master mode option	description
0	auto
1	length framing : tolerates packet fragmentation

Length framing is necessary when connections are made through external hardware which fragment the Modbus packets. For example wireless modems.

Q925696	view only		0

When set on, settings of the connected unit are view only. They can ont be edited.

Q925697	select loadcell transmitter		0

Shows the currently connected unit and allows it to be manually selected.

Q925698	select comm port		2

select comm port	description
1	COM1 RS232 port
2	COM2 RS485 port
5	USB device (only if currently connected)
7	USB host (only if currently connected)

Shows the current comm port and allows it to be manually selected.

Q925699	select baudrate		0

select baudrate	description
0	auto : scan through all baudrates to find a controller
1	fixed : use port baudrate setting

Q925690	connection test		0

Tests whether the connection to the connected transmitter or processor is working. Useful to diagnose problems with communications links.

CompactCom

Q92571	reset CompactCom	8948	0

Information & Resets

Product Information

These settings can only be viewed, and show important features of the display.

Q92612	product serial number	8852	🔍
Q92613	software version number	8854	🔍
Q92614	CPU type	8858	🔍

Reset settings

Q92633	reset other settings (1= reset to defaults)	8954	0

Set to 1 to reset all user settings to the defaults.

Other display settings

Q97	language select	8618	

Selects the language to use for the display.

To change the language in the identification line of the display (top line), reset the 'system name design'. When at this setting, press Fn 1 to reset. (Q25541).

When a non-English language is selected, pressing the language key will toggle between the language and English.

Q98	display brightness	8516

Adjusts the display brightness.

I/O Function Table

Input Functions (level sensitive Π)		
0	no function/pulse input †	0
1	stop	1 ⇑
2	run	2 ⇑
3	pause	3 ⇑
4	net mode	4 ⇑
5		5 ⇑
6 *	dump/refill	6 ⇑
7	batch wait	7 ⇑
8	dump/refill wait	8 ⇑
9	auto clamp release	9 ⇑
10	clamp release	10 ⇑
11	manual jog/continue	11 ⇑
12	timer enable	12 ⇑
13		13 ⇑
14	user bit 1	14 ⇑
15	user bit 2	15 ⇑

Control1 = control1_inputs (0–15) or control1_internal (208–223) or control1C (224–239) or control1G or control1_inputs_aux

Input Functions (edge sensitive ↲)		
16	acquire zero	0 ⇑
17	acquire tare	1 ⇑
18	set net	2 ⇑
19	set gross	3 ⇑
20	net/gross	4 ⇑
21		5 ⇑
22		6 ⇑
23		7 ⇑
24	set remote mode	8 ⇑
25	reset remote mode	9 ⇑
26	remote/local	10 ⇑
27		11 ⇑
28	timer start	12 ⇑
29	start key	13 ⇑
30	pause key	14 ⇑
31	stop key	15 ⇑

Control2

CONTROL1
The control1 register contains 16 level sensitive input signals. This register has 5 control sources which are combined together.

control1_inputs come from the digital inputs as set with the 'INx functions'.
control1_internal are internally generated signals (e.g. the START/STOP keys).
control1C and control1G are registers accessible via communications and are for remote control of the instrument.
control1_input_aux come from auxiliary IO

The 4 registers are or'ed together, so for example a 1 on bit 2 of any of the 4 sources will set the run bit. Any control1 register with bit 1 set (stop) will override and cause a stop.

Input Functions (edge sensitive ↲)		
32	reset total	0 ⇑
33	totalise	1 ⇑
34		2 ⇑
35	dump/refill	3 ⇑
36	stop2 key	4 ⇑
37	user function 1	5 ⇑
38	user function 2	6 ⇑
39	user function 3	7 ⇑
40	print	8 ⇑
41	print total	9 ⇑
42	print remote	10 ⇑
43	print total remote	11 ⇑
44		12 ⇑
45	acknowledge alarms	13 ⇑
46		14 ⇑
47	capture weight	15 ⇑

Conotrol3

NOTES
To invert signal, use negative value.
e.g. for NOT run, use -2.

† IN0 is pulse input, other inputs are no function.
‡ Only OUT0 & OUT1 maybe set to pulse output. Other outputs are no function.
⇑ can be set and reset with macros and the setting IO Control (Q25420)
* retained while power is off

Output Functions			
48	pulse output‡	0	
49	motion	1	
50 *	net mode	2	
51	at zero	3	
52	in zero band	4	
53 *	manual tare entry	5	
54		6	
55 *		7	
56		8	Status1
57	running	9	
58	paused	10	
59		11	
60	healthy	12	
61	fault	13	
62	alarm	14	
63	alarm alert	15	

Output Functions			
64	stopping	0	
65		1	
66		2	
67	under weight	3	
68	over weight	4	
69		5	
70		6	
71		7	
72	clamp drive	8	Status2
73 *	user bit 3	9 ⇑	
74 *	user bit 4	10 ⇑	
75 *	user bit 5	11 ⇑	
76 *	user bit 6	12 ⇑	
77	timer output	13	
78	clock active	14	
79	daylight saving time	15	

Output Functions			
80	limit 1 output	0	
81	limit 2 output	1	
82	limit 3 output	2	
83	bulk drive	3	
84	fast drive	4	
85	slow drive	5	
86	dump/refill drive	6	
87	clamp close drive	7	
88	clamp open drive	8	Status3
89	IN0	9	
90	IN9	10	
91	OUT0	11	
92	OUT9	12	
93	MO3 fitted	13	
94	disable macros	14	
95	MR1 connected	15	

Output Functions				
96		IN1	0	
97		IN2	1	
98		IN3	2	
99		IN4	3	
100		IN5	4	
101		IN6	5	
102		IN7	6	
103	output function	IN8	7	
104		OUT1	8	IOx
105		OUT2	9	
106		OUT3	10	
107		OUT4	11	
108		OUT5	12	
109		OUT6	13	
110		OUT7	14	
111		OUT8	15	

IO FUNCTION BITS
In most cases, IO Function bits are set and reset by the controller or the digital input signals.

MODBUS
The registers control1, control2, control3, status1, status2, status3, IOx, faults, control4 and IOx2 can all be read over modbus.
The registers control2, control3, control1C and control1G can be written to over modbus.
Bits marked ⇑ can also be set by writing their bit number to the IO Control register (address 8038). Writing the negative value of the number will reset the bit. For example writing -14 to 8038 will reset 'user bit 1'. (write 14 to set)

MACROS
IO Function bits 1 to 187 can be set & reset using the SET_BIT, CLEAR_BIT and TOGGLE_BIT instructions.
The IF instruction can test bits 1 to 150.

IOx
This register hold the state of inputs IN1 to IN8 and outputs OUT1 to OUT8.

The status of IN0, IN9, OUT0 and OUT9 are in the status3 register

Output Functions			
112		weight fault	0
113			1
114			2
115			3
116			4
117			5
118			6
119	output function		7
120			8 ⇧
121		user fault 1	9 ⇧
122		user fault 2	10 ⇧
123		user fault 3	11
124			12
125		Comms fault	13
126		P-Module not compatible	14
127		no P-Module fitted	15

(Faults)

Faults/Alarms
The Faults register holds the fault status of the unit.
Faults are conditions that are either present or not. The source of the fault must be removed to clear the fault.
The "fault bit" (61) is on when any fault condition exists.
User faults can be created and cleared by setting and resetting bits.

Alarms
Alarm events are created by a new fault or other alarm sources in the controller.
When any alarm event occurs, the "alarm" (62) and "alarm alert" (63) bits are set.
When alarms are acknowledged (45), the "alarm alert" is reset.
The "alarm" bit will also be reset by an acknowledge if there are no faults present.

Output Functions			
144		IN1aux	0
145		IN2aux	1
146		IN3aux	2
147		IN4aux	3
148		IN5aux	4
149		IN6aux	5
150	output function	IN7aux	6
151		IN8aux	7
152		OUT1aux	8
153		OUT2aux	9
154		OUT3aux	10
155		OUT4aux	11
156		OUT5aux	12
157		OUT6aux	13
158		OUT7aux	14
159		OUT8aux	15

(IOxAux)

IOxAux
This register hold the state of inputs IN1aux to IN8aux and outputs OUT1aux to OUT8aux.

The output states are set using the factory default OUT1 to OUT8 functions.

Input Functions (level sensitive ⊓ or edge sensitive ⌐)			
160		gates open	0
161		clamp request L	1
162		clamp request R	2
163		bag in place X	3
164		bag in place Y	4
165			5
166		fill gate open	6
167		dump/refill gate open	7
168			8
169			9
170			10
171		start batch	11
172		finish batch	12
173		abort batch	13
174		start dump/refill	14
175		manual fill done	15

(Control4)

OPERATING DETAILS

Modbus Access

The communications ports of the ModWeigh Controllers (COM1 and COM2) use Modbus protocol. This can be used to access any data value and any user setting.

The Modbus protocol supported is RTU. (ASCII mode is not supported). Transmission is with 8 data bits, no parity and 2 stop bits. The following function codes are supported;

3 - read holding registers

4 - read input registers

6 - preset single register

16 - preset multiple registers (10 hex)

23 - read/write multiple registers (17 hex)

Data can be accessed as floats (4 bytes) or integers (2 or 4 bytes). Floats are preferred as the data is stored in engineering units. The following table shows how the addresses shown in the setup summary are translated into Modbus register addresses. (Note with Modbus protocol, the actual address transmitted is one less than the register address. With some systems, you must specify an address one less than expected).

Address	Modbus Register Address		Data description
1000 to 4999	Address	1000 to 4999	Macro strings
8000 to 8999	6000 + (Address - 8000) / 2	6000 to 6499	Integer (16 bit) (limited by integer range)
8000 to 8999	7000 + (Address - 8000)	7000 to 7999	Long integers (32 bit words)
8000 to 8999	Address	8000 to 8999	Float (IEEE 4 byte reals)

The interface registers starting at address 8000 contain the most common data required for Modbus access.

Modbus registers are 2 bytes, so 4 byte floats or 4 byte integers are stored in two consecutive registers.

The following tables provide information for Modbus access to the transmitter.

Address	Data description
1000 to 4999	Macro strings (contains printouts and programs)
8000 to 8029	Interface registers (PLC access)
8030 to 8699	Configuration settings (full instrument calibration)
8700 to 8899	Data outputs (values produced by the instrument)
8900 to 8999	Activations (when set, a process is activated e.g. a zero or span)

Control and status bits can be read over modbus. Refer to the IO Function table page 47 and the Interface Registers page 39 for further information.

Bits may be set in one of two ways. Either by writing to the control registers (contol1C, control1G, control2, control3) or by setting and resetting individual bits using the "IO Control" register.

OPERATION

The display normally shows the detailed operating status of the system. There are 5 soft keys with labelled functions. Dedicated keys give access to the operator menu, alarm menu, system select menu, setup menu and change the displayed data.

Display

Following is a description of the various elements of the display.
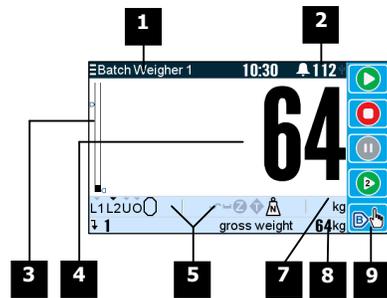
1	Identification of selected unit. Press SELECT (Ξ) to view and select another unit from list of units connected.
2	Alarm Symbol flashes when an alarm is present.

3	A bar graph of the gross weight. The left marker shows the target batch weight. BATCH IN The right marker shows the dump end weight. BATCH OUT The right marker shows the refill end weight.

4	Main display of measured value.

5	A group of annunciators described below.

▼ L1	Limit 1 indicator. A high limit by default.
▼ L2	Limit 2 indicator. A low limit by default.
▼ U	Under weight indicator.
▼ O	Over weight indicator.
(symbol)	Shows batching in progress, discharging or refilling. Also shows the bag clamp status when in use.
G̊	Gross weight
N̊	Net weight

⤴	Motion
⬥T	Tare acquired by push button
⬥Tᴇ	Tare value enter with keypad
❷	Weight at centre of zero
⊔	Weight within zero band

7   Engineering unit main display is calibrated in.

8   Secondary display shows one of a selection of values. Press the ↓ key to scroll through the list.

9   Shows functions of soft keys A to E.

Keys
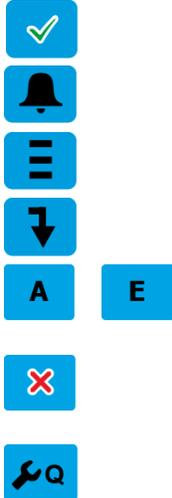
operator menu

Press the OK (tick) key to reach the operator menu. See the Operator Menu section below for details.

alarm menu

Press the ALARM key to reach the alarm menu. See the Alarm Menu section below for details

system select menu

Press this key to view and select another unit from list of units connected.

scroll display

Press this key to select the next line at the bottom of the display.

soft keys A – E

The function of the soft keys is shown in the display. These are shortcuts to items in the operator menu.

cancel

Press this key to cancel an entry or back up a menu. When in any of the menus, holding this key down for 2 seconds will exit back to the operator status display.

setup menu

The setup menu is used to calibrate and setup the system. Refer to the Instruction Manual.

Operator Menu

The operator menu allows selection of one of several actions or settings.
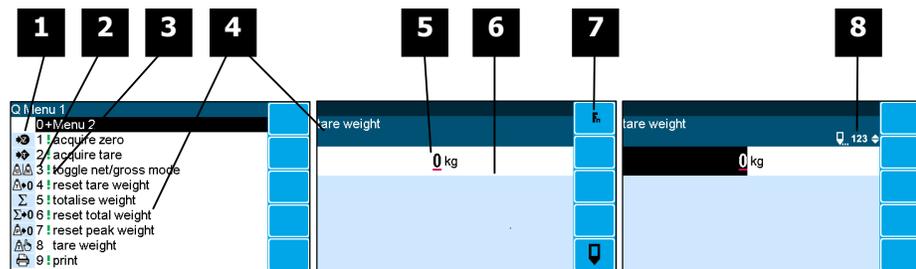
1   Soft key icon for this function. See Actions and Settings below for a description of these icons.

2   Quick key number. Press key with same number to directly enter the named

   menu. Alternatively use the UP and DOWN keys to select and item and press ENTER.

3   Type of menu entry

✚	open another menu.
(blank)	setting
❗	action

4   Name of the menu entry

5   Setting value. To change press EDIT key. If editing is locked, a password will be requested. The password is 11.

6   Hint line which reveals extra information about the setting.

7   Soft keys used with settings.

Icon	Description

| | Press **Fn** key for menu of special functions. |
| | Press EDIT key to edit the setting. |

8

Icon	Description
🔒	The setting is locked. Password must be entered to edit.
🔍	The setting can only be viewed.
≠	The setting has been changed from the default.
...	The setting is being edited.
123	Use numbered keys to change setting value.
⬍	Use UP & DOWN keys to scroll through selection list.
on⬍off	Use UP & DOWN keys to turn setting on or off.
◀▶	Use the arrow keys to move through the bits of a control or status register.

Gives information about the settings and indicates active keys or the preferred method of making a value change while editing

Actions

start key

Press this key to start the system. If the system is running, pressing this key will pause the system.

stop key

Press this key to stop the system. If batching is stopping and waiting for no motion, pressing this key a second time will abort the batch.

pause key

Press this key to pause or unpause the system.

dump/refill

Press this key to start a dump or refill process. If a Manual Refill has been requested, press this key to acknowledge that the refilling is finished.

stop2 key

This key may be customised for a particular application.

acquire tare

Press this key to acquire a tare

net/gross

Press this key to change between NET and GROSS modes.

reset tare weight

Press this key to set the TARE WEIGHT to zero.

print

Press the PRINT key to produce a Status Report printout.

reset tare weight

Press this key to set the TARE WEIGHT to zero.

print total

Press this key to print the totalised weight.

reset total weight

Press this key to reset the totalised weight.

acquire zero

Press this key to zero the weight display.

totalise

Press this key to add the currently displayed weight to the totaliser.

user function 1

This key may be customised for a particular application.

user function 2

This key may be customised for a particular application.

user function 3

This key may be customised for a particular application.

Settings

set tare weight

Press this key to display the TARE WEIGHT setting. Use the keypad to set the tare weight.

batch number

Press this key to view or set the batch number. The batch number will increment at the end of each batch.

slow cutoff

Press this key to view or set the weight before the batch setpoint that the slow drive turns off. Used to achieve a more accurate batch weight.

fast cutoff

Press this key to view or set the weight before the batch setpoint that the fast drive turns off.

batch setpoint

Press this key to display the BATCH WEIGHT setting. Use the keypad to set the batch weight.

set setpoint

Press this key to display the SETPOINT 1 (high limit) setting. Use the keypad to set the setpoint.

Alarm menu

An alarm is indicated by a flashing alarm icon. An alarm number will flash in the display while a fault is active or until it is acknowledged.

Press the ALARM key to see the alarm menu and acknowledge the alarms. The menu shows a list of the previous alarms.

For details on an alarm in the list, use the UP, DOWN and ENTER keys, or key in the number next to the alarm.

Press BACK to exit the alarm menu, or press 6 to clear the alarms and exit the menu.

Alarms		Alarm Comments
112	weight fault	AI1 < -4mV/V: faulty loadcell or wiring AI1 > 4mV/V: faulty loadcell or wiring weight too low weight too high no sense voltage: faulty loadcell or wiring
113		
114		
115		
116		
117		
118		
119		
120		
121	user fault 1	
122	user fault 2	
123	user fault 3	
124		
125	Comms fault	
126	P-Module not compatible	
127	no P-Module fitted	fit P-Module
176	hopper too full	
177	hopper part full	
178	hopper weight too low	
179	busy	batching in progress
180	can't start	stop input is on
181	batch weight too low	below minimum batch weight
182		weight not stable or outside zero band
183	zero limited	signal > 3mV/V
184	span limited	signal too low to span
185	fill gate timeout	gate did not close
186		
187	dump/refill gate timeout	gate did not close
188	no flow during batch	no motion for longer than batch timeout
189	no flow during dump/refill	no motion for longer than dump/refill timeout
190	motion timeout	motion for longer than the motion timeout
191	batch over	batch number reached
192		
193		
194		
195	power supply brown out	check power supply
196	error at power down	totaliser and other data may be invalid
197	setting error	at address ####
198	macro error	at address #### excess recursion at address #### bit stack error at address ####
200	controller alarm	STORAGE error: unit requires servicing COP error: unit requires servicing RAM error: cycle power and check alarms controller fault: contact your supplier language file data error
201	P-Module alarm	STORAGE error: unit requires servicing
202	MO3 card alarm	STORAGE error: unit requires servicing
203	MR1 alarm	