APPLICATIONS
- Silo/Tank weighing
- Batch weighing
- Platform scales

FEATURES
- Digital high accuracy design (no pots or DIP switches)
- Excitation for up to 10 x 350Ω loadcells
- 6 or 4 wire loadcell connection
- Update rate 100 times per second
- 4-20mA output
- Modbus communications (independent RS232 and RS485 ports)
- Field software communications
- Overall accuracy better than 0.01%
- Totalising
- Peak reading
- Rate of change (flowrate)

MT1 TRANSMITTER
- Size 136 x 66 x 50mm
- Optional removable P-Module holds calibration settings

MD1, MP1 INDICATOR
- IP65 Facia
- 4.3" (109mm) colour LCD
- 480 x 272 pixels
- Silicone tactile keypad

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

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

MO3 I/O for MP2
- 4 Digital inputs
- 4 Digital outputs
- 4-20mA input (or 0-10V)
- 4-20mA output

Application
The ModWeigh MW61 Weigher Systems are state of the art weighing instruments that can be used with any loadcell based weighing system. The unit is fully digital with no potentiometers or DIP switches. The basic calibration is done by pushbutton on the unit, or full calibration facilities remotely by a ModWeigh Weight Indicator.

When calibrated remotely, the calibration may be done by entering loadcell capacity and sensitivity which allows the calibration of systems without the use of test weights.

ModWeigh Display
The ModWeigh Weight Indicator display are separate products which may be used with the ModWeigh family of products for display of weight, setup and calibration. It has a graphics display with easy to use menu selection of settings.
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.

Direct Calibration
Direct calibration uses the loadcell capacity and loadcell sensitivity to calibrate the weight signal. Large capacity weighing systems can be quickly and accurately calibrated without the need for large test weights.

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

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

Zeroing/Taring
The ZERO and TARE keys allow the weight reading to be set to zero. The SET TARE key allows a manual tare weight to be entered.

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.)

Total Weight
The displayed weight can be added to a running total. The total can be reset at any time.

Peak Weight
A peak weight reading is maintained of the highest absolute value of the weight measured. The peak value can be reset to 0.

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 Outputs AO1 & AO2
A 4-20mA output normally of weight may be programmed to be any of the internal signals including displayed weight, gross weight and net weight.

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.

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
An ActiveX control is available to allow programmers to easily communicate with a ModWeigh instrument. Typically this can be used with a Visual Basic programme to collect and write data to the controller.

Feature Summary

<table>
<thead>
<tr>
<th>Feature Summary</th>
<th>Digital Inputs</th>
<th>Digital Outputs</th>
<th>Isolated Pulse</th>
<th>Isolated 4-20mA Outputs</th>
<th>Corner adjustment and balancing for 4 load cells</th>
<th>Trade approvals (planned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT1,MR1,MD1</td>
<td>2+8</td>
<td>1+9</td>
<td>✓</td>
<td>1 2</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MT1,MR1,MD2</td>
<td>2+8</td>
<td>1+9</td>
<td>✓</td>
<td>1 2</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MP1,MR1</td>
<td>1+8</td>
<td>9</td>
<td>✓</td>
<td>1 2</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>MP2,MO3</td>
<td>1+4</td>
<td>2+4</td>
<td>✓</td>
<td>1 2</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>MP2</td>
<td>1</td>
<td>2</td>
<td>✓</td>
<td>0 1</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

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 settings ≤ 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 kΩ approximate
Input type PNP output sensors

Digital Outputs OUTx
Max output current \( \Sigma I_{DO} < 0.25 \text{ A} \)
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 32 Vdc
Power MT1 1.0 to 2.2 W + \( P_{\text{Tacho Excitation}} \)
Power MR1 1.5 to 2.5 W + \( P_{\text{OUTx}} \)
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 + \( P_{\text{OUTx}} \) + \( P_{\text{Tacho Excitation}} \)
MP2 Restrictions \( P_{\text{Loadcell Excitation}} + P_{\text{AO1}} + P_{\text{AO2}} < 1.5 \text{ W} \)
\( I_{\text{Supply}} < 0.5 \text{ A} \)

Dimensions
Following are the dimensions of the hardware items that make up the system.
The displays/processors are designed for panel mounting.

MT1 Transmitter

![MT1 Transmitter Diagram](image-url)
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 – 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.

Several systems can be connected onto the same bus. Use bus termination for cable runs over 100m.

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.

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

Several systems can be connected onto the same bus. Use bus termination for cable runs over 100m.

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.

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.

Several systems can be connected onto the same bus. Use bus termination for cable runs over 100m.

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.
Connection Diagram – MP1

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

Several systems can be connected onto the same bus. Use bus termination for cable runs over 100m.

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.

---

**Digital Inputs**
- IN1
- IN2
- IN3
- IN4
- IN5
- IN6
- IN7
- IN8

**Digital Outputs**
- OUT1
- OUT2
- OUT3
- OUT4
- OUT5
- OUT6
- OUT7
- OUT8

**Power/COM2**
- 24V
- 0V
- +D
- −D
- ADS

---

**Analog Inputs**
- IN1
- IN2
- IN3
- IN4
- IN5
- IN6

**Analog Outputs**
- +mAO2
- −mAO2
- +mAO1
- −mAO1

---

**Loadcell**
- +EX/0V
- −EX
- +SIG
- −SIG
- +SEN
- −SEN

---

**COM2**
- +D
- −D
- 0V

---

**MC1**
- AD1
- AD2
- AD3
- AD4
- AD5
- AD6
- AD7
- AD8
- AD9
- AD10

---

**Power Supply**
- +24V
- 0V

---

**Bus Address**
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

---

**Limit Outputs**
- limit 1 output
- limit 2 output
- motion
- healthy
- net mode
- at zero
- weight fault
- alarm alert

---

**Totaliser**
- power supply input

---

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

Several systems can be connected onto the same bus. Use bus termination for cable runs over 100m.

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.
Connection Diagram – MP2

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

- Keep all wiring separated from mains wiring.
- Use shielded cable where indicated.
System Ordering

A ModWeigh system is a group of ModWeigh parts that together form the system. Many possible systems can be created, but most applications will use one of the systems listed below. When ordering, just specify the system order code. To create a custom system, specify the individual components required.

<table>
<thead>
<tr>
<th>Weigher Instrument</th>
<th>System Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW61A,MT1,MD1,MR1</td>
</tr>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW61A,MT1,MD2,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK61A,MP1,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK61A,MP2,MO3</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK61A,MP2</td>
</tr>
</tbody>
</table>

Parts Ordering

Following is a list of order codes for the individual parts of a ModWeigh system.

The order code (and options) are shown below.

<table>
<thead>
<tr>
<th>Product</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Module (for transmitter only)</td>
<td>MW61A</td>
</tr>
<tr>
<td>Unactivated P-Module (requires a product key)</td>
<td>MX61A</td>
</tr>
<tr>
<td>Product Key</td>
<td>MK61A</td>
</tr>
</tbody>
</table>
**Special Options**

<table>
<thead>
<tr>
<th>Manual Types</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese manuals</td>
<td>CH</td>
</tr>
<tr>
<td>Korean manuals</td>
<td>KO</td>
</tr>
<tr>
<td>German manuals</td>
<td>DE</td>
</tr>
<tr>
<td>Spanish manuals</td>
<td>ES</td>
</tr>
<tr>
<td>French manuals</td>
<td>FR</td>
</tr>
<tr>
<td>Italian manuals</td>
<td>IT</td>
</tr>
<tr>
<td>Polish manuals</td>
<td>PL</td>
</tr>
<tr>
<td>No manuals</td>
<td>NM</td>
</tr>
<tr>
<td>Manufacturing certificate</td>
<td>MC</td>
</tr>
</tbody>
</table>

**Transmitter**

<table>
<thead>
<tr>
<th>Component</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loadcell transmitter</td>
<td>MT1</td>
</tr>
<tr>
<td>Loadcell processor</td>
<td>MP1</td>
</tr>
<tr>
<td>Loadcell processor</td>
<td>MP2</td>
</tr>
</tbody>
</table>

**Processor**

**IO Option**

<table>
<thead>
<tr>
<th>Option</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>digital IO - 4In 4Out, 1 x 4-20mA input &amp; output</td>
<td>MO3</td>
</tr>
</tbody>
</table>

**Display**

<table>
<thead>
<tr>
<th>Display Type</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3” Colour display</td>
<td>MD1</td>
</tr>
<tr>
<td>2.8” Colour display</td>
<td>MD2</td>
</tr>
</tbody>
</table>

**Remote IO**

<table>
<thead>
<tr>
<th>Component</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote IO unit</td>
<td>MR1</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ12 Cable 2m (COM1 cable)</td>
<td>MAC</td>
</tr>
<tr>
<td>RJ12 to 9 pin D-connector adaptor (ModWeigh to PC)</td>
<td>MAD</td>
</tr>
<tr>
<td>RJ12 to 25 pin D-connector adaptor (ModWeigh to printer)</td>
<td>MAP</td>
</tr>
<tr>
<td>DIN Rail mount kit for MT1 or MR1</td>
<td>MAR</td>
</tr>
<tr>
<td>Stack mount kit for MT1 or MR1</td>
<td>MAS</td>
</tr>
<tr>
<td>RS485 Line Terminator</td>
<td>MAT</td>
</tr>
</tbody>
</table>

**Other ModWeigh Products**

- **MW93** Weight Change Systems – for loss-in-weight and gain-in-weight flow control systems.
- **MW94** Impact Weigher Systems – impact weigher processor for continuous flowrate measurement.
- **MW95** Belt Weigher Systems – belt weigher processor for continuous flowrate measurement.
- **MW96** Weighfeeder Systems – weighfeeder processor for continuous flowrate control application of a weighing conveyor.
Contact Details

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