**ModWeigh**

**FEATURES**

- Flowrate measurement for impact weighers
- Flowrate Output
- Material Totaliser
- Modbus communications (independent RS232 and RS485 ports)
- Field software upgrades
- 12-24Vdc power supply
- Overall accuracy better than 0.01%

**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**

A ModWeigh MW94 Impact Weigher System is used to measure the flowrate of a free flowing solids material. It measures the impact force of material striking a plate and converts this to a flowrate. This is integrated to give a total weight of material.

**ModWeigh Display**

A ModWeigh Flowrate Indicator is used to calibrate the system and provide a status display of the operating system. 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.

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
Auto zeroing automatically sets the zero point when there is no material flow and reduces errors that
would be caused by and incorrect zero.

Signal Filtering
Filtering for the weight can be adjusted to get the optimum compromise between reduction of plant vi-
bration and response speed.

Internal Signals

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

Batching
The system can be used to batch out a desired weight by stopping the feeder when the batch weight
has been totalised. A pre-act is available to compensate for overrun.

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.

Material Total
The processor incorporates a totaliser which totalises the weight of material through the system. The
totaliser can be reset to zero. A pulse output is available to operate external counters. A low flow cutout
ensures that low flows do not cause false counts. The total is retained after a power failure.
The totaliser can be set to operate with 5, 6, 7 or 8 digits.

Outputs

Material Flowrate
An analog flowrate output signal is available for connection to other instruments.

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 content 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>Digital Inputs (includes pulse input)</th>
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<th>Isolated Pulse Output</th>
<th>Isolated 4-20mA Inputs</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>
</tr>
<tr>
<td>MT1, MR1, MD2</td>
<td>2+8</td>
<td>1+9</td>
<td>✓</td>
<td>1 2</td>
<td>✓</td>
</tr>
<tr>
<td>MP1, MR1</td>
<td>1+8</td>
<td>9</td>
<td>✓</td>
<td>1 2</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>
</tr>
<tr>
<td>MP2</td>
<td>1</td>
<td>2</td>
<td>✓</td>
<td>0 1</td>
<td>×</td>
</tr>
</tbody>
</table>

Specifications

Loadcell Input AI1

<table>
<thead>
<tr>
<th>Input Range</th>
<th>±4 mV/V (0-20mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excitation</td>
<td>5 Vdc ±20 %, 250 mA maximum current</td>
</tr>
<tr>
<td>Signal processing rate</td>
<td>100 Hz (response time settings≤ 0.5 s)</td>
</tr>
<tr>
<td>Input sensitivity</td>
<td>0.5 µV/division maximum</td>
</tr>
<tr>
<td>Zero range</td>
<td>±3 mV/V (±15 mV)</td>
</tr>
<tr>
<td>Zero drift</td>
<td>±0.02 µV+0.0005 % of deadload/°C typical</td>
</tr>
<tr>
<td>Span drift</td>
<td>±0.0005 %/°C typical</td>
</tr>
<tr>
<td>Non-linearity</td>
<td>&lt;0.002 % of FS</td>
</tr>
<tr>
<td>Input noise</td>
<td>0.15 µVp-p typical</td>
</tr>
</tbody>
</table>
EMC INDUSTRIAL GROUP LTD
Specifications

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

Pulse Input IN0 - frequency input
- Maximum range 0.01Hz to 4 kHz
- Typical operating range 10 to 1000 Hz
- Minimum pulse width 50us
- IN0 set to PNP
  - High voltage > 8 V
  - Low voltage < 4 V
  - Maximum voltage 32 V
  - Input load 4 kΩ approximate
- IN0 set to NAMUR
  - Terminal voltage 8 V
  - Switching threshold 1.55 mA
  - Hysteresis 0.2 mA
  - Namur fault <0.1 mA or >6 mA
- IN0 set to AC
  - Voltage range 0.2 to 50 Vac

Digital Inputs INx (except IN0)
- High voltage > 8 V
- Low voltage < 4 V
- Maximum voltage 32 V
- Input load 6 kΩ approximate
- Input type PNP output sensors

Pulse Output OUT0
- Max output current 50 mA
- Max working voltage 30V ac/dc
- Max frequency 500 Hz
- Duty cycle 50 % ±20 % (f > 0.5 Hz)
- Max output pulse time 1000 ms (f < 0.5 Hz)
- Isolation galvanically isolated to 50 Vac

Digital Outputs OUTx (except OUT0)
- Max output current \(\sum I_{\text{IOx}} < 0.25 A\)
- 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 32 Vdc
- **Power MT1**: 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

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]

**MR1 Remote IO**

![MR1 Remote IO Diagram]

**MD1 Display**

**MP1 Processor**

![MD1 Display Diagram]

**MD2 Display**

**MP2 Processor**

![MD2 Display Diagram]

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 system 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.
Connection Diagram – MP2

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

Connection Diagram – MP2

Keep all wiring separated from mains wiring.

Use shielded cable where indicated.

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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>Impact Flowmeter Instrument</th>
<th>System Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW94A,MT1,MD1,MR1</td>
</tr>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW94A,MT1,MD2,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK94A,MP1,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK94A,MP2,M03</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK94A,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>
</tr>
</thead>
<tbody>
<tr>
<td>select one of the following</td>
</tr>
<tr>
<td>P-Module (for transmitter only)</td>
</tr>
<tr>
<td>Unactivated P-Module (requires a product key)</td>
</tr>
<tr>
<td>Product Key</td>
</tr>
</tbody>
</table>
Special Options

select any (or none) of the following

Chinese manuals
Korean manuals
German manuals
Spanish manuals
French manuals
Italian manuals
Polish manuals
No manuals
Manufacturing certificate

Transmitter

select one (or none) of the following

Loadcell transmitter
Loadcell processor
Loadcell processor

Processor


IO Option

select one (or none) of the following (only for MP2)

digital IO - 4In 4Out, 1 x 4-20mA input & output

Display

select one (or none) of the following

4.3” Colour display
2.8” Colour display

Remote IO

select one (or none) of the following

Remote IO unit

Accessories

select one (or none) of the following

RJ12 Cable 2m (COM1 cable)
RJ12 to 9 pin D-connector adaptor (ModWeigh to PC)
RJ12 to 25 pin D-connector adaptor (ModWeigh to printer)
DIN Rail mount kit for MT1 or MR1
Stack mount kit for MT1 or MR1
RS485 Line Terminator

Other ModWeigh Products

MW61 Weigher Systems – loadcells indicators. Suitable for scales, vessel weighing and most general weighing applications.


MW95 Belt Weigher Systems – belt weigher processor for continuous flowrate measurement.
Contact Details

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