**FEATURES**
- Flowrate measurement for belt 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 MW95 Belt Weigher System is used to measure the flowrate of material carried by a belt conveyor. It measures the belt loading and belt speed and calculates the material flowrate.

**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.

Direct & Dynamic Calibration
Direct calibration uses the loadcell capacity and loadcell sensitivity to calibrate the weight signal. Dynamic calibration allows calibration of the weight while the belt is moving knowing the platform weight (kg) or the belt loading (kg/m). This is useful when calibrating is done using chains.

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.

Tacho Input
The tacho input is used to measure the belt speed and belt travel. Basic calibration is done using a tacho constant setting.

The system can be used to calibrate the tacho by measuring the number of pulses as a known length of belt passes a point. Other belt lengths can be measured in a similar manner.

Zeroing
The weight of the unloaded belt is averaged over one complete belt revolution and the resulting value is stored as the dynamic zero.

The zeroing can be semi-automated by using an output signal to stop the material feed onto the belt, waiting until the belt is empty, performing the zero averaging, restarting the feed and waiting until material has reached the weigh point before returning to flow control.

Auto zeroing continuously monitors the platform weight. Any small drift in the weight measurement or material build up on the weigh platform is automatically zeroed out. This ensures that with no product on the belt, a zero flowrate is recorded.

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.

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 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</th>
<th>Digital Inputs (includes pulse input)</th>
<th>Digital Outputs (includes pulse output)</th>
<th>Isolated Pulse Output</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</td>
<td>2</td>
<td>√</td>
</tr>
<tr>
<td>MT1, MR1, MD2</td>
<td>2+8</td>
<td>1+9</td>
<td>√</td>
<td>1</td>
<td>2</td>
<td>√</td>
</tr>
<tr>
<td>MP1, MR1</td>
<td>1+8</td>
<td>9</td>
<td>√</td>
<td>1</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>MP2, MO3</td>
<td>1+4</td>
<td>2+4</td>
<td>√</td>
<td>1</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>MP2</td>
<td>1</td>
<td>2</td>
<td>√</td>
<td>0</td>
<td>1</td>
<td>x</td>
</tr>
</tbody>
</table>

EMC INDUSTRIAL GROUP LTD

Features

MW95A_TI_ALL_SV6.01a_EN
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

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  \( \Sigma I_{\text{OUT}} < 0.25 \text{ A} \)
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

[Diagram of MT1 Transmitter]

MR1 Remote IO

[Diagram of MR1 Remote IO]

MD1 Display

[Diagram of MD1 Display]

MP1 Processor

[Diagram of MP1 Processor]

MD2 Display

[Diagram of MD2 Display]

MP2 Processor

[Diagram of MP2 Processor]
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.

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.

<table>
<thead>
<tr>
<th>Digital Inputs</th>
<th>Power/COM2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN1</td>
<td>24V</td>
</tr>
<tr>
<td>IN2</td>
<td>0V</td>
</tr>
<tr>
<td>IN3</td>
<td>+D</td>
</tr>
<tr>
<td>IN4</td>
<td>−D</td>
</tr>
<tr>
<td>IN5</td>
<td>ADS</td>
</tr>
<tr>
<td>IN6</td>
<td>5V</td>
</tr>
<tr>
<td>IN7</td>
<td>4V</td>
</tr>
<tr>
<td>IN8</td>
<td>3V</td>
</tr>
<tr>
<td>COM1</td>
<td></td>
</tr>
<tr>
<td>COM2</td>
<td></td>
</tr>
<tr>
<td>COM3</td>
<td></td>
</tr>
<tr>
<td>COM4</td>
<td></td>
</tr>
<tr>
<td>COM5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital Outputs</th>
<th>Pulse Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT1</td>
<td>pulse output</td>
</tr>
<tr>
<td>OUT2</td>
<td>running</td>
</tr>
<tr>
<td>OUT3</td>
<td>run motor</td>
</tr>
<tr>
<td>OUT4</td>
<td>healthy</td>
</tr>
<tr>
<td>OUT5</td>
<td>weight fault</td>
</tr>
<tr>
<td>OUT6</td>
<td>belt speed fault</td>
</tr>
<tr>
<td>OUT7</td>
<td>material feed</td>
</tr>
<tr>
<td>OUT8</td>
<td>alarm alert</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analog Inputs</th>
<th>Analog Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>+mAD2</td>
</tr>
<tr>
<td>V2</td>
<td>−mAD2</td>
</tr>
<tr>
<td>A1</td>
<td>+mAD1</td>
</tr>
<tr>
<td>A2</td>
<td>−mAD1</td>
</tr>
</tbody>
</table>

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.

Connection Diagram – MP2

Keep all wiring separated from mains wiring

Use shielded cable where indicated.
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>Belt Weigher Instrument</th>
<th>System Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW95A,MT1,MD1,MR1</td>
</tr>
<tr>
<td>P-Module, transmitter, display, IO</td>
<td>MW95A,MT1,MD2,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK95A,MP1,MR1</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK95A,MP2,MO3</td>
</tr>
<tr>
<td>Product Key, Processor, IO</td>
<td>MK95A,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>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

<table>
<thead>
<tr>
<th>Select any (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese manuals</td>
</tr>
<tr>
<td>Korean manuals</td>
</tr>
<tr>
<td>German manuals</td>
</tr>
<tr>
<td>Spanish manuals</td>
</tr>
<tr>
<td>French manuals</td>
</tr>
<tr>
<td>Italian manuals</td>
</tr>
<tr>
<td>Polish manuals</td>
</tr>
<tr>
<td>No manuals</td>
</tr>
<tr>
<td>Manufacturing certificate</td>
</tr>
</tbody>
</table>

### Transmitter

<table>
<thead>
<tr>
<th>Select one (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loadcell transmitter</td>
</tr>
<tr>
<td>Loadcell processor</td>
</tr>
<tr>
<td>Loadcell processor</td>
</tr>
</tbody>
</table>

### Processor

<table>
<thead>
<tr>
<th>Select one (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loadcell processor</td>
</tr>
<tr>
<td>Loadcell processor</td>
</tr>
</tbody>
</table>

### IO Option

<table>
<thead>
<tr>
<th>Select one (or none) of the following (only for MP2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital IO - 4In 4Out, 1 x 4-20mA input &amp; output</td>
</tr>
</tbody>
</table>

### Display

<table>
<thead>
<tr>
<th>Select one (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3” Colour display</td>
</tr>
<tr>
<td>2.8” Colour display</td>
</tr>
</tbody>
</table>

### Remote IO

<table>
<thead>
<tr>
<th>Select one (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote IO unit</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Select one (or none) of the following</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ12 Cable 2m (COM1 cable)</td>
</tr>
<tr>
<td>RJ12 to 9 pin D-connector adaptor (ModWeigh to PC)</td>
</tr>
<tr>
<td>RJ12 to 25 pin D-connector adaptor (ModWeigh to printer)</td>
</tr>
<tr>
<td>DIN Rail mount kit for MT1 or MR1</td>
</tr>
<tr>
<td>Stack mount kit for MT1 or MR1</td>
</tr>
<tr>
<td>RS485 Line Terminator</td>
</tr>
</tbody>
</table>

### Other ModWeigh Products

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