# MW61A Weigher Instrument
# Technical Information

## ModWeigh

**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**
- **Removable P-Module holds calibration settings**

- **1 Digital inputs**
- **2 Digital outputs**
- **Modbus communications (independent RS232 and RS485 ports)**
- **Field software upgrades**
- **12-24Vdc power supply**
- **Overall accuracy better than 0.01%**
- **Totalising**
- **Peak reading**
- **Rate of change (flowrate)**

**HOUSING OPTIONS**

- **MTxR DIN Rail mounting (IP00)**
- **MTxF Field housing (IP67)**
- **MTxG Field housing, Rail mount (IP67)**
- **MT2x Size 110 x 80 x 70mm**
- **MT4x Size 170 x 80 x 70mm**

**OPTIONS**

- **±5V excitation for safety barrier applications**

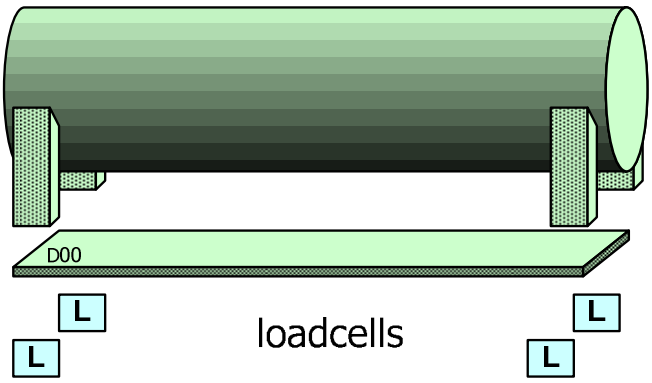
### Application

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 an MW99 or MD1 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 MW99 and MD1 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 and Spanish.

## Inputs

### Digital Inputs IN1..IN8

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 excitation voltage can be adjusted on up to four loadcells, allowing differences in loadcell sensitivities to be corrected.

### 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. The MT6x & MT8x transmitters optionally have a second analog output AO2.

### 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 OUT1..OUT8

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 display to transmitter 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.

# ModWeigh I/O

| | | I/O available for each hardware type (& option required) | | | |
|---|---|---|---|---|---|
| | | MT2x | MT4x | MT6x | MT8x |
| Analog inputs | AI1 (loadcell) | ● | ● | ● | ● |
| | AI2 (4-20mA 0-10V) | | | MO2 | MO2 |
| Analog outputs | AO1 (4-20mA) | ● | ● | ● | ● |
| | AO2 (4-20mA) | | | MO2 | MO2 |
| Digital inputs | IN1 acquire zero | ● | ● | ● | ● |
| | IN2 acquire tare | | | ● | ● |
| | IN3 print | | | ● | ● |
| | IN4 capture weight | | | ● | ● |
| | IN5 print total | | | | ● |
| | IN6 reset total | | | | ● |
| | IN7 totalise | | | | ● |
| | IN8 hold flowrate | | | | ● |
| Digital outputs | OUT1 limit 1 output | ● | ● | ● | ● |
| | OUT2 limit 2 output | ● | ● | ● | ● |
| | OUT3 motion | | | ● | ● |
| | OUT4 healthy | | | ● | ● |
| | OUT5 net mode | | | | ● |
| | OUT6 at zero | | | | ● |
| | OUT7 weight fault | | | | ● |
| | OUT8 alarm alert | | | | ● |
| Communi-cations | COM1 (RS232) | ● | ● | ● | ● |
| | COM2 (RS485) | ● | ● | ● | ● |

# Specifications

**Loadcell Input AI1**

| | |
|---|---|
| Input Range | ±4 mV/V (0-32mV) |
| Excitation | 8 Vdc ±10 %, 250 mA maximum current |
| Signal processing rate | 100 Hz (response time setting≤ 0.5 s) |
| Input sensitivity | 0.5 µV/division maximum |
| Zero range | ±30 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 |
| Input impedance | ›1000 MΩ. |
| Sense input impedance | ›100 kΩ |
| Sense voltage range | 3-10 V |

**Analog Input AI2**

| | |
|---|---|
| 4-20mA input resistance | 47 Ω |
| 0-10V input resistance | ›1 MΩ |
| Isolation | not isolated, all 0V terminals are common |

**Analog Outputs AO1 & AO2**

| | |
|---|---|
| Output range | 0 to 20 mA (-90 µA to 21 mA, includes standard 4-20mA) |
| Maximum load | 1000Ω @ 24 V supply, 500Ω @ 12 V |
| 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 | ‹1 µA/°C. |

**Digital Inputs IN1..IN8**

| | |
|---|---|
| High voltage | › 8 V |
| Low voltage | ‹ 4 V |
| Maximum voltage | 32 V |
| Input load | 3200Ω to 4800Ω |
| Input type | PNP output sensors |

**Digital Outputs OUT1..OUT8**

| | |
|---|---|
| Max output current | 0.25 A |
| Supply voltage | 8 Vdc ‹+V1 and +V2 ‹32 Vdc |

**Communications COM1 & COM2**

| | |
|---|---|
| COM1 Interface | RS232 |
| COM1 Handshake | CTS can be enabled |
| COM2 Interface | RS485 |
| Baud rates | 9600, 19,200, 38,400, 57,600 and 115,200 |
| Settings | 8 data bits, no parity, 2 stop bits (8-N-2) |
| Protocol | Modbus RTU |

**General**

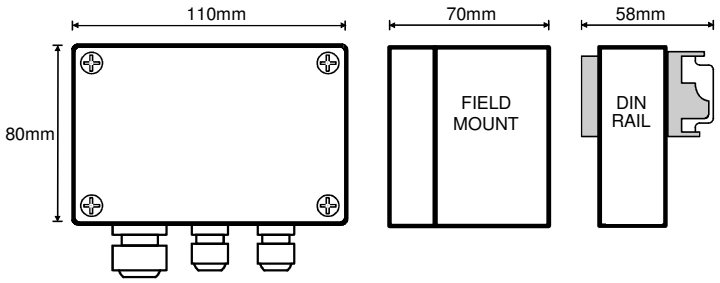
| | |
|---|---|
| Housing | Polycarbonate UV resistant. |
| Operating temperature | -10 to 45 °C |
| Supply voltage | 10 to 32 Vdc |
| Power (transmitter) | 2.5 VA @ 100 mA loadcell excitation current |
| | 4 VA @ 250 mA loadcell excitation current |
| Power (display) MW99 or MD1 | 2 VA |

# Dimensions

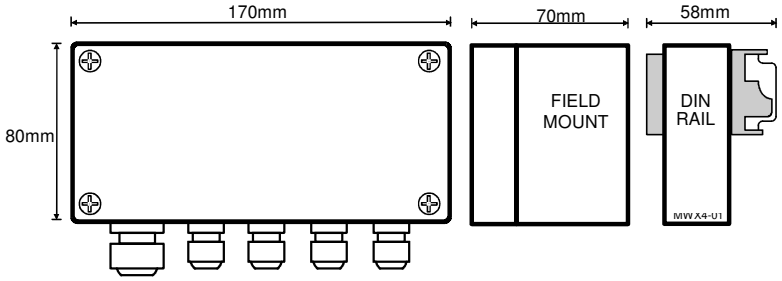
There is a range of transmitter container sizes available. Each is available either for field mounting or rail mounting.

The display is designed for panel mounting.

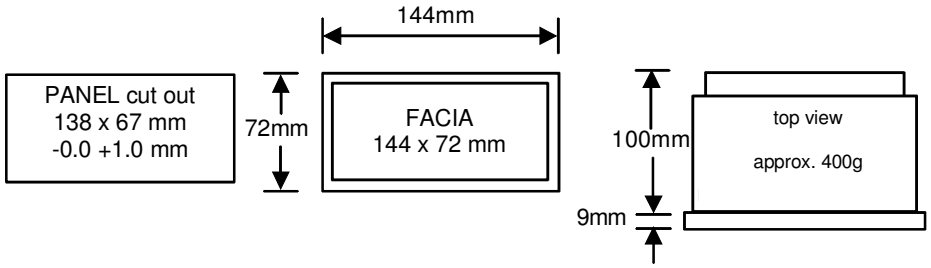
**MT2x Transmitter**



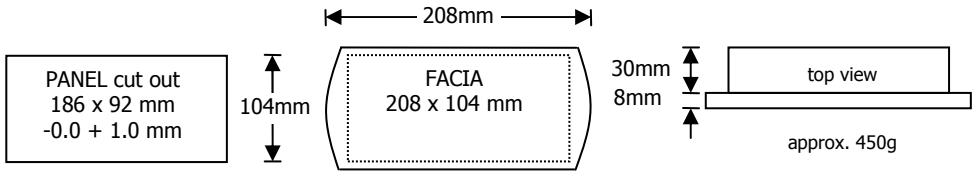

**MT4x Transmitter**




**MW99 Display**




**MD1 Display**



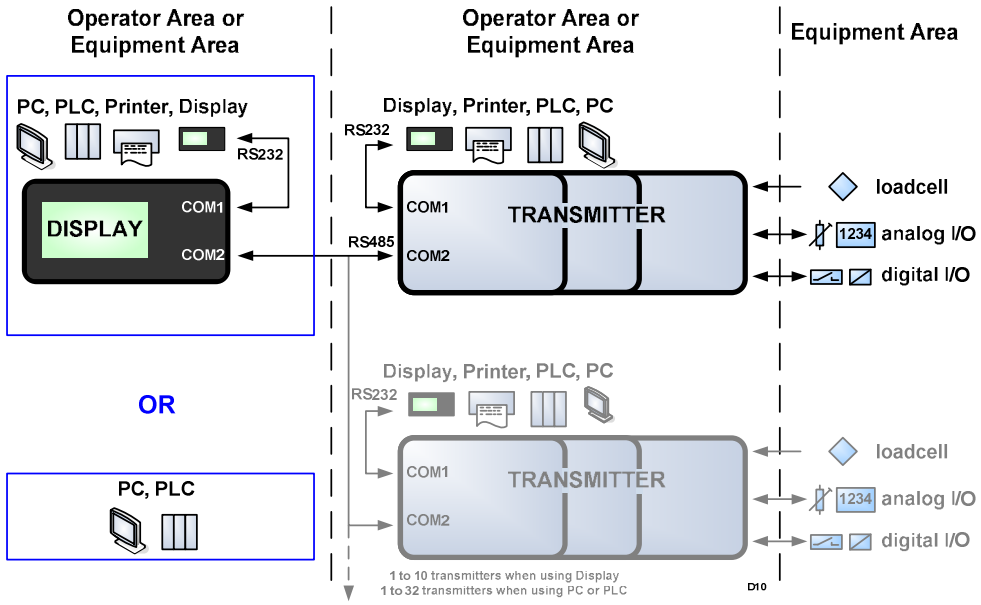

# Connections

**Connection Principles**

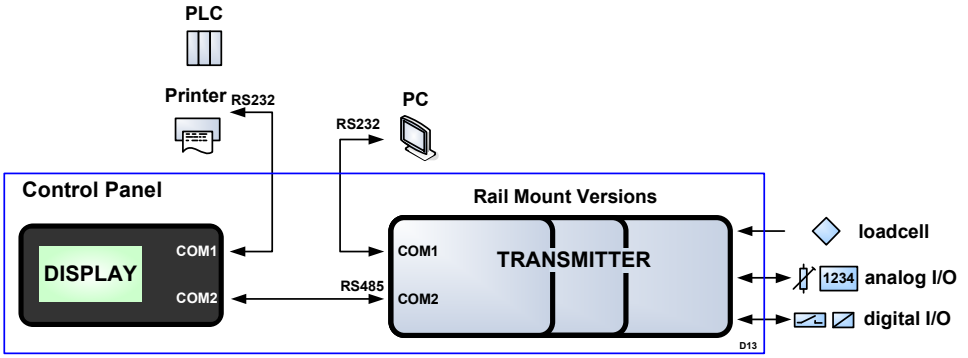
ModWeigh instruments can be configured in many different ways to suit any given application. The display is normally located to suit an operator. The transmitter can be located in the field to reduce field wiring or can be located with the display for a more conventional approach.

With only one transmitter and one display, the units are typically connected using COM2 (the RS485 port) of each instrument.

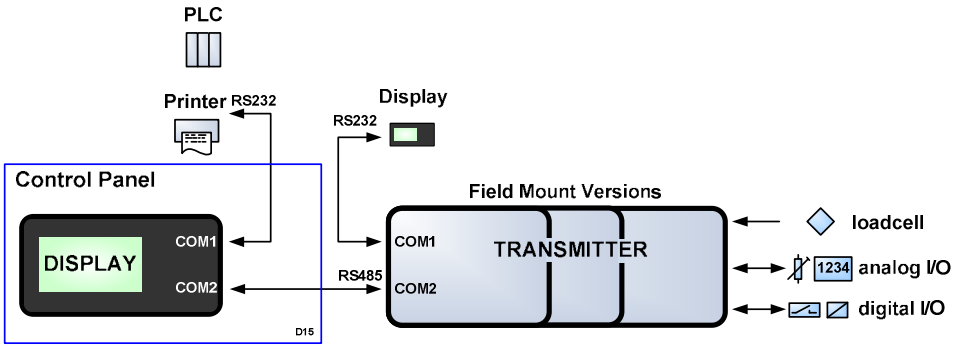
## General Connection Principles



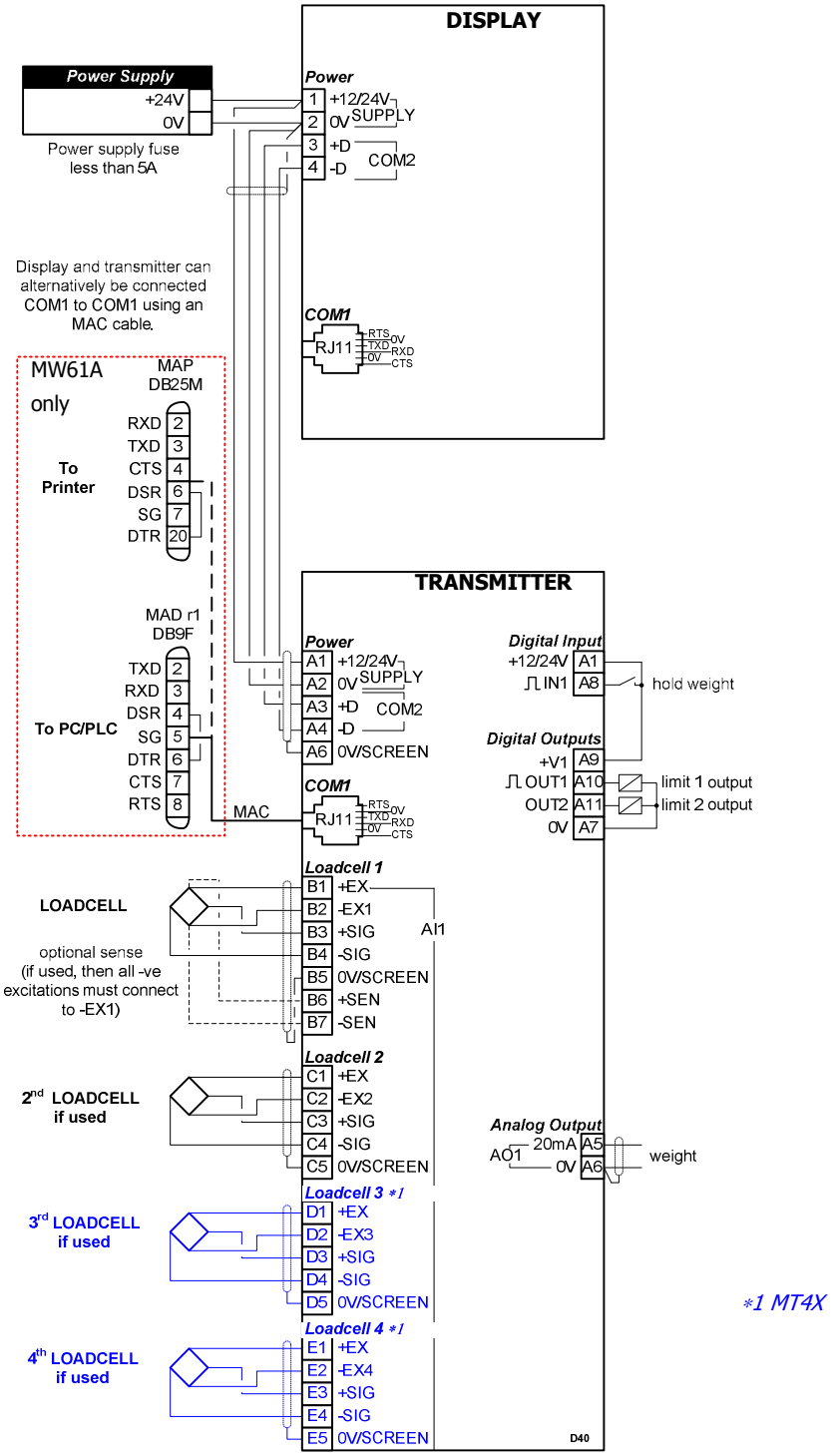

## Transmitter in Control Panel




## Transmitter with Equipment



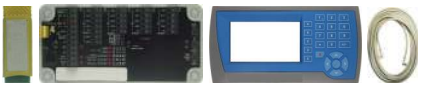
## Connection Diagram




- Keep all wiring separated from mains wiring
- Use shielded cable where indicated
- All 0V terminals internally connected

# 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.

| | System Order Code |
|---|---|
| **Weigher Instrument** | |
| 2 loadcell terminals, 1 digital input/2 digital outputs, no display | |
|  MW61A, MT2x | |
| rail mount | **MW61A,MT2R** |
| field housing | **MW61A,MT2F** |
| field housing, rail mount | **MW61A,MT2G** |
| **Weigher Instrument** | |
| 2 loadcell terminals, 1 digital input/2 digital outputs & display | |
|  MW61A, MT2x, MD1, MAC | |
| rail mount | **MW61A,MT2R,MD1,MAC** |
| field housing | **MW61A,MT2F,MD1,MAC** |
| field housing, rail mount | **MW61A,MT2G,MD1,MAC** |
| **Weigher Instrument** | |
| 4 loadcell terminals, 1 digital input/2 digital outputs, no display | |
|  MW61A, MT4x | |
| rail mount | **MW61A,MT4R,MAC** |
| field housing | **MW61A,MT4F,MAC** |
| field housing, rail mount | **MW61A,MT4G,MAC** |
| **Weigher Instrument** | |
| 4 loadcell terminals, 1 digital input/2 digital outputs & display | |
|  MW61A, MT4x, MD1, MAC | |
| rail mount | **MW61A,MT4R,MD1,MAC** |
| field housing | **MW61A,MT4F,MD1,MAC** |
| field housing, rail mount | **MW61A,MT4G,MD1,MAC** |

# Parts Ordering

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

The transmitter order code (and options) are shown below. The display is ordered separately, and any accessories (cables etc).

A display is recommended to calibrate and commission a Weigher Transmitter. A typical order code list is **MW61A,MT4F,MD1,MAC,MAD** Provides a P-Module, a transmitter, a display, a cable and adaptor to connect to a PC.

**P-Module**

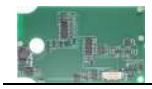
| **Product Module** | P-Module order code |
|---|---|
| Weigher Instrument | **MW61A** |

## Transmitter







| **Transmitter I/O** | transmitter order code | |
|---|---|---|
| 2 loadcell terminals, 1 digital input / 2 digital outputs | **2** | |
| 4 loadcell terminals, 1 digital input / 2 digital outputs | **4** | |
| 2 loadcell terminals, 4 digital input / 4 digital outputs | **6** | |
| 2 loadcell terminals, 8 digital input / 8 digital outputs | **8** | |

| **Transmitter Housing** | | |
|---|---|---|
| Rail mount | | **R** |
| Field housing | | **F** |
| Field housing Rail mount | | **G** |

| | |
|---|---|
| | **,MT** |

| **Transmitter options** | transmitter option code list |
|---|---|
| Analog input/output AI2/AO2 (MT6x & MT8x only) [1] | **,MO2** |
| ±5Vdc loadcell excitation (for safety barrier applications) [2] | **,MOE1** |

## Display

| **Display** | display order code |
|---|---|
| ModWeigh Display | **,MD1** |
| Weight Indicator | **,MW99d3** |

## Accessories

| **Accessories** | accessory list |
|---|---|
| RJ12 Cable 2m (COM1 cable) | **,MAC** |
| RJ12 to 9 pin D-connector adaptor (ModWeigh to PC) | **,MAD** |
| RJ12 to 25 pin D-connector adaptor (ModWeigh to printer) | **,MAP** |

## Components & Spares





| **Components & Spares** | |
|---|---|
| **Transmitters** | |
| MT2F/MT2G field mount lid | MCL2x |
| MT4F/MT4G & MT6F/MT6G field mount lid | MCL4x |
| MT8F/MT8G field mount lid | MCL8x |

| **Displays** | |
|---|---|
| Display without label | MW99dx |
| Weight Indicator display label | LBL230-3 |
| Pair of display mounting clips | BRK61P |
| Screw connector for MW99 power connector | TS17-9 |

## 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.

[1] May be fitted in field or ordered with transmitter.
[2] Must be ordered with transmitter (it can not be fitted in the field).

# Contact Details

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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 MT24x))