



EMC ModWeigh MW96A Mk2 & Mk3[†] Weighfeeder System

FEATURES

- Flowrate measurement and control for weigh feeders
- Removable P-Module holds calibration settings



- Motor Speed Control Output Signal
- Flowrate Output
- Material Totaliser
- 4 Digital inputs (1, 4 or 8)
- 4 Digital outputs (2, 4 or 8)
- Modbus communications (independent RS232 and RS485 ports)
- Field software upgrades
- 12-24Vdc power supply
- Overall accuracy better than 0.01%

HOUSING OPTIONS

- MTxR DIN Rail mounting (IP00)
- MTxF Field housing (IP67)
- MTxG Field housing, Rail mounting (IP67)
- MT2x Size 110 x 80 x 70mm
- MT4x Size 170 x 80 x 70mm
- MT6x Size 170 x 80 x 70mm
- MT8x Size 230 x 80 x 70mm

OPTIONS

- $\pm 5V$ excitation for safety barrier applications

Application

An EMC MW96 Weigh Feeder System is used to measure and control the flowrate of material carried by a belt conveyor.

It measures the belt loading and belt speed and calculates the material flowrate which it controls by varying the belt speed.



MW99 Weight Indicator

An EMC MW99d4 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.



[†] Mk3 Model Available end of 2006 (except MT8x models)

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 Approvals

Mk3 only: The instrument has OIML approvals (pending), for trade weighing applications.

Inputs

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

Flowrate Setpoint

The setpoint is the flowrate of material the belt conveyor should be carrying. The processor can control to the local setpoint, which is set using the keypad, or it can control to the remote setpoint. The option MO2 is required for a remote analog setpoint.

The calibration of analog input (AI2) is fully adjustable over the range 0-20mA and 0-10V. If the remote setpoint is not used, the analog input is available for other functions.

Digital Inputs IN1..IN8

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

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 and other signals can be adjusted to get the optimum compromise between reduction of plant vibration and response speed.

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 conveyor when the weight has passed the weigh platform. A pre-act weight can be adjusted to shut off the conveyor before the target weight is reached allowing time for the conveyor to stop and allowing the correct batch weight to be reached.

Loop Control

The processor compares the flowrate with the setpoint. A proportional/integral (PI) control technique with feed forward alters the motor speed demand signal to maintain the flowrate at setpoint. Feed forward allows the system to reach the desired set flowrate very quickly and also to respond to changes in setpoint rapidly.

Volumetric Mode

Normally the controller operates gravimetrically and automatically adjusts the speed demand signal to reach the required flowrate setpoint. In volumetric mode, the PI control is disabled, and the speed demand is estimated using the feed forward settings. This allows the system to be kept operating even in the event of loadcell or tacho failures.

Advanced Control Settings

Feed forward settings can be adjusted and corrections for plant delays (transport delay) can be made. A ratio setting is available to multiply the setpoint signal by a percentage for ratio control applications.

Event Collection

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

Internal Signals

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.

Outputs

Speed Demand

An analog speed demand output signal is used to drive an externally connected motor controller to vary the belt speed.

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 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 & Designs

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 Designs.

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

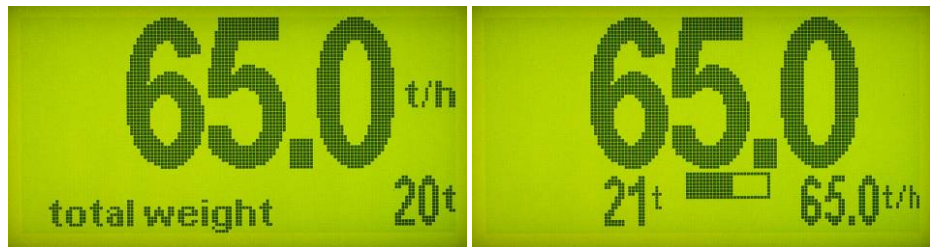
Display Customisation

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.

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.





ModWeigh I/O

The following table shows the I/O available for each of the transmitters available and also for the display.

The function of each input and output is shown in the table below. The functions of each input or output are user programmable.

		I/O available for each hardware type (& option required)					
		MT2x	MT4x	MT6x	MT8x	MW99d ¹	MW99p ²
Analog inputs	AI1 (loadcell)	•	•	•	•		•
	AI2 (4-20mA 0-10V)			MO2	MO2		MO5
Analog outputs	AO1 (4-20mA)	•	•	•	•		MO4/MO5
	AO2 (4-20mA)			MO2	MO2		MO5
Digital inputs	IN1 pulse input	•	•	•	•		
	IN2 acquire zero			•	•		
	IN3 run			•	•		MO6
	IN4 reset total			•	•		MO6
	IN5 print				•		MO6
	IN6 print total				•		MO6
	IN7 stop				•		•
	IN8 pause				•		•
Digital outputs	OUT1 pulse output	•	•	•	•		
	OUT2 low flow	•	•	•	•		
	OUT3 run motor			•	•		
	OUT4 healthy			•	•		
	OUT5 weight fault				•		MO6
	OUT6 belt speed fault				•		MO6
	OUT7 material feed				•		MO6
	OUT8 alarm alert				•		MO6
Communi-cations	COM1 (RS232)	•	•	•	•	•	•
	COM2 (RS485)	•	•	•	•	•	•
	COM3 (RS485)						MO7

¹ Options do not apply to units prior to serial number 24310.

² Future product

Specifications

Loadcell Input AI1	Input Range	±4 mV/V
	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 Outputs AO1 & AO2	Output range	0 to 20 mA (-90 µA to 21 mA)
	Maximum load	1000 Ω @ 24 V supply, 500 Ω @ 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 500 Ω gives 10 V at 20 mA.
	Non-linearity	< 0.01 %
	Drift	< 1 µA/°C.
Analog Input AI2	4-20mA input resistance	47 Ω
	0-10V input resistance	> 1 MΩ
	Isolation (MO2 option) :	not isolated, all 0V terminals are common
Digital Inputs IN1..IN8	High voltage	> 8 V
	Low voltage	< 4 V
	Maximum voltage	32 V
	Input load	3200 Ω to 4800 Ω
	Input type	PNP output sensors
	IN1 frequency input	
	Maximum range	0.01Hz to 4 kHz
	Typical operating range	10 to 1000 Hz
	Pulse duty cycle	20 % to 80 %
	Rate of freq change	< 20% per ms
	IN1 set to NAMUR	
	Terminal voltage	8 V
	Switching threshold	1.55 mA
Hysteresis	0.2 mA	
Namur fault	< 0.1 mA or > 6 mA	
Digital Outputs OUT1..OUT8	Max output current	0.25 A
	Supply voltage	8 Vdc < +V1 & +V2 < 32 Vdc
	OUT1 frequency output	
	Max frequency	1200 Hz
	Duty cycle	50 % ±20 % (f > 5 Hz)
Max output pulse time	100 ms (f < 5 Hz)	
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-1)
Protocol	Modbus RTU	

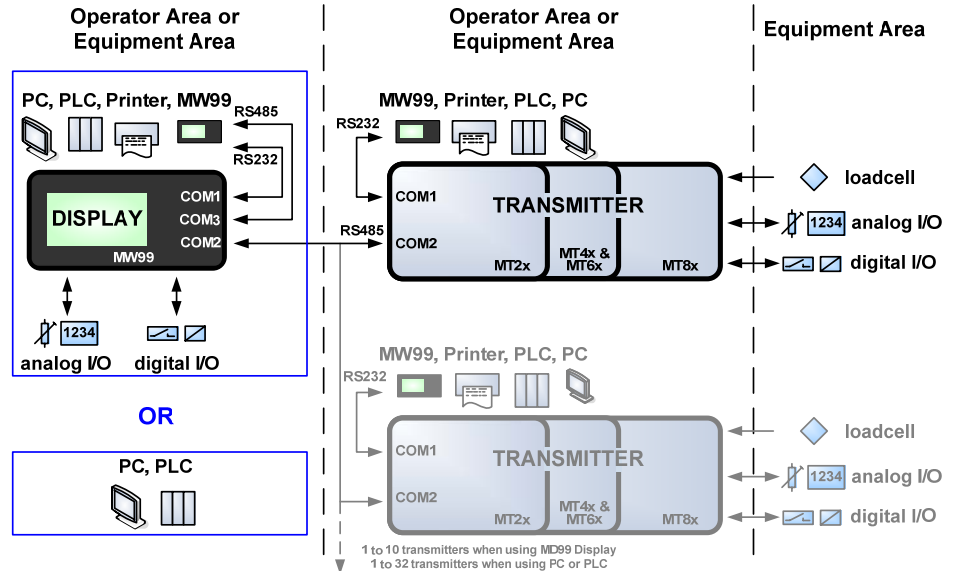
General

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)	2 VA

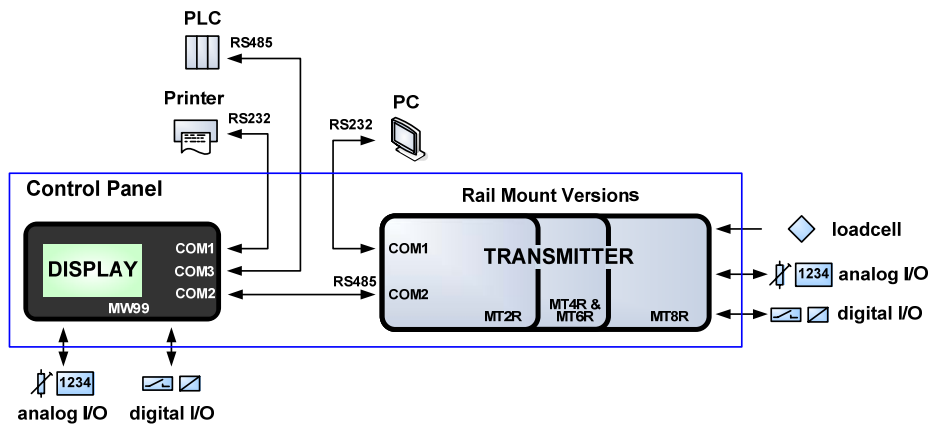
Connections

Principles

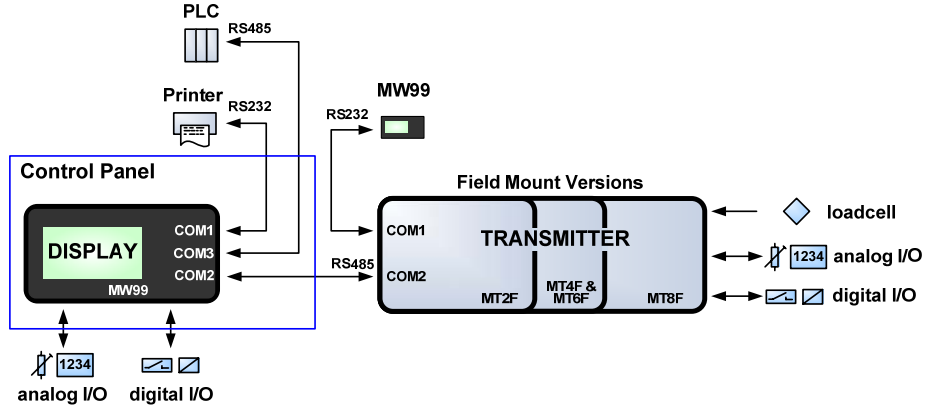
ModWeigh instruments can be configured in many different ways to suit any given application. The display is normally located to suit an operator. The transmitter can be located in the field to reduce field wiring or can be located with the display for a more conventional approach.



Transmitter in Control Panel

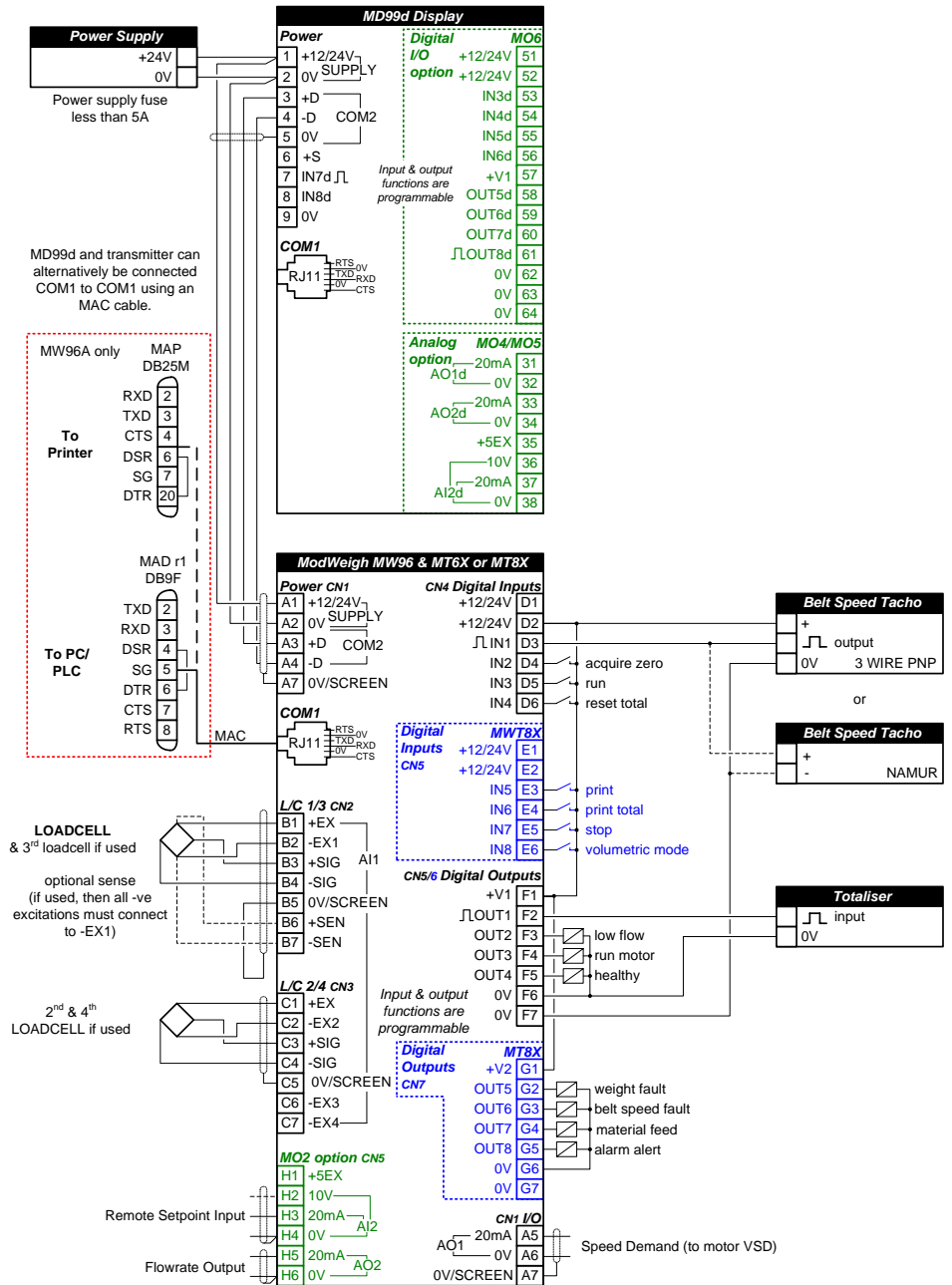


Transmitter with Equipment



Termination

Following is a typical basic weighfeeder connection diagram.

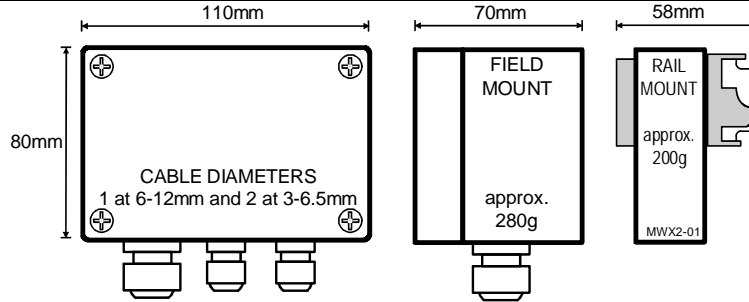


Dimensions

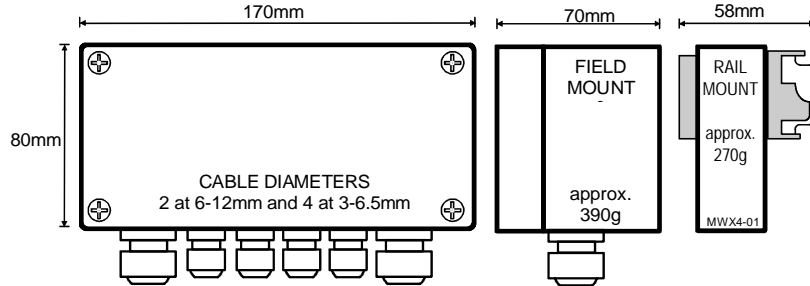
There are three basic container sizes for the four transmitter types. Each is available either for field mounting or rail mounting.

The display is designed for panel mounting.

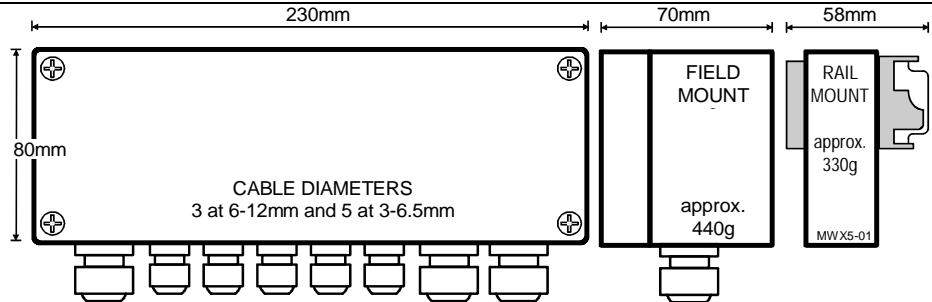
MT2x Transmitter



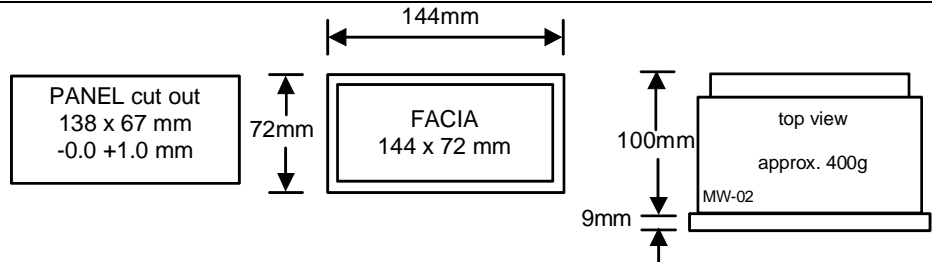
MT4x & MT6x Transmitter



MT8x Transmitter

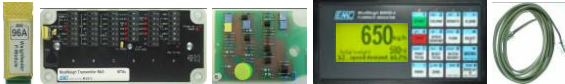


MW99 Display

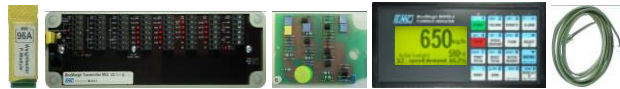


System Ordering

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	
<p>2 loadcell terminals³, 4 digital inputs/4 digital outputs</p>  <p>MW96A, MT6X, MO2, MW99d4, MAC</p>	<p>M96A-61R rail mount</p> <p>M96A-61F field housing</p> <p>M96A-61G field housing, rail mount</p>

2 loadcell terminals⁴, 8 digital inputs/8 digital outputs



MW96A, MT8X, MO2, MW99d4, MAC

M96A-81R

rail mount

M96A-81F

field housing

M96A-81G

field housing, rail mount

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).

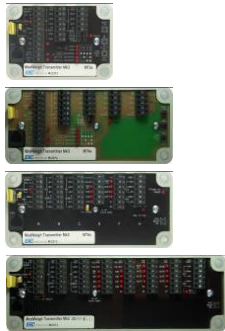
A display is necessary to calibrate and commission a Weighfeeder system. A typical order code list is **MW96A, MT6R, MO2, MW99d4, MAC, MAD** to provide a P-Module, transmitter, 4-20mA remote setpoint input & 4-20mA flowrate output, a display, a cable and adaptor to connect to a PC.

P-Module



Product function	P-Module order code
Weighfeeder	MW96A
Weighfeeder– Chinese manuals	MW96A-CH

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) ⁵	MO2
±5Vdc loadcell excitation (for safety barrier applications) ⁶	MOE1

Display



Display	display order code
Flowrate Indicator (2 digital inputs)	MW99d4

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/G field mount lid	MCL2x
MT4F/G & MT6F/G field mount lid	MCL4x
MT8F/G field mount lid	MCL8x

Displays	
Display without label	MC99dX
Weight Indicator display label	MC99L1
Flowrate Indicator display label	MC99L2
Pair of display mounting clips	BRK61P
Screw connector for MW99 power connector	TS17-9
Screw connector for MO6 option tplan	TS17-14

Other ModWeigh Products

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

EMC MW93 Weight Change Systems – for loss-in-weight and gain-in-weight flow control systems.

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

Contact Details

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