MES Series Flowmeters

Primary admixture flowmeter used worldwide since 1995.

- **Available in sizes 20, 25, 32, 40 and 50mm.**
- **Pulse, Digital LCD, Mechanical display and combo options**
- **Nutating Disc operation allows a long operational life.**
- **Accuracy un-affected by Specific Gravity changes.**

MES-series flowmeters are the most commonly used devise for measurement of admixtures.

New!

New: -CSM option:
Ceramic ferite magnet
with
Black glass-nylon shaft
for more acidic chemicals

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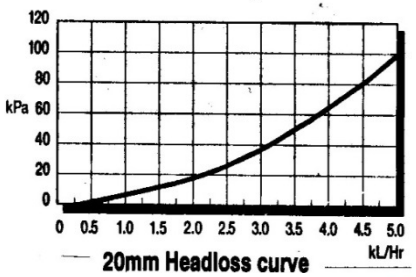
MES Flowmeters

- 20mm range most commonly used
- Operational chamber life up to 15-20 years
- Manufacture date engraved on pulsehead
- New - CSM ceramic magnet option



MES20-S-T

Black Body = Ryton + Teflon coated

Yellow Body = Ryton Chamber

	MES20	MES20R	MES20MR	MES20LCD5DP	MES20S types
Main Usage	**General batching**	**High vibration areas**	**Manual Batching**	**Precision Manual Batching**	**aggressive chemicals**
Display	--	--	Yes	Yes	available
Decimal point	--	--	--	Yes	available
Power	5 to 25 VDC	external	None	internal battery	DC or battery
Pulse Output	Transistor 1000 ppl	Reed Switch 60.6 ppl	Reed Switch 60.6 ppl	--	*Transistor 1000 ppl * Reed 61 ppl
for Manual Batching	--	--	--	Yes	--
for Semi-Automatic	Yes	Yes	Yes	--	Yes
for Automatic	Yes	Yes	Yes	--	Yes

MES Flowmeters - Components

*Note: Ppl changes with body size.
1000 ppl for MES20 only.

Head

Transistor Pulse 1000 ppL (Round J-Box)

Reed Switch Pulse 60.6 ppL (square & grey/green)

Resetable Litres Display
optionally with decimal point

Non-resetable Mechanical Totaliser & Pulse Output 60.6 ppL

WARNING: Use correct LCD head (size is on lid) for body size.

Body

Standard (brass)

Ryton Chamber (yellow)

Calibration is unchanged for specific gravity >= 1.1

Ryton Chamber + Teflon Coating (black)

Various Body Sizes
for 20, 25, 32, 40 & 50mm Ø pipes

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MES Flowmeter Sizes - Specifications

Model Number	MES20	MES25	MES32	MES40	MES50
Size	20mm (3/4")	25mm (1")	32mm (1¼")	40mm (1½")	50mm (2")
Transistor NPN pulse output rate (pulses per Litre)	1000	555	261	116	64
Reed Switch pulse output rate (pulses per Litre)	61	34	16	7.2	3.9
Start flow @ ±5% (Litres/min)	0.6	1.1	1.5	3.0	4.0
Minimum accurate flow @ ±1.5% (Litres/min)	1.5	2.7	3.8	7.5	9.5
Nominal flow (Litres/min)	45	65	125	200	360
Maximum flow (Litres/min)					
Admixture (Specific Gravity 1.4)	54	80	132	268	428
Admixture (Specific Gravity 1.1)	68	102	168	340	545
Water (Specific Gravity 1.0)	75	112	185	375	600
Accuracy (Repeatability)	± 1.5% (± 0.2%)	± 1.5% (± 0.2%)	± 1.5% (± 0.2%)	± 1.5% (± 0.2%)	± 1.5% (± 0.2%)
Voltage Supply	5 - 25 VDC	5 - 25 VDC	5 - 25 VDC	5 - 25 VDC	5 - 25 VDC
Supply Current (proportional to supply voltage)	5 - 25 mA	5 - 25 mA	5 - 25 mA	5 - 25 mA	5 - 25 mA
Weight (# including connectors)	1.8 kg	2.6 kg	6 kg	17 kg #	21 kg #
Connection type	¾" BSP (male)	1" BSP (male)	1¼" BSP (male)	1½" (flanged)	2" (flanged)
Max. working pressure	1160 kPa	1160 kPa	1160 kPa	1034 kPa	1034 kPa
Headloss at nominal flow	25 kPa (3m)	25 kPa (3m)	25 kPa (3m)	25 kPa (3m)	25 kPa (3m)
Max. liquid temperature	50°C	50°C	50°C	50°C	50°C

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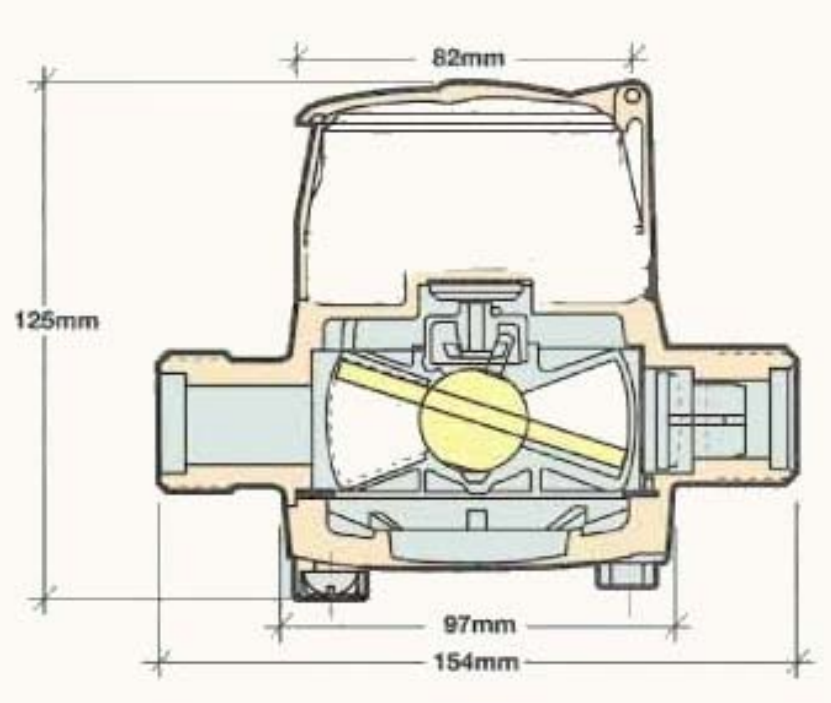
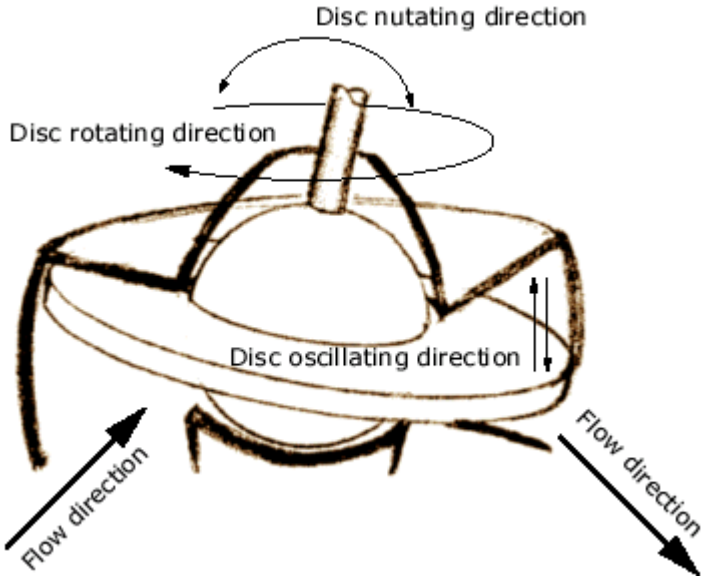
MES20 Flowmeter – How it Measures

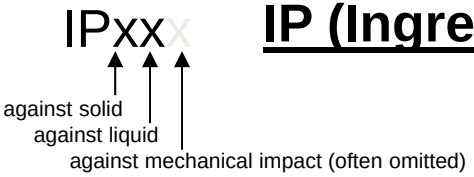
- Is a Positive Displacement type
  - Measures volume of liquid flowing by counting repeatedly the filling and discharging of a known fixed volume.
- Measuring chamber with nutating (wobbling) disk
  - Has a chamber that has inside it a nutating (wobbling) disk that creates fixed-volume discrete “parcels” from the passing liquid.
- Chamber is magnetically coupled to the pulsehead
  - The volume of the liquid that passes the chamber is found by counting the number of “parcels” (i.e. the number of revolutions of the nutating disk).





MES20 Flowmeter – Installation - Rating

IP (Ingress Protection) Ratir



Protection rating against solids	Interpretation	Protection rating against liquids	Interpretation
X	No specific protection	X	No specific protection
0	Inherent degree of protection	0	Inherent degree of protection
1	Protected against solid objects larger than 50mm. (eg. accidental contact with the hand)	1	Protected against drops of water falling vertically.
2	Protected against solid objects larger than 12mm. (eg. accidental contact with finger)	2	Protected against water drops falling at up to 15 degrees from vertical.
3	Protected against solid objects larger than 2.5mm. (eg. tools and wires)	3	Protected against water drops falling at up to 60 degrees from the vertical.
4	Protected against solid objects larger than 1mm. (eg. fine tools and wires)	4	Protected against splashing water from all directions.
5	Protected against quantities of dust that could interfere with satisfactory operation	5	Protected against jets of water from all directions
6	Completely protected against dust	6	Protected against jets of water of similar force to heavy seas.
-	-	7	Protected against the effects of immersion.
-	-	8	Protected against the effects of submersion.

http://www.greenhouse.gov.au/lgmodules/wep/toolkit/streetlighting/street_ip.html

MES20 Flowmeter – Installation - Location

- Flush out pipes thoroughly before connecting flowmeter.
- **Install** under cover, in an accessible area for any future service.
- flowmeters should be grouped together off the ground on a stand.
- Avoid high vibration areas – move, use dampeners, use MES20-R instead with ME2000, ME3000 or UIC/A.

- **Direction:** Arrow on meter body must coincide with flow direc

- **Orientation:** in any plane, except upside down (to avoid deposits in chamber magnetic drive section)

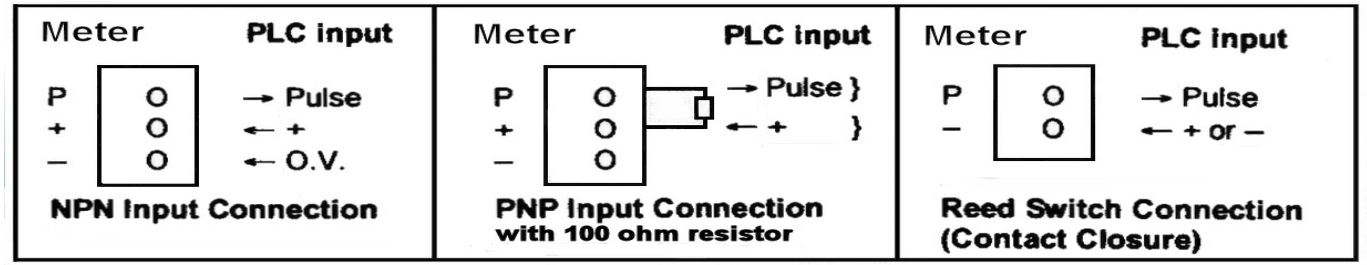
- **Filter:** can pass small impurities & has internal strain
  but if liquid contains granules or many impurities, a filter box or strainer may be fitted before the flowmeter (800 micron cartridge filter recommended).
- Install any regulation valve preferably before the flowmeter.
- If injecting into water line, a solenoid may be needed at the discharge point to avoid syphoning.

MES20 Flowmeter – Installation - Wiring

- To avoid water ingress into electronics, ensure cable entry glands are secure and loop cable down.

To Wire:
- Remove colour cap
- Open Junction Box lid
- Pass cable through cable gland
- Strip cable ends
- Fit to terminal connector
- Check wiring
- Tighten gland
- Close Junction Box

- Electrical connections:



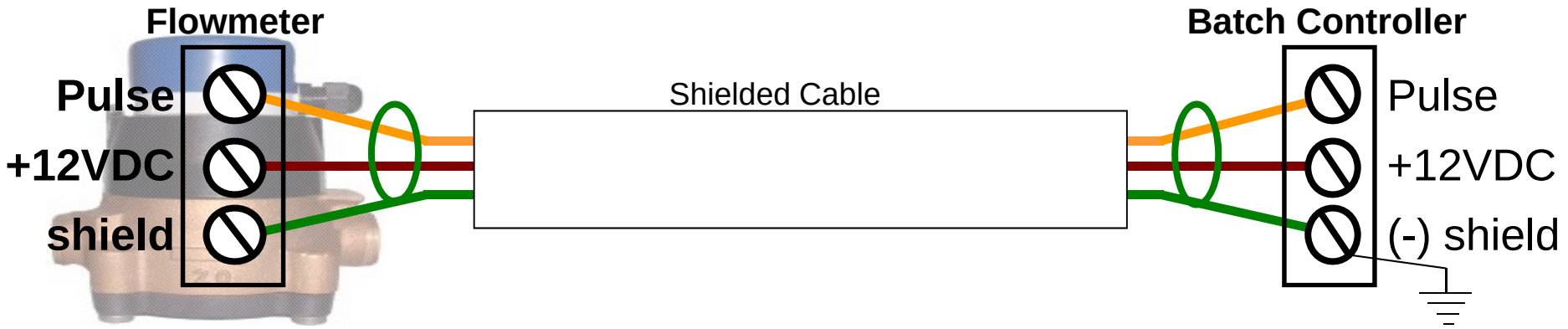
For PNP input (12 – 24 VDC) fit a 1.5 – 1.8K resistor (value depends on input impedence).

Current limiting resistor and debounce capacitor are fitted.

- Interface cards are available to scale output pulses.
- To avoid interference, use only shielded cable.
- Ensure only regulated DC voltages used (when using external power).

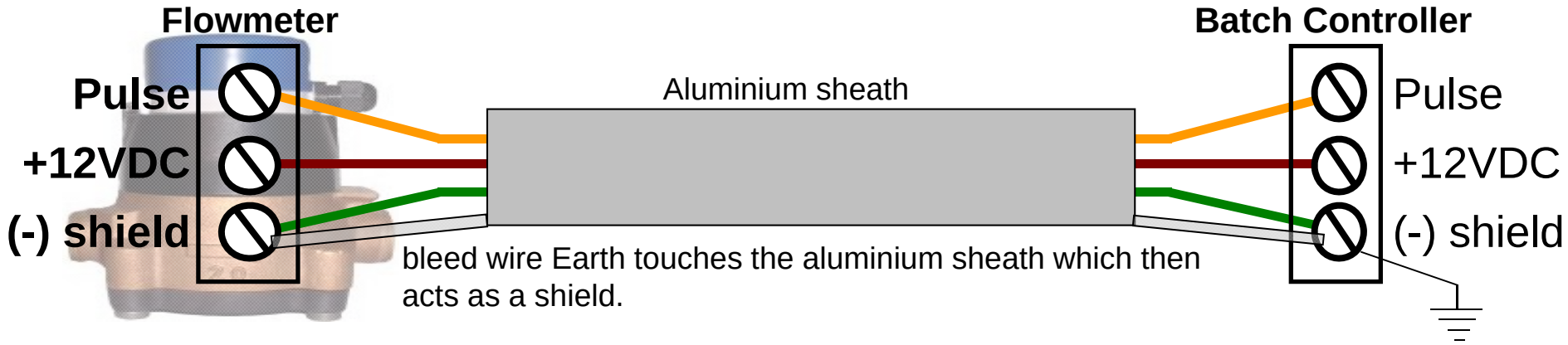
MES20 Flowmeter – Installation - Wiring

The shield is internally Earthed at the <u>Batch Controller end only</u> and not at the flowmeter end.



Do not Earth shield at flowmeter

Shield goes to Earth internally



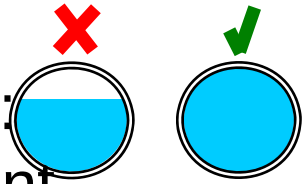
Do not Earth this end

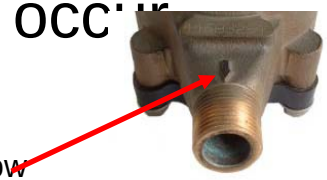
Shield goes to Earth internally

MES20 Flowmeter - Operation

- Do not exceed operating specifications as this can damage the meter

- Don’t exceed recommended maximum flowrate*
  (75 Litres/min for MES20) - damage/overdose can occur





- Must have full pipe at all times:
  - For accurate measurement,
  - To avoid dry chemical deposits (through exposure to air)
  - Fouling meter chamber

- A calibration check is recommended every 6 to 12 months.
- Replace chamber if accuracy out by > 5% (low replacement cost).

* Note: The higher the Specific Gravity of the liquid, proportionally the lower the maximum flowrate.

MES20 Flowmeter – Operational Issues

The MES20 is a high-resolution flowmeter. Note: false counts is usually due to excessive high **vibration** – either directly to the meter installation, or from extreme plant vibration of the liquid.

This can be dealt with by:

- If possible, install flowmeter **away from vibration areas**; or
- Using **rubber dampeners** to buffer the flowmeter from vibration e.g. from a nearby compressor, alternate pumps; or
- Using a MES20-R **reed switch** contact closure output flowmeter tre)

for use with ME2000, ME2008, ME3000, ME995-7 or UIC series or scale the PLC input accordingl

This is available as a complete flowmeter, or pulsehead only (whi interchangeable with the MES20 pulsehead, so that existing plum and meter body installation is not disturbed); or

Also:

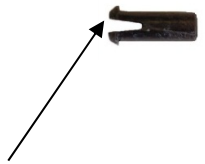
- Counts can result if a **Check Valve** is faulty, and allows liquid to drain back into the storage tank. The Check Valve should be directly after the flowmeter to eliminate vibration in the liquid line.
- Ensure hoses are tied down to avoid unnecessary liquid vibration.

MES20 Flowmeter – Head Removal

- Pulsehead is self-contained, and is attached to meter body via a bayonet turn and lock fitting mechansim.
- Don’t deform the pulsehead copper face as that could damage internal parts.

- Push in the locking pin with a screwdriver.

- Turn pulsehead anti-clockwise 1/8 turn, then lift pulsehead off. **Don’t lose pin.**



- To re-attach, reverse sequence, and tap-in locking pin (split end goes in first).

MES Flowmeters – Body Types

Old Body

20 & 25mm body discontinued.
Couplings and Gaskets
still available.

- Body end threads are 25 mm gas metric.
- Shipped with 20mm (3/4”) BSP (male) coupling connectors.
- Couplings are screwed on for connecting to pipe.

New Body

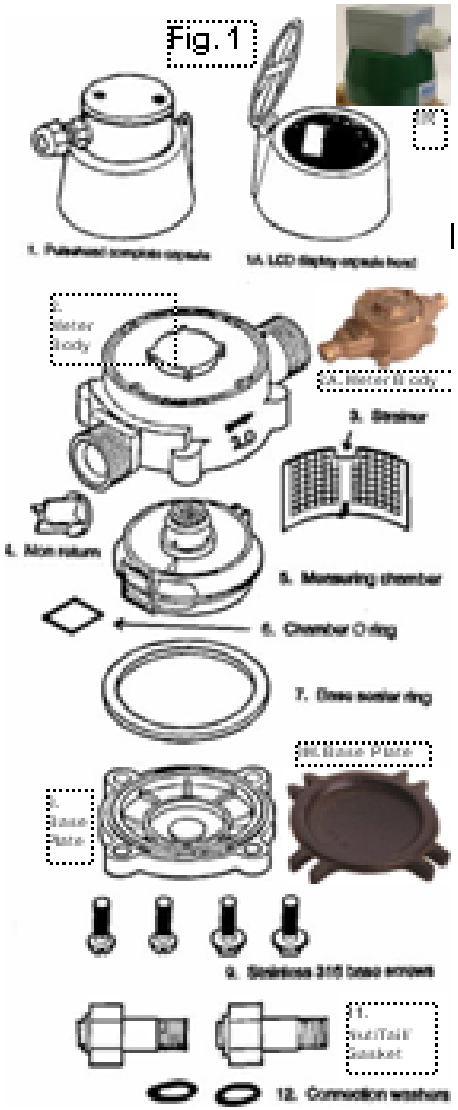
- 20mm (3/4”) BSP (male) threaded ends.
- 25mm (1”) BSP (male) threaded ends.
- Barrel Union Plastic Connectors Now optionally available

MES20 Flowmeter – Chamber Access

(1) Rotate or remove meter body from pipe.
(2) Unscrew the 4 base screws

(3) Remove baseplate and base seal ring.
(4) Using long nose pliers, pry and pull out white strainer/ locator, so unlocking the measuring chamber assembly.

*Note: Don't lose strainer, as it also acts as a spacer/positioning element.



MES20 Flowmeter - Maintenance

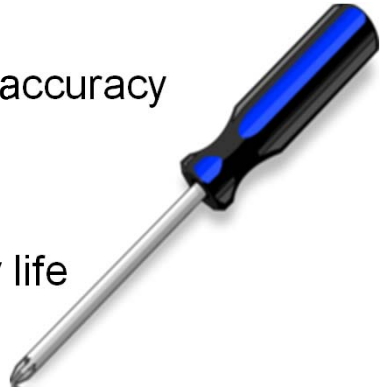
• Flush the flowmeter with water if the pipe runs dry.
• If measuring chamber is blocked, there will be pressure loss on output and loss of flowrate and possible overdose may occur. Blockage will be detected by ME995, ME188, ME2000/2008, ME3000 systems.

- If flow becomes excessively restricted, or meter is out of calibration or pulsehead stops sending pulses, then:

o Reset the connected controller.
o Remove flowmeter pulsehead.
o Shake pulsehead (MES-P only) left-right to check if there are pulses (counts appear on Batch Controller etc).

- If no pulses:
  - Check wiring cable connector and that 12VDC is delivered to pulsehead.)K:
  - Switch off connected equipment and replace pulsehead.
- If get pulses, then check chamber:
  - Access chamber and inspect. Either:
  - For minimum service time, use a new chamber (E.G. Order Code: 20-5);
  - Clean chamber parts in warm soapy water or diluted HCl acid (5 water : 1 acid).
    After use with chemicals, if MES20 removed from pipeline, always flush out working chamber with water.
    Ensure wobble disc roller pin (20-5D) is in place and shutter plate (20-5B) is refitted.
  - Re-insert chamber, secure position with the strainer/locator. Refit or replace body gasket.
- Re-assemble flowmeter
- **Always perform a calibration check of the flowmeter after any service.**

MES20 Flowmeter - Maintenance



- **Abrasive particles** can wear out the chamber and create inaccuracy over time (detect this through calibration checks).
  In Australia, the admixture standard allows ± 5% tolerances.
- Liquids should be **free of particles** to increase the accuracy life of the chamber to 10 to 20 years – use **filters** if necessary.
  (or use MM or AMM20 magflows –no moving parts)
- A **calibration check** is recommended every 6 to 12 months (admixtures only).
- If calibration is within +/- 3 to 4% there is no need to inspect the working chamber.
- If 5%> then if required, **clean chamber** parts in warm detergent water or diluted acid 5:1.
- If after cleaning still out, **then replace chamber** if out by more than 5% (low replacement cost).
- After use with chemicals, if MES20 is removed from pipeline, be sure to **flush out working chamber** with water.
- To **avoid water damage to electronics**, ensure all cable entry glands are secure, cables are looped downwards and the meters are under cover and not prone to flooding.
- Treat underside of pulseheads with care – **do not deform** the copper face.
- **After any service perform a calibration check of meter**.

MES Flowmeters - Components

MES Standard Chamber
Order Code: 20-5 (for 20mm flowmeter)
(Dark Grey in Colour)

MES Ryton-MTL Chamber (-*S*)
Order Code: 20-5-S (for 20mm flowmeter only)
For highly aggressive-chemical/Petroleum-resistant
measuring chamber and seals.
(Dark brown in colour)

MES-CSM Higher Chemical Resistant Magnet

MES standard chamber flowmeters can now be optionally ordered with a new optional Ceramic magnet with black glass/nylon driver fitted on the measurement chamber which allows higher resistance to chemicals that may affect the standard magnet. The flowmeter order code with the new ceramic magnet option for 20mm is MES20-CSM. A replacement standard chamber, but with the new ceramic magnet, is order code 20-5-CSM. Standard chambers can also be returned for upgrade to the ceramic magnet option. (To distinguish CSM magnet is smaller & (red, yellow) or new black glass filled Nylon driver shaft is used.

MES20 Flowmeter - Spares

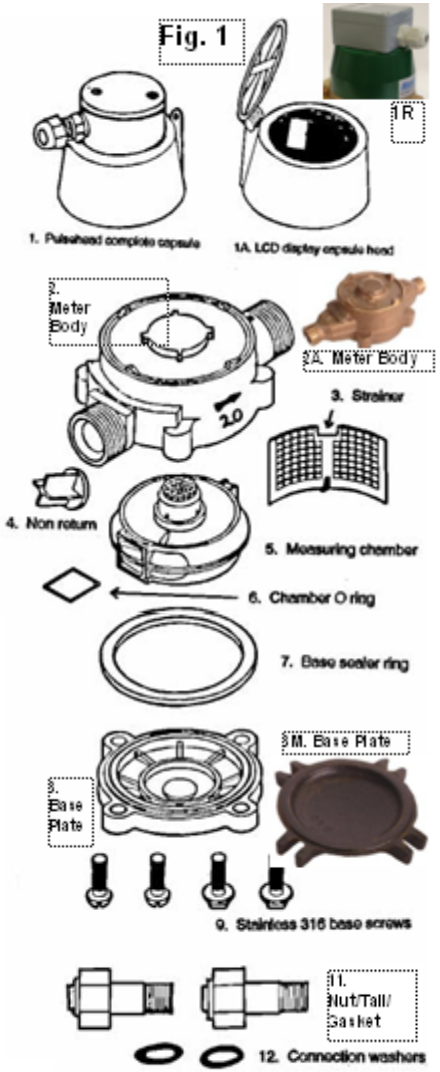
For MES spare parts, the Product Code format is "*size-code*"

e.g. "20-5" is a spare measuring chamber for a 20mm MES flowmeter

Part No.	Description
1	Pulsehead complete NPN output (Round junction box)
1R	Pulsehead complete REED output (Square junction box)
1A	LCD Litres display capsule
1B	LCD Litres dec. pt display capsule
2	Meter body(old type) *
2A	Meter body(new type, coupling-free)*
3	Strainer
4	Non-return valve
5	**Measuring chamber (complete)**
6	Chamber O-ring
7	Base sealer ring
8 or 8M	Base plate (8: plastic, 8M: metal)
9	Stainless 316 base screw
11	Nut/Tail/Gasket connection kit (pair)
12	Connection washer (each)
13	Oval flange kit (pair)
BC	Chamber and Body (parts 2 to 9)
20-5-S	Special Ryton-MTL Chamber chemical/petroleum resistant

20-5-CSM Standard chamber with ceramic magnet

Measuring Chambers Standard and Special 20-5 20-5-S



* body comes without measuring chamber and without any couplings.

MES Flowmeters - Summary

MESLCD5 range pictured

Advantages

- High resolution PD measurement
- Ideal for admixtures
- No external power required, so is ideal in remote sites.
- Simple and cost effective.
- Sizes 20 to 50mm

MES20 Pictured MES20-R

Advantages

- High resolution PD measurement for accurate batching.
- Accuracy largely un-affected by S.G. changes.
- Ideal for admixtures (used worldwide)
- Safeties can be added via other equipment e.g. ME Batch Controllers, ME2008, PLC/Computer.
- Simple and cost effective.
- Sizes 20 to 50mm

MES Flowmeters - Summary

- Always perform a calibration check after any service.
- For admixtures we recommend a calibration test in 6 - 12 month cycles.
- MES pulseheads can be swapped between different flowmeter body sizes provided the pulses/Litre setting is changed accordingly in the ME2000 / ME2008 / ME3000 / ME995-7 / UIC or other scalable devices.
- ME188 and ME995 Batch Controllers (except ME995-7 and ME3000) are only for use with MES20 / AMM15,20 / MEA15 flowmeters (because 1 pulse/1ml input needed to Batch Controller).
- Never swap LCD display heads between different flowmeter body sizes (display counts will not represent actual volume as they are calibrated to the specific size meter).

- If in doubt, call ManuFlo.