

MPB SERIES TX200 TRANSMITTING FLOWMETER

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1 INTRODUCTION

The TX200 Flowmeter is for use with many types of gases. Parts in contact with gases are of a 316 (A4) stainless steel construction. The enclosure for the pointer and interface board is produced from an aluminium billet with a hard anodised coating.

All versions have an analogue pointer and graduated scale display. This can be a percentage display (0–100%), or a calibrated scale to suit customer requirements.

The TX200 Flowmeter can be fitted with a rotary encoder. This gives 4-20mA output that reflects the specific flow rate of the flowmeter.

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The following recommendations are made to ensure safe and efficient operation:

Only suitably qualified personnel should install, operate, and maintain the equipment.

Only MPB Industries manufactured, or approved parts should be used.

The flowmeter should not be used for any other purpose than for that which it was supplied for, unless approved by MPB industries.

2 TECHNICAL

Environmental:

Ambient Temperature:	-5 °C / + 50°C
Max Operating pressure:	50 Bar
Max Process Temperature:	150°C (Viton seals)
Min Process Temperature:	5°C
Ingress Protection of Enclosure:	IP67

Performance

Measuring Span:	10:1
Measuring Accuracy:	5% Full scale (analogue scale)

Electrical:

Power Supply:	7-12 Vdc
Cable Gland Entry:	M12
Outputs:	4-20 mA
	High and Low flow Alarms (Factory set Normally Closed, but can be supplied Normally Open)

Mechanical:

Flow Tube Body Material:	316L Stainless Steel
Float Body Material:	316L Stainless Steel
Valve seal Material:	FPM
Indicator enclosure material:	Anodised Aluminium
Inlet and outlet connections:	1/8" threaded taper (BSP, or NPT)

3 INSTALLATION

The TX200 Flowmeter must be installed in a completely vertical position. With the inlet at the bottom on the enclosure and the outlet at the top.

It is important that the TX200 Flowmeter is mounted vertical, otherwise the accuracy of the reading will be affected.

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In order to have stable readings, it is essential to have a laminar flow path. To achieve this, the TX200 Flowmeter should be installed in straight vertical pipework. This section of pipework should have an internal diameter of the same or larger than the inlet/outlet connections of the TX200 Flowmeter. Recommended minimum distances:

Outlet: 5 DN
Inlet: 3 DN

These distances must be straight and unencumbered.

The installation of a filter before the instrument is important. This will avoid possible obstructions damaging or fouling the measuring float.

The filter mesh should be maximum 200 µm.

The measuring float has an encapsulated magnet. If the media to be measured has suspended magnetic particles, it will be necessary to fit a magnetic filter on the inlet of the instrument to avoid the accumulation of particles around the measuring float.

The TX200 flowmeter can be supplied with wall mounting brackets (see fig 2).

Note: The inlet needle valve is designed to control the flow to the inlet of the measuring tube. This is not a shut off valve.

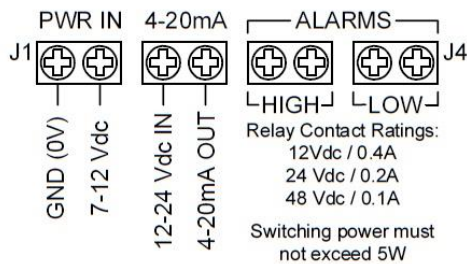


Remove all packing, including any internal transportation aids from inside the enclosure.

Do Not install a flowmeter into a system where the operating pressure could be higher than the stated design pressure of the flowmeter. This could cause the process connections to leak.

3.1 ELECTRICAL CONNECTION

The TX200 flowmeter has the following terminal connectors.



It is recommended to use a shielded multi strand cable with sections of 0.25 or 0.5 mm². The shield would require grounding at the opposite end to the TX200 Flowmeter.

The TX200 Flowmeter is fitted with a M12 cable gland at the rear of the enclosure.

Alarm relays NO or NC (factory set NC – open to alarm).

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4. OPERATION:

Ensure inlet valve (if fitted) and flow control valve are closed.

Open each valve slowly. A flow will be established. This will cause the measuring float to rise and in turn show a reading on the analogue scale in the window of the flowmeter enclosure.

Initially open the flow control valve fully, close valve, then re-open valve to required flow rate.



Note: opening the shut valve or applying pressure too quickly could damage the measuring float.

4.1 Transmitter Board

The TX200 Flowmeter can be fitted with a transmitter board. This has a 4 -20 ma output which can be used to generate an alarm, or display the flow rate externally.

The board also has 2 programmable alarms. These could be used for high and low alarm levels. These are factory set for normally closed operation.

In addition to this there is a NAMUR 43 output.

The 4-20 mA output should be proportional to flow rate. Where this cannot be achieved by calibration, the 4-20 mA output can be recalibrated to give a more linear output. This can be done at the factory, or onsite with the aid of bespoke software from MPB.

4.2 Applying Power to the Transmitter for the first time

Connect power to the board as detailed in section 3.1.

Both LED's on the transmitter board will start to flash quickly. This indicates the meter needs calibrating.

4.3 Calibrating the Transmitter

To set the 20mA upper limit, either physically move the pointer to the maximum flow position, or allow the flow required to pass through the flow tube. The pointer will then move to display the flow rate on the analogue scale plate. Press the upper button for 5 seconds then release. If the calibration is successful, the upper LED will flash 5 times then extinguish. If the upper LED starts to flash again, repeat the procedure but hold the button for a little longer.

To set the 4mA lower limit is similar to above but move the pointer to the lower limit and press the lower button for 5 seconds to save the calibration. Again, the lower LED will flash 5 times if successful.

With both calibration points set, the output current will track the position of the pointer as it moves. The value of the loop current will depend on which range is selected.

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4.4 Setting Flow Rate Alarms

Lower and upper flow rate alarms can be set for the flowmeter.

To set the lower flow alarm, move the pointer to the flow limit required. Press the lower button for 2 seconds and release. If successful, the lower LED will flash twice.

To set the upper flow alarm limit, move the pointer to the required upper flow rate position, press the upper button for 2 seconds then release. Again, the upper LED will flash twice if successful.

With one or both alarms positions saved, should the flow rate fall outside the permitted flow rates then the appropriate alarm relay will activate and the corresponding LED will turn on. If meter diagnostics is enabled, a message will also be transmitted.

The corresponding LED will illuminate when the upper or lower flow rate alarm point is reached.

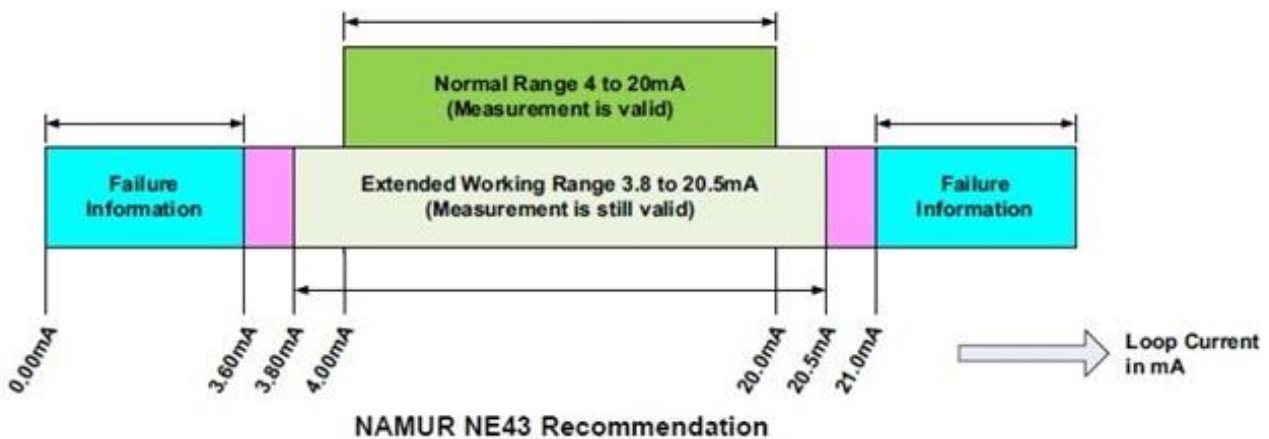
To disable the upper alarm, move the pointer to the minimum flow rate, press the upper button for 2 seconds then release. The upper LED will flash twice if successful.

To disable the lower alarm, move the pointer to the maximum flow position, press the lower button for 2 seconds then release. The lower LED will flash twice if successful.

Note: On power up, if the lower alarm is enabled and the pointer positioned to trigger a low flow alarm, the alarm condition will not be activated. Only when the pointer moves to a valid reading then drops to a low flow position will the alarm activate. This feature is to prevent false alarms triggering while the flow settles.

4.5 Extended output range – NAMUR 43

Note: MPB software will be required to configure the following options.



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If the flowmeter is configured for NAMUR NE43, then the following will apply: -

- a) The min/max working flow range will be extended to cover 3.8 to 20.5mA
- b) Internal flowmeter errors will have the following loop current values: -
 - I. 22.0mA – Encoder magnetic field too low. Move magnet nearer to encoder IC.
 - II. 22.2mA – Encoder magnetic field too high. Magnet is either too close to the encoder IC or magnet is unsuitable (too strong).
 - III. 22.4mA – Encoder internal error.
 - IV. 22.6mA – Bad AGC (Automatic Gain Control) value. Re-position magnet for more reliable readings.
 - V. 22.8mA – Invalid encoder reading.

4.6 Special Output Current Capabilities

It is possible to configure the flowmeter to provide extra operational information via the loop output current. This is independent of the loop output configuration chosen: -

- I. Select '*report alarms in loop*' and the output current will show: -
 - 3.6mA for lower alarm active
 - 21.0mA for upper alarm active
- II. Select '*report not cal in loop*' and if the flowmeter min/max flow rates are not calibrated then the current loop will be 23.0mA.

4.7 Power On Delay

A value from 0 to 250 seconds (default 3) can be set which will inhibit the loop output until the delay period from power on has elapsed. This is to give time for the flow rate to stabilise before true measuring takes place.

Both LED's will be on during this time and the loop current will be 3.37mA.

4.8 ID/Serial Number

Each flowmeter can be given a unique ID or serial number. This can be up to 30 alpha/numeric characters long.

4.9 Setting Flow Rates and Flow Rate Units

Via the comms port, it is possible for the meter to transmit the actual flow rate measured. Alternative flow rates can be added, but standard flow rates are: -

- No units
- Litres/min
- cc/min
- Litres/hour
- Percentage flow

The min and max flow rates will need to be entered to enable live flow rate information to be transmitted over the comms port.

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4.10 Flow Volume and Flow Volume Alarm

The transmitter may also show the accumulated volumetric flow. Additionally, you can configure the transmitter to trigger an alarm when a total flow volume required has been reached.

The alarm can be configured in the following way: -

- No action, alarm disabled
- Trigger upper relay only
- Trigger lower relay only
- Trigger both relays

The volumetric flow will start counting from the end of the power on delay period but can be reset at any time.

4.11 Flowmeter Runtime Values

When power is applied to the transmitter, a count is started counting the minutes the flowmeter has been operating.

Two runtime values are available, time since power on and accumulated time since the first power on. These times can be read via the comms port and may be useful for setting maintenance intervals.

4.12 RS485 Full-Duplex Communications

The inclusion of the on-board comms port allows data to be sent and received over cable lengths reaching 1000 metres.

4.13 Alarm Relay Configuration

The alarm relays (High and Low) are configured as Normally Closed (NC) at the Factory. These can be set to Normally open (NO). This should be stated at time of ordering or returned to the factory to be set.

5 MAINTENANCE

Minimal maintenance is required for TX200 Flowmeter. It may be required to clean the internal flow tube to remove any chemical deposits that have adhered to the flow tube. Remove the TX200 Flowmeter from the pipework. A 4mm Allen key is required to remove the top stop. Once the top stop screw has been removed, the flowmeter can be turned upside down and the float and top stop with drop out. Care should be taken not to damage the float.

If needed, the whole flow tube with measuring valve can be removed by unscrewing the two M4 Hex Socket Set screws in the back of the enclosure. Care should also be taken not to misplace the two locating pins in the measuring valve assembly. These must be put back in place when reassembling to stop the flow tube rotating in the enclosure.

Valve packing / seals are recommended to be changed every 5 years. It is recommended that the valve assembly be pressure tested to 1.5 times the working pressure of the flowmeter to ensure no leaks occur when flowmeter is put back into service. This can be done either independently or in the system it is operating in.

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Failure of the valve seals may result in the process gas / fluid being propelled from the flow control valve.

Front cover seal should be inspected for damage, whenever the cover has been removed, before refitting.



Do not re-use seals or gaskets. This practice should never be carried out. It is recommended that only MPB spares are used. MPB part numbers for these can be found on the MPB parts drawing (this can be requested from MPB Industries Ltd head office).

6 TROUBLE SHOOTING

Pointer stuck at top – reduce flow, allow pointer to fall, re-establish flow.

Both LED`s on control board are flashing quickly – this shows the board has yet to be calibrated.

Both LED`s on the control board are flashing slowly – this shows that the 4-20 mA loop has not been connected or connected incorrectly.

LED`s flashing alternately - this implies the control board is unable to detect pointer movement.

7 WARRANTY

MPB Industries Ltd's warranty extends for a period of one year after shipment. The equipment or material of its manufacture is free from defects in workmanship and materials. Corrosion or other decomposition by chemical action is specifically excluded as a defect covered hereunder.

MPB Industries Ltd's warranty does not cover:-

1. Damage caused by use of the items for purposes other than those for which they were designed.
2. Damage caused by unauthorised attachments or modifications.
3. Products subject to any abuse, misuse, negligence, or accident.
4. Products where parts not made, supplied, or approved by MPB Industries are used and in the sole judgment of MPB Industries such use affects the product's, performance, stability or reliability.
5. Products that have been altered or repaired in a manner in which, in the sole judgment of MPB Industries, affects the product's performance, stability or reliability.

If the Buyer discovers a defect in material or workmanship, it must promptly notify MPB in writing; MPB reserves the right to require the return of such defective parts to MPB, transportation charges prepaid, to verify such defect before this warranty is applicable. In no event shall such notification be received by MPB later than 13 months after the date of shipment. No action for breach of warranty shall be brought more than 15 months after the date of shipment of the equipment or material.

Figure 1

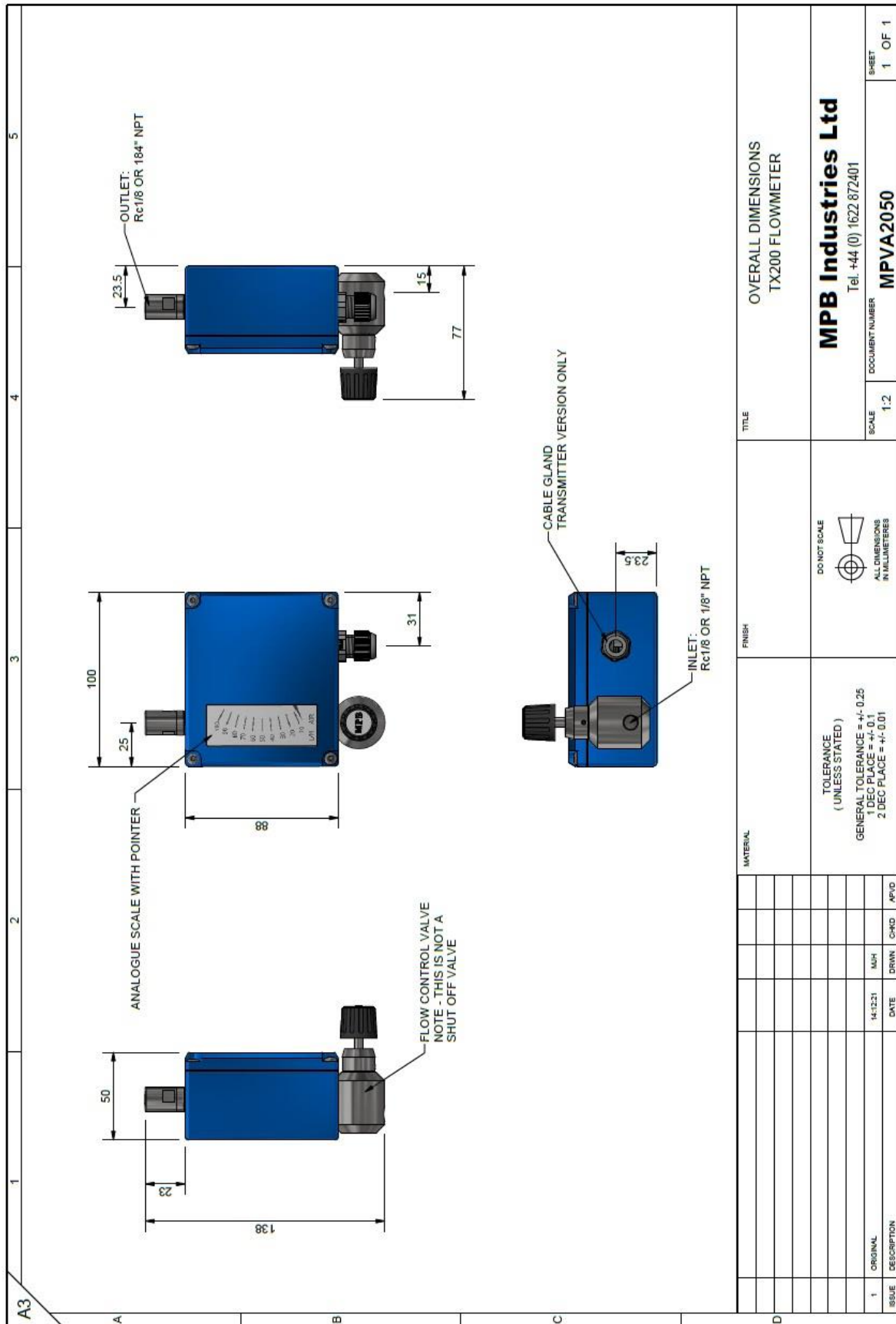
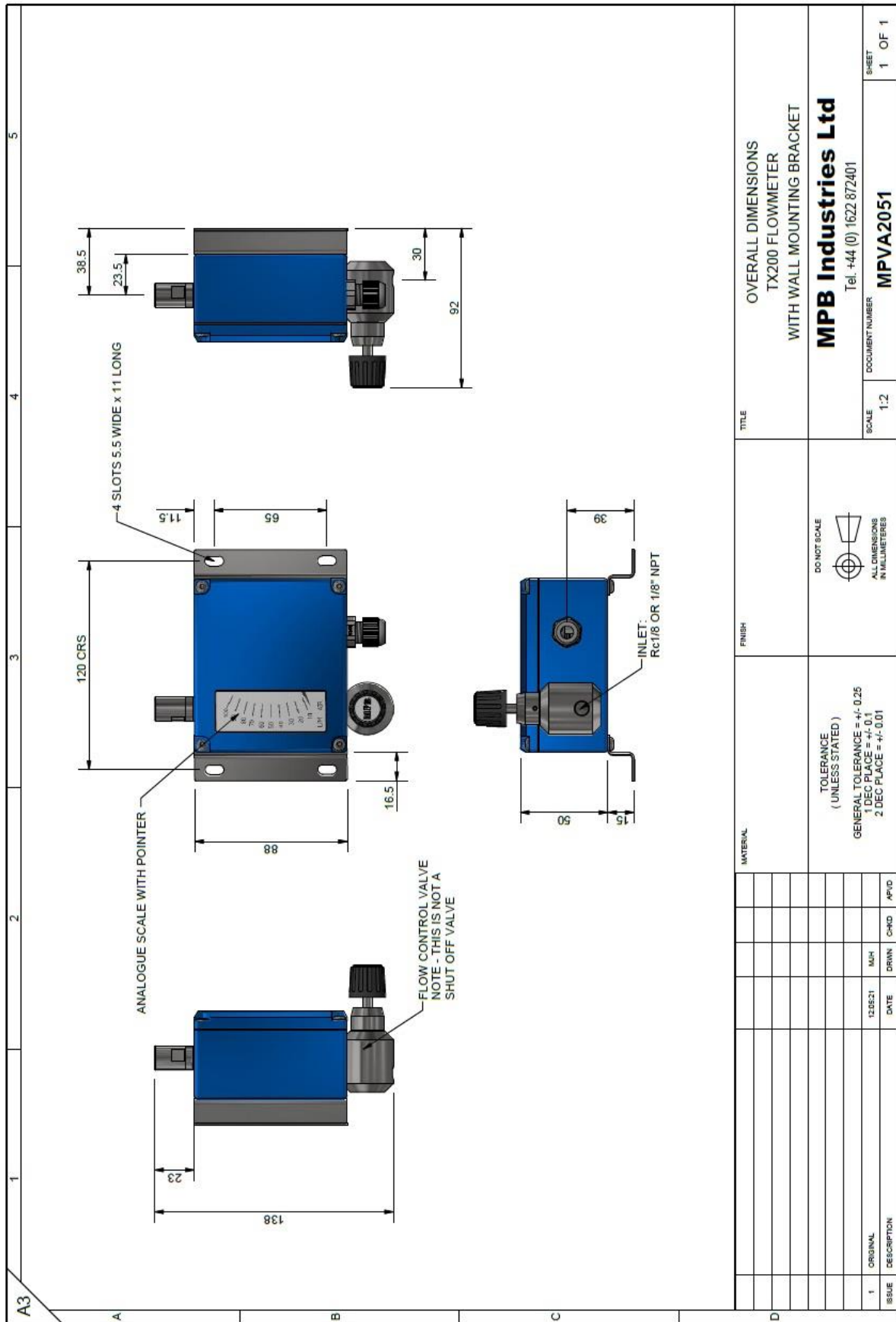


Figure 2



ISSUE	DESCRIPTION	DATE	DRWN	CHKD	AP'D
1	ORIGINAL	12/25/21	M/H		

MATERIAL	FINISH	TOLERANCE (UNLESS STATED)	SCALE	DOCUMENT NUMBER	SHEET
		GENERAL TOLERANCE = ±0.25 HOLE PLACES = ±0.1 2 DEC PLACES = ±0.01	1:2	MPVA2051	1 OF 1
		DO NOT SCALE 			
TITLE		OVERALL DIMENSIONS TX200 FLOWMETER WITH WALL MOUNTING BRACKET			
MPB Industries Ltd Tel: +44 (0) 1622 872401					