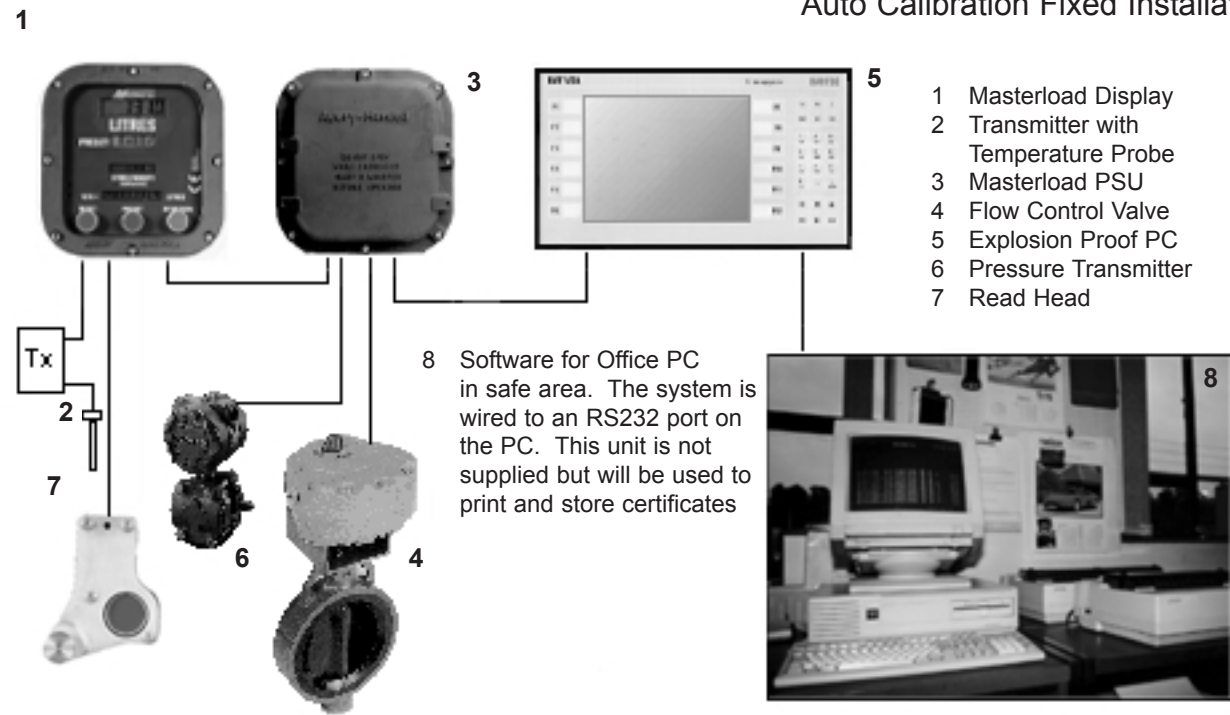


Hardware

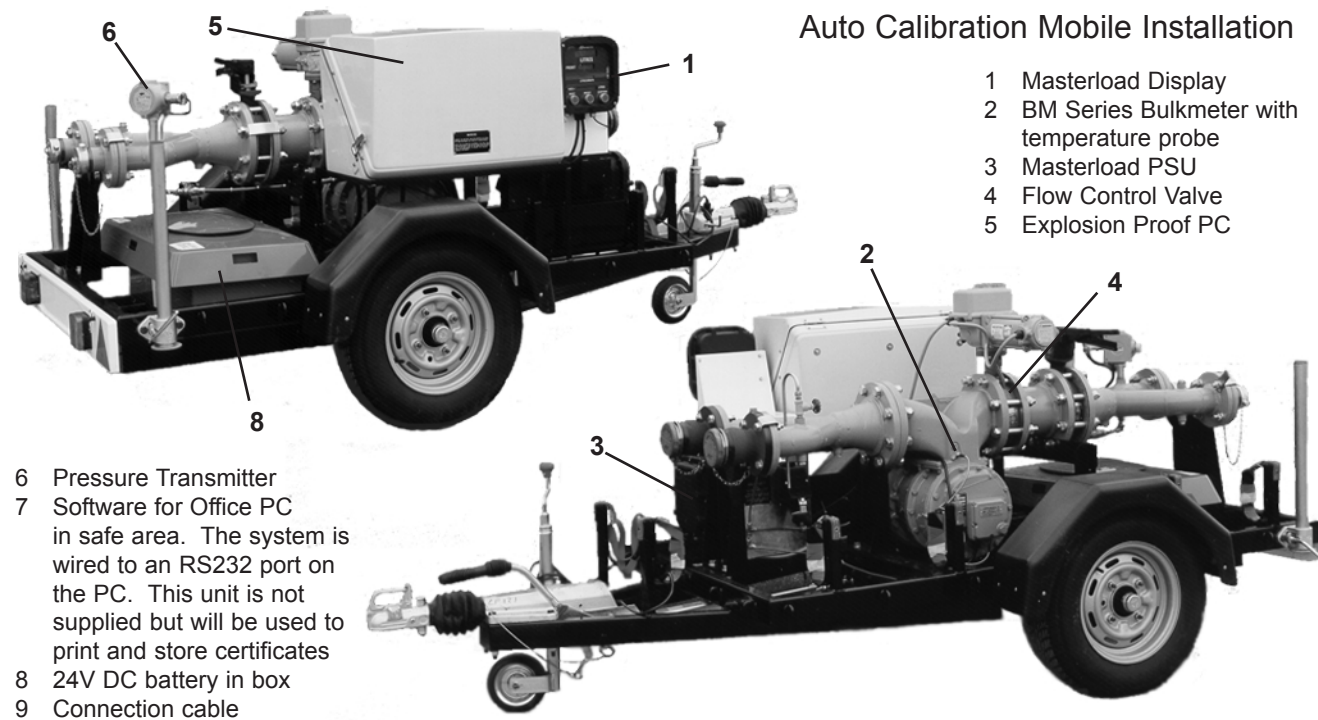
A fixed installation would typically be:-

Avery Hardoll BM series Bulkmeter fitted with Masterload II. 4" butterfly valve with motorized control. Pressure and temperature sensors. Operator interface (PC Terminal). 24V DC power pack, to be mounted in a suitable non hazardous location, and software to run on an office PC (not supplied).

Auto Calibration Fixed Installation



Auto Calibration Mobile Installation



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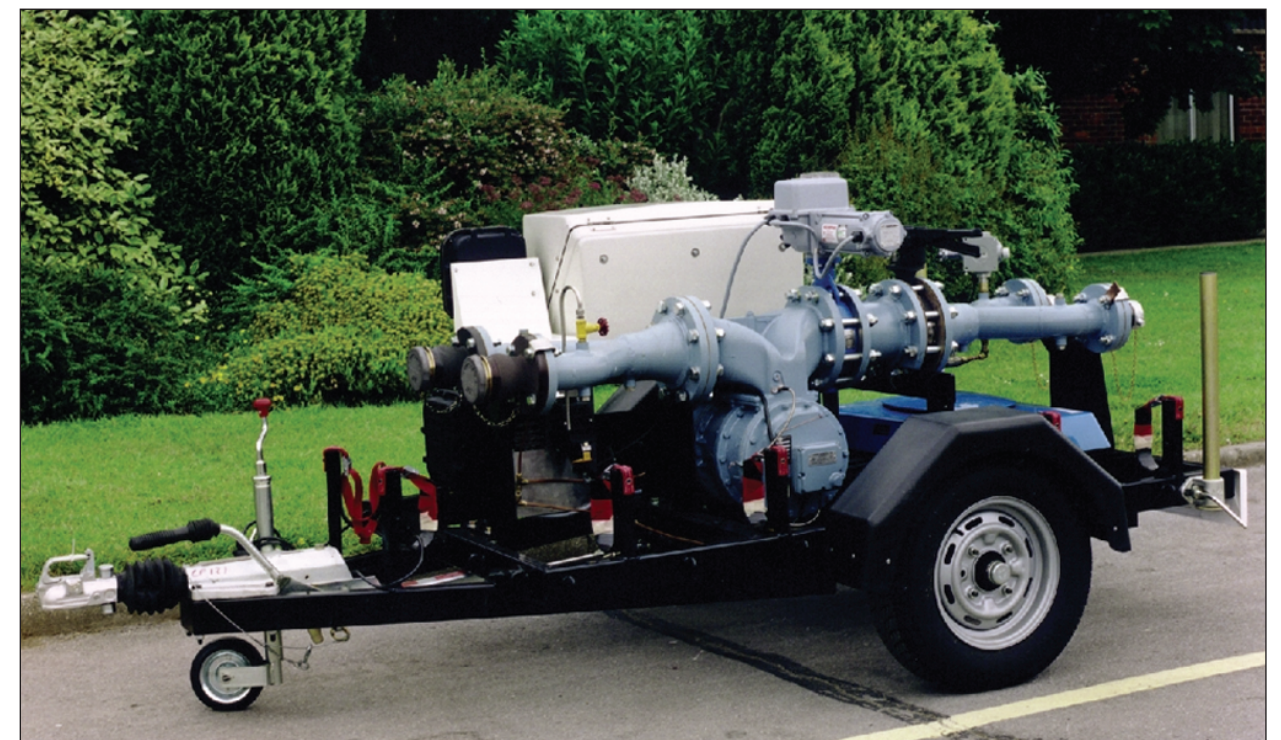
A Flight Refuelling company



A Collective Member of
IP THE INSTITUTE OF PETROLEUM



AUTOCAL Autocal Calibration with Masterload II



- Simplifies calibration of all meters with Masterload II
- Reduces calibration time to approx. 8 minutes
- Reduces total volume of product to maximum of 5000 litres per calibration based on a 2500 lpm meter with 4 point calibration
- All Masterload II's are suitable for autocalibration as standard
- Available as fixed installation or trailer mounted
- 'Through the glass' infra-red connection
- Can be fitted to existing Master Meter installations

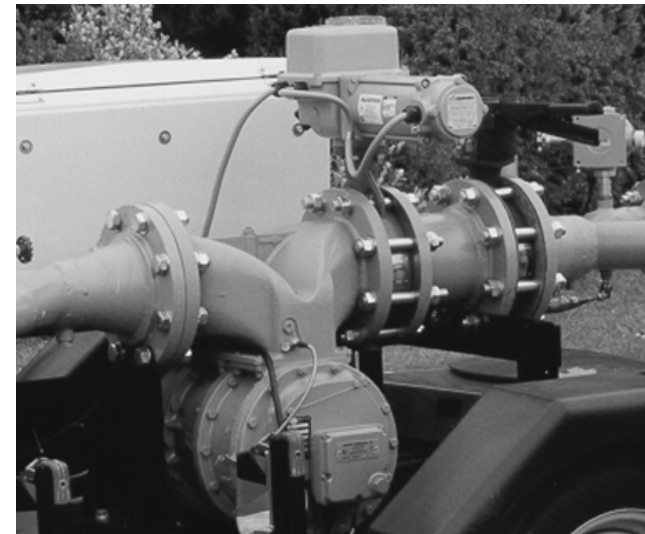
Introduction

Autocal is a software program designed to simplify the calibration procedure of all meters fitted with Masterload II electronic meter controllers. Using a Masterload II Master Meter, either fixed installation or trailer mounted, and linked to an explosion proof computer, the system can be used to calibrate all sizes of meter within the flow range of the master meter and automatically download the correction factor into the meter under test (MUT). On completion of the calibration all relevant data is downloaded to the office PC to provide a printed record sheet and store a detailed history of the meter for future analysis.



All Masterload II meters are fitted as standard with the relevant software and an infra-red transmitter and receiver mounted in the display unit behind the glass. This allows a Masterload II Master Meter to transmit and receive data through the glass without the need to add on components such as pulse transmitters.

Autocalibration with Masterload II is available as a fully functional system either mounted on a road trailer or as a fixed installation. Alternatively, it can be supplied as an upgrade to your existing Master Meter facilities.



The system dramatically reduces the time taken to calibrate a meter whether in a vehicle application or on a loading gantry. Typically, a triple capsule 4000 litre per minute meter will take approximately 8 minutes to fully calibrate compared to nearly 3 hours using conventional methods. This represents a significant cost saving in both calibration service charges and meter downtime.

One of the major problems with meter proving at the truck loading depot is disposal of the product passed during calibration and the time taken moving the vehicle to the disposal point. With the Autocal system, the volume of product required for calibration is reduced to a maximum of 5000 litres or one compartment on a standard vehicle for the same size meter, significantly reducing the problems of product disposal.

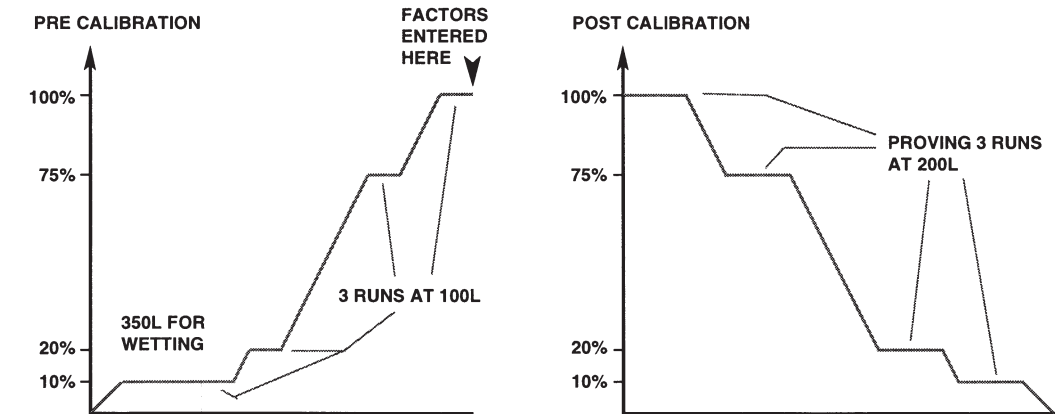
System Operation Description.

The first part of the operation is to access the office computer via a data cable connection between the autocal computer and the Office PC to download the previous data for the meters to be calibrated that day. On completion of the calibration the cable is reconnected to download the certificates back to the office computer for storage, printing and future analysis.

The Master Meter is connected in line in the conventional way and the Autocal reader is attached to the meter under test.

The correct meter is selected on the Operator Console by entering the meter serial number and, when communication is confirmed with the Meter Under Test (MUT), the START button is pressed. The calibration then takes place automatically using a single volume run, measuring errors at stable points as flowrate increases, entering the correction factors whilst at maximum flowrate and checking the same points whilst flowrate decreases.

Calibration Flow Profile



On completion of the run the calibration certificate is displayed on the Operator Console for verifying by the operator. On completion of the days work the calibrations are downloaded to the Office PC for archiving and printing as required. Measurements of temperature and pressure are taken during the runs thus providing an extremely accurate calibration to the latest industry standards without the requirement for highly skilled engineers.

| AHM | | | | | | | | | |
|--|----------|-----------|---------------|------|----------------------|-------------|--------------|----------------------|----------------|
| GEC-Marconi Aerospace | | | | | Client | | | ESSO | |
| Avery-Hardoll Fluid Management | | | | | Location | | | AUONMOUTH | |
| Abbey Works, Titchfield, | | | | | Veh ID | | | 1001 | |
| Hampshire PO14 4QA | | | | | Reg No | | | N68EPO | |
| Telephone 01329 853853 | | | | | Job. ref | | | | |
| Facsimile 01329 853804 | | | | | Load Ticket No. | | | | |
| Electronic MUT / Auto Calib. | | | | | Certificate No: 64 Z | | | Prove date: 02/07/97 | |
| REFERENCE METER | | | | | | | | | |
| RUN NO. | RUN CODE | FLOW RATE | METER READING | TEMP | PRESS | CORRECTION | | FACT | |
| | | | | | | M/FACTOR | TEMP | PRESS | 54B/54 |
| 0 | | | | | | | | | |
| FLOWRATE- LPM | | | FLOW RATE | | PRE CALIB. | POST CALIB. | ORIG. CORR'N | FINAL CORR'N | AUE.MET FACTOR |
| PRESSURE- PSI | | | C | | | | | | |
| S/No- | | | C | | | | | | |
| TEMPERATURE- DEG C | | | | | | | | | |
| ESC = Exit < ←↑↓→ Home End Tab Shift+Tab > RS = Print Form | | | | | | | | | |