Department of consumer and corporate affairs / Ministère de la consommation et des corporations

**STANDARDS BRANCH - DIRECTION DES NORMES**

# NOTICE OF APPROVAL
# AVIS D'APPROBATION

G-56-1

OTTAWA October 16, 1973

## MERCURY INSTRUMENTS, INC., MODEL MERCOR III-PT AND MERCOR III-PTS VOLUME CORRECTING INTEGRATOR

### Apparatus

| | |
|---|---|
| Static pressure ranges | |
| (i) Diaphragm element: | 0-30 psig |
| (ii) Helical Bourdon Ni-Span-C elements: | 0-50, 060, 0-100, 0-250 and 0-1,000 psig |
| (iii) Suppressed Pressure Range | 200-1,000 psig |
| Temperature ranges | 0°F to +100°F and -30°F to +120°F |
| Temperature measuring system | Case compensated, mercury filled with 5 foot armoured capillary. |
| Volume registers | |
| (i) Uncorrected (line conditions) | Clock-type register, available with 5, 10, 100 or 1,000 cu. ft. per rev. test dial. |
| (ii) Corrected counters | Plastic, Veeder - Root No. 728137, 7 digit capacity. |
| Supercompressibility factor | Based on hydrocarbon gas at 50°F and 0.6 Sp. Gr. |

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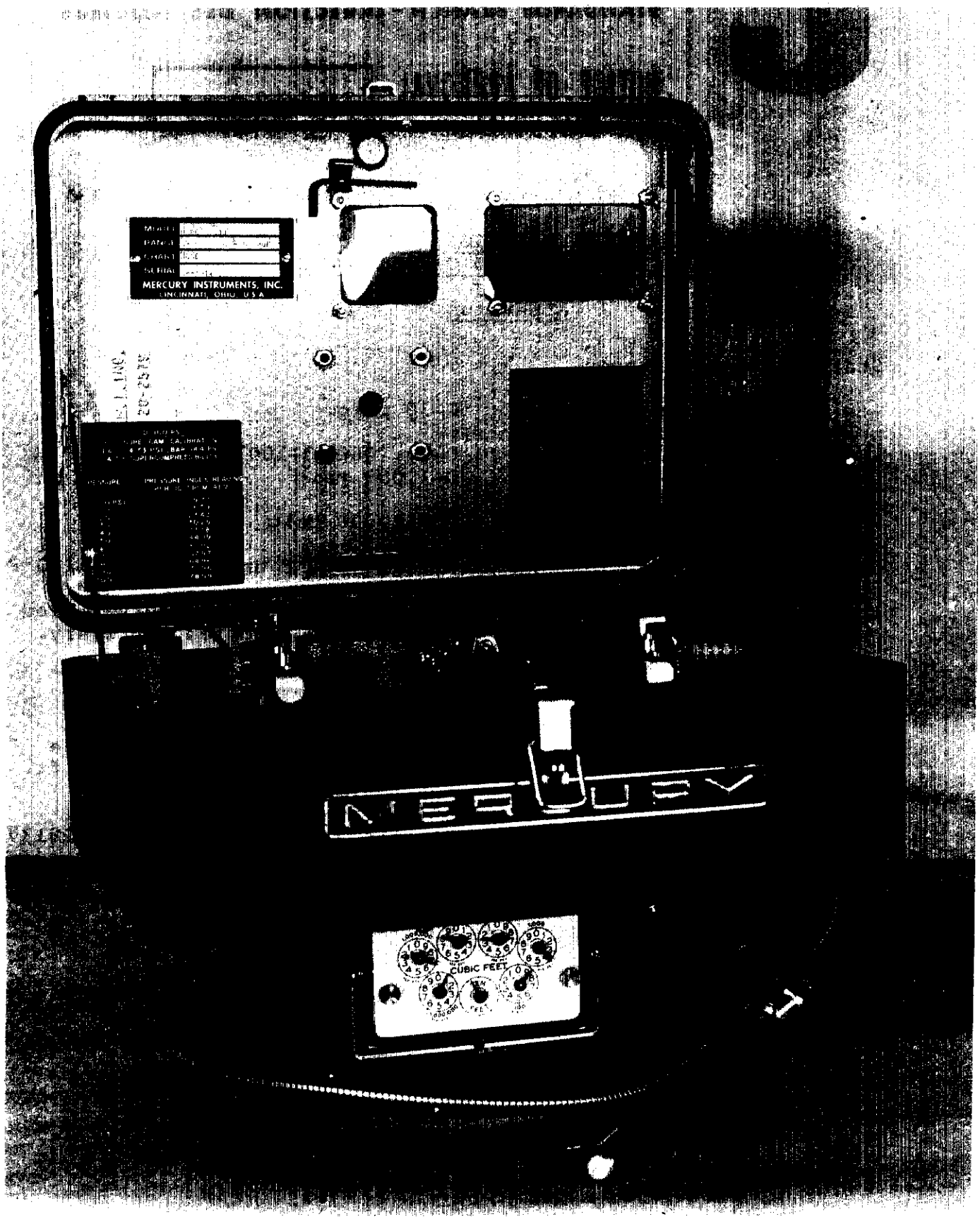

## Description

The Mercor III-PT is an auxiliary gas measurement device intended as an attachment to, and to be driven by, a gas meter (either diaphragm, rotary or turbine type). It replaces the standard register. Its function is to sense the flowing pressure and temperature of gas being metered and to automatically correct the registration of the meter so as to provide an integrated readout at specified base conditions. The device can also incorporate a supercompressibility correction referred to a constant flowing gas temperature.

The instrument uses a cascaded mechanical system, with temperature compensation being superimposed on the pressure system. The input drive from a meter rotates a cylindrical integrating pressure drum at a speed proportional to the rate of gas flow at line conditions. A pressure beam assembly is pivoted at the rear of the case. A steering wheel attached to the assembly rides on the drum. The angle of the axis of the steering wheel in relation to the axis of the drum is determined by a bourdon pressure tube and linkage system. The assembly assumes its position along the drum, for a given applied pressure, when the two axes are parallel. A drive wheel, guided by the assembly, is rotated by the raised surface of the drum. The raised surface is so proportioned along its length, that the output of the pressure section is integrated to base conditions. In instruments which include supercompressibility correction, (Mercor III-PTS), the shape of the raised surface is modified to suitably adjust the integration. The output shaft drives a counter which displays the integrated volume passed, corrected to base pressure.

The temperature drum, a truncated cone, is driven by the output shaft of the pressure integrator. A wheel attached to the temperature assembly rests on the tapered drum and acts as both a steering wheel and an output drive for the final corrected counter. The temperature assembly operates in a similar manner to the pressure assembly. The output from the temperature integrator depends on two factors:

a) The rate at which the output of the pressure integrator drives the temperature cone.

b) The position of the drive wheel on the cone which depends on the existing line temperature.

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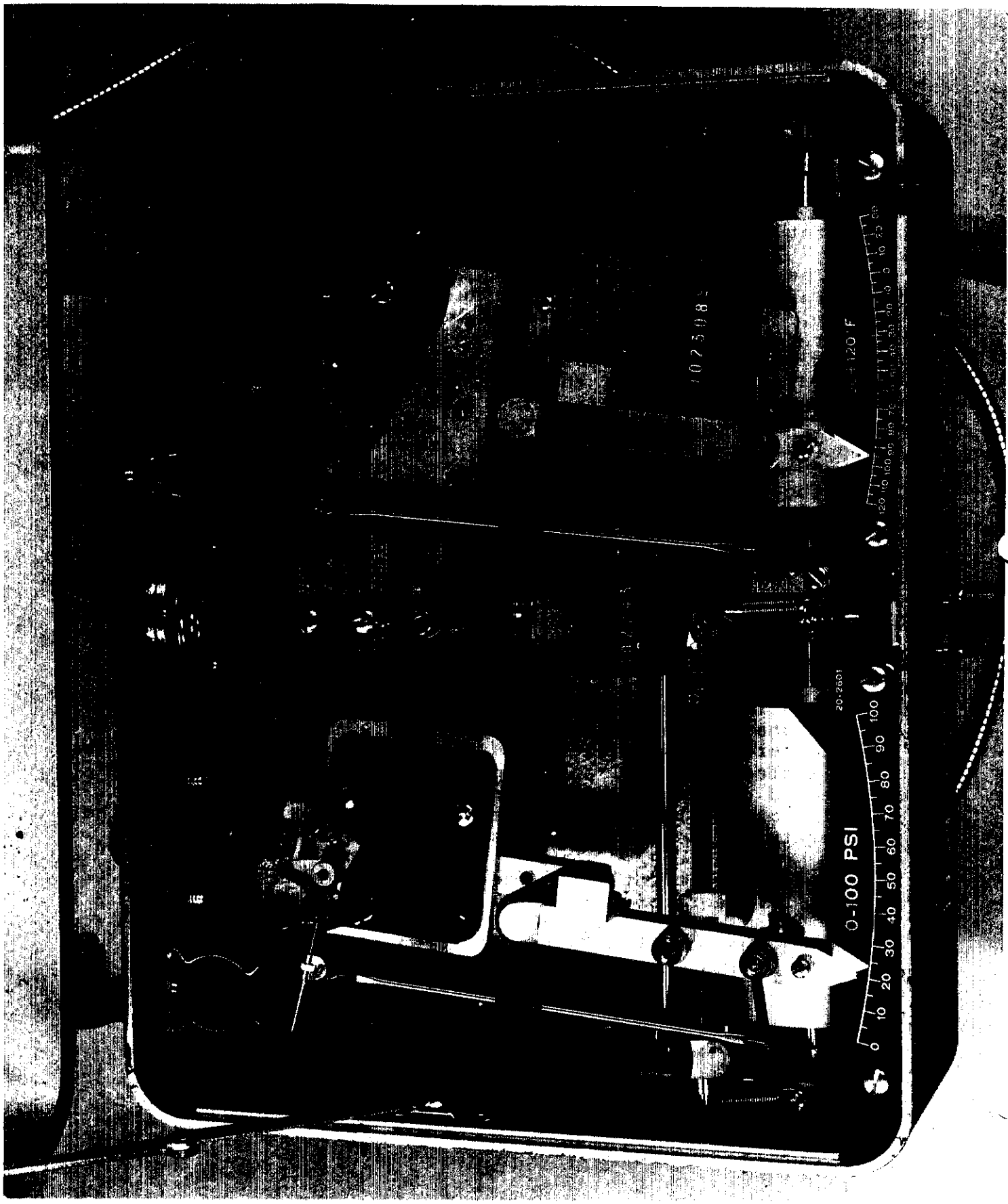

In addition pointers attached to the pressure and temperature beams provide a visual indication of these line parameters.

The selection of the weighted average supercompressibility factor $(Fpv)^2$, should be based on a record of the flowing gas volumes, pressure and temperatures. Whether or not a continuous record is available, the variations in pressure and temperature normally existing in the line must not introduce an error greater than ±0.5% from the selected $(Fpv)^2$ factor. It must be emphasized that the Mercor III-PTS in its present design cannot apply the supercompressibility correction which would take account of the varying temperature of the metered gas. In order to fulfil the requirements of the tolerance limit of ±0.5% in the $(Fpv)^2$ factor, then, it may be necessary to apply an additional factor at the extreme ends of the temperature range OR alternately, use a Mercor III PT and recording **volume-pressure-temperature gauge and** calculate the factor on a continual basis.

Mercor III-PT **(and III PTS) is equipped with a clock-type** register which contains reversible gearing to match the direction of rotation of the output shaft from the meter. The instrument incorporates a bulls-eye levelling device which enables the instrument to be properly leveled on installations.

For installation and operation of the Mercor III PT, careful adherence must be made to the company's manual of instructions.

Each instrument shall have the following information marked on the nameplate or nameplates:

- Manufacturer's name, Instrument Model designation, Serial number, Pressure range, Temperature range, Base pressure, Atmospheric Pressure, Base Temperature, data for supercompressibility correction, and applicable multipliers for indexes.

Where the instrument and auxiliary equipment are exposed to solar heating, the application of reflective paint is recommended.

The Mercor III-PT may be used in conjunction with Mercury instruments as approved under Approval Notices G-54 and G-55.

Note: All Mercor III instruments put into service under Approval Notice G-56 will be modified by the manufacturer to make them essentially the same as the Mercor III-PT approved herein.

Approval granted to: Parkinson Cowan (Canada) Ltd., Chatham, Ontario.

W.J.S. Fraser

for Chief, Standards Laboratory, Standards Branch.

W.J.S. Fraser, Chief, Electricity & Gas Division. Standards Branch.

Ref: GL 1147-57/M7-84
G 1147-57/M7-84

DEPARTMENT OF CONSUMER AND CORPORATE AFFAIRS
STANDARDS BRANCH

FILES: S-17-1
SL-100-84

September 18, 1972

TO: DISTRICT INSPECTORS OF ELECTRICITY AND GAS

FROM: CHIEF, ELECTRICITY AND GAS DIVISION

Under Approval G-56 covering the Mercor III Volume Correcting Integrator it was anticipated that certain developments by the manufacturer towards improving the performance of the device would be completed and approved by July 1, 1971. G-56 was re-issued July 1, 1971 to extend the approval of the original design. Now, owing to the fact that approval of the modifications has not yet been obtained, the validity of Approval G-56 is again extended to June 30, 1973.

Please inform all holders of G-56 to this effect.

W.J.S. Fraser

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