

**INSTALLATION, OPERATION,
and MAINTENANCE
of
WALLACE & TIERNAN
ABSOLUTE PRESSURE INDICATOR
TYPE FA-160**

**INSTRUCTION MANUAL
FIA-160-1-4**



WALLACE & TIERNAN INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

SECTION I

INTRODUCTION

This instruction book describes the Absolute Pressure Indicator Model FA-160 manufactured by Wallace and Tiernan Inc., Belleville, New Jersey, and provides instructions regarding its installation, operation and maintenance.

SECTION II

GENERAL DESCRIPTION

The Wallace and Tiernan Absolute Pressure Indicator is a vacuum measuring device which measures the unknown vacuum in terms of pressure above absolute zero. This eliminates the effect of barometric pressure changes and the true absolute pressure is indicated directly without correction or adjustment.

The mechanism consists of a pressure sensitive element, lever system, pointer and dial all housed in a suitable case. Metal capsules serve as the pressure sensitive element which connect to a geared sector through an actuating rod and flexure pivot. The sector engages a pinion mounted on the pointer shaft. The shaft turns in bearings at the top and bottom. Backlash is prevented by a spring which provides uniform tension for all positions of the sector and pinion. The pressure sensitive element has a built-in stop which limits damage to the mechanism from over-pressure. Each instrument has a custom calibrated dial over its full range to match the mechanism thereby permitting direct reading without consulting correction curves.

All types except FA-160174 and FA-160184 are equipped with a Wallace and Tiernan Protector Check Valve FU-3229 screwed and sealed into the inlet connection. This valve provides a slow release when vacuum is suddenly broken, but offers little resistance when vacuum is applied. There is no choke in this system, (valve opening equivalent to 3/16" diameter orifice), so this Protector Check Valve **MUST BE LEFT IN PLACE AND USED AT ALL TIMES**. Otherwise, the mechanism may be damaged by sudden vacuum release.

As optional equipment, an Excess Pressure Relief Valve (FU-2857) may be supplied. This valve is connected in parallel with the indicator to provide protection against overpressuring the pressure sensitive element. When the pressure of the system exceeds two pounds gauge pressure, a spring loaded valve provides release. The valve seats against a Neoprene gasket so that the valve will be tight under full vacuum.

SECTION III INSTALLATION

The Absolute Pressure Indicator is calibrated with the dial in a vertical position unless otherwise specified. Dwgs. 8968 and 18068 show the important dimensions of the instrument case and the cut-out and mounting holes required in a panel. The instrument should be protected from severe vibration, by mounting it on a shockproof panel. The instrument should be located where the temperature will be as uniform as possible. The instrument is shipped with a dust plug, screwed into the opening, which must be replaced by a suitable means for adapting it to the system.

SECTION IV OPERATION

The instrument case is constructed of metal and is airtight. It is general practice to screw into the Protector Check Valve a 1/4" pipe fitting to accommodate flexible tubing which is in turn connected to the vacuum apparatus. Metal tubing may also be used to make the connection.

To obtain an accurate reading at the low end of the scale when starting from atmospheric pressure, it will be necessary to evacuate the Absolute Pressure Indicator at least one-half to one hour, depending on the speed of the vacuum pump and the resistance of the system. True zero requires much longer evacuation.

It cannot be emphasized too strongly that for accurate pressure indications the Absolute Pressure Indicator must be in pressure equilibrium with the entire system under evacuation, especially at pressures less than about 10mm. of mercury. For rapid pressure indication, the resistance of the system to be measured and the resistance of the system containing the Absolute Pressure Indicator should be equal. To instantaneously compare two vacuum gauges, for example, both should have the same volume, and be connected to the system by lines having equal volume and pressure resistance.

SECTION V CARE OF THE INSTRUMENT

An Absolute Pressure Indicator is a precision instrument. It has been constructed just as ruggedly as the service for which it was intended will permit. However, in an instrument as sensitive and accurate as this, delicate parts must be used. The indicator is to be handled with care.

The mechanism does not require oil. The oil will only interfere with proper functioning and introduce serious errors in readings. It cannot be too strongly stressed---DO NOT OIL THE MECHANISM.

SECTION VI MAINTENANCE

These Absolute Pressure Indicators are precision instruments and each dial is individually calibrated for its particular mechanism. Each dial and mechanism is marked with a serial number and they are not interchangeable.

During operation of the instrument under a high vacuum source, if the indicator does not read zero, the system should be checked for tightness. However, if the instrument has been badly jarred, the indicator may not read zero. This may be determined by placing the indicator in a system as close to the vacuum source as possible. After evacuation for a period of 12 hours, the error, if any, may be corrected by the "zero adjustment". This may be accomplished by using the special bezels shown in Dwg. 8704. Bezel FU-3187 is for

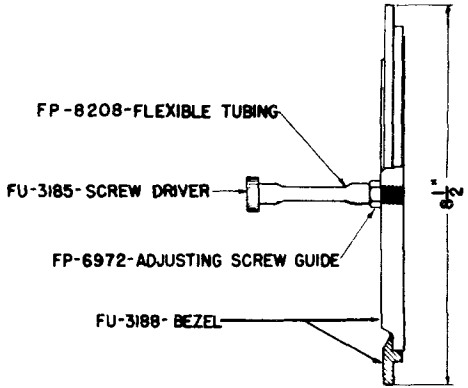
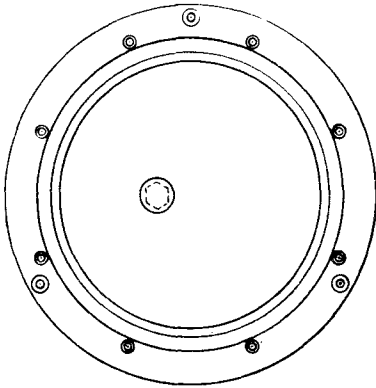
the 2-3/4" dial instruments and FU-3189 is for the 6" dial instruments. The following is the procedure for making adjustments:

1. Disconnect the instrument from the vacuum source.
2. Remove the bezel. (See Dwg. 18142 or 18144.)
3. Replace with special bezel. Put the gasket in the groove. Make bezel tight by pulling down evenly on screws.
4. Evacuate the instrument for 1 hour prior to making the adjustment. Push the screw driver in to engage the adjusting screw. The pointer will move in the same direction as the rotation of the screw.
5. Having made the adjustment, remove the special bezel and replace with the standard bezel.
6. Evacuate the instrument for 1 hour and read to insure that the instrument is tight.

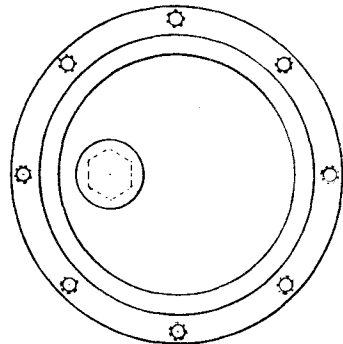
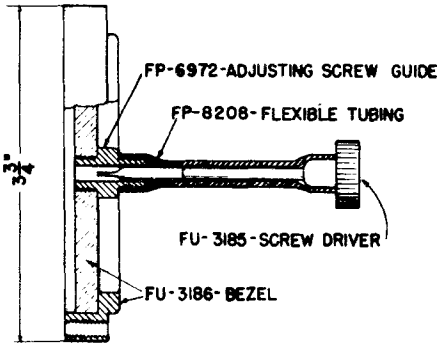
If the special bezels are not available, the correction is made by a trial and error method. The following is the procedure recommended:

1. Remove the instrument from the vacuum source.
2. Remove the bezel. (See Dwg. 18142 or 18144.)
3. Insert a screw driver in the slot of the adjusting screw. A clockwise rotation causes a like movement of the pointer.
4. Replace the bezel. Put gasket in groove. Make bezel tight by pulling down evenly on screws.
5. Evacuate the instrument for 1 hour to determine accuracy of applied correction.

The range of this correction is approximately 10° . It is important that the case should be tight by properly replacing the gasket. When the gasket is improperly replaced, the case will develop a leak. A correction made without comparison against a standard may be compensating for a leak rather than a shock-induced error.



FU-3189



FU-3187

ZERO SETTING BEZEL ASSEMBLY

REV. 1-63

DWG. NO. - 8704-2

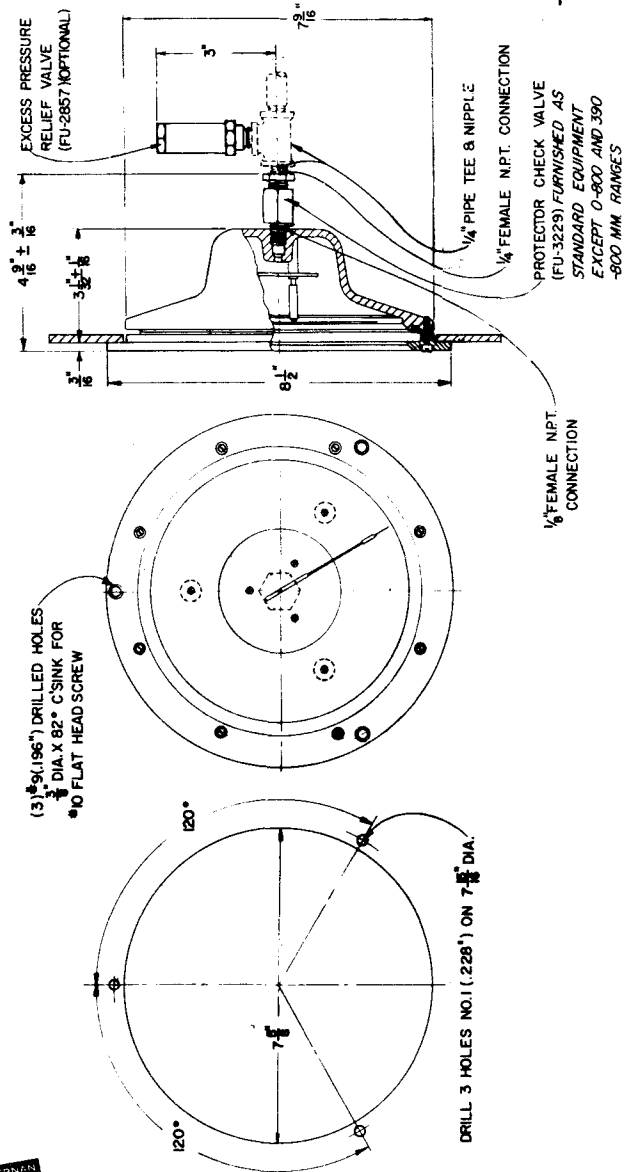
1-15-52

SERIES FA-160 BAROMETER OR
ABSOLUTE PRESSURE INDICATOR

DIMENSIONS

With 6" Dial

8963-4



WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS



25 MAIN ST., BELLEVILLE 9, N. J.

REV 11-62.

DWG NO 8963-4

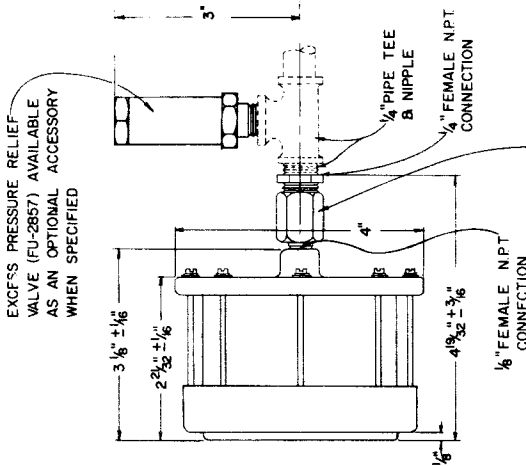
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SERIES FA-160 ABSOLUTE PRESSURE INDICATOR

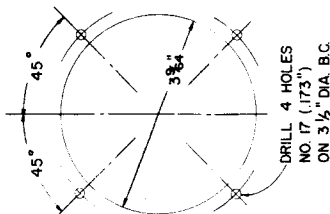
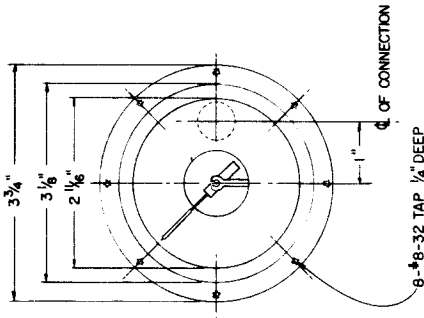
DIMENSIONS

With 2³/₄" Dial

18068-2



PROTECTOR CHECK VALVE (FU-3229) FURNISHED ON ALL RANGES LESS THAN ONE ATMOSPHERE.



PANEL OPENING



25 MAIN ST., BELLEVILLE 9, N. J. REV. 71-62.

DWG NO 18068-2

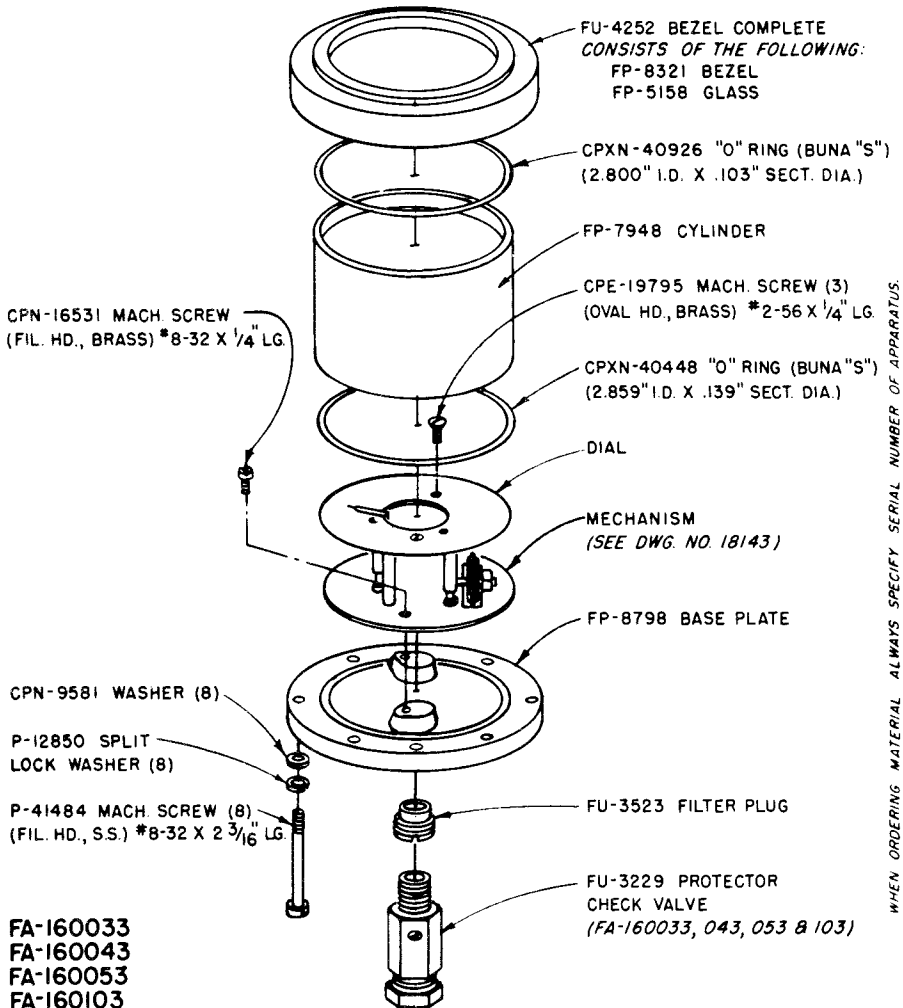
6-62

FORMERLY 1366

SERIES FA-160 ABSOLUTE PRESSURE INDICATOR

PARTS

18142



WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS.

- FA-160033
- FA-160043
- FA-160053
- FA-160103
- FA-160163
- FA-160243



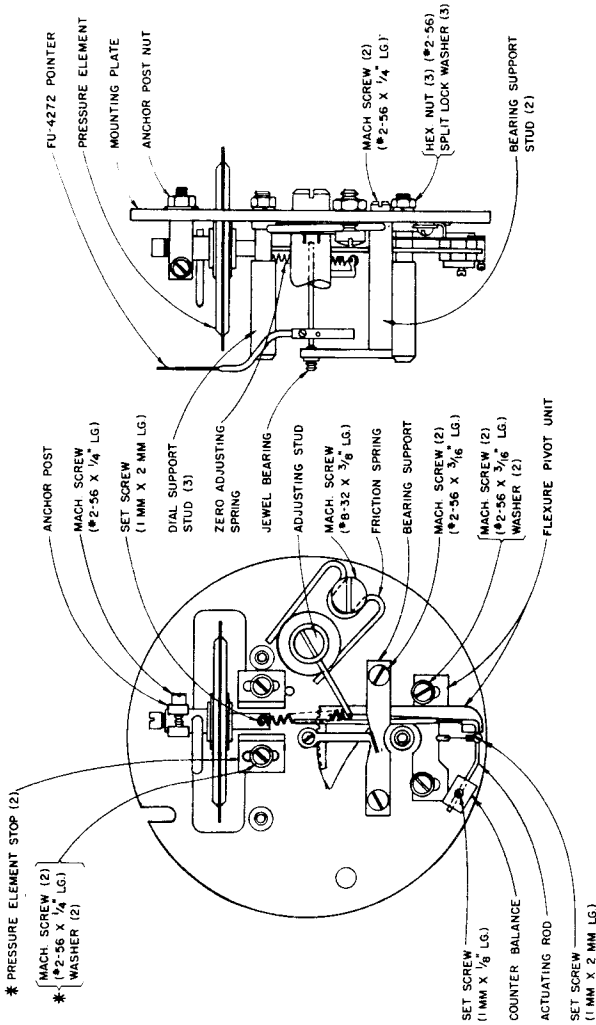
25 MAIN ST., BELLEVILLE 9, N. J.

DWG. NO. **18142**

12-62

MECHANISM PARTS

Used In Series FA-160 Absolute Pressure Indicator 18143



* INCLUDED IN FU-4168 ONLY

NOTE --- IF REPAIRS TO THE MECHANISM ARE REQUIRED, THE COMPLETE INSTRUMENT SHOULD BE RETURNED TO THE FACTORY

WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS.

FU-4164 TO FU-4169



25 MAIN ST., BELLEVILLE 9, N. J.

DWG. NO. 18143

12-62

SERIES FA-160 BAROMETER
OR ABSOLUTE PRESSURE INDICATOR

PARTS

18144

CP-31677 MACH. SCREW (8)
(FIL. HD, S.S.) #8-32 X 5/8" LG

FU-2542 BEZEL AND GLASS
CONSISTS OF THE FOLLOWING:
FP-2988 BEZEL
FP-5590 GLASS

FP-4057 MACH. SCREW (3)
(OVAL HD PHIL., BRASS) #2-56 X 1/4" LG

CPH-22681 MACH. SCREW (3)
(OVAL HD PHIL., BRASS)
#2-56 X 3/16" LG

FP-5936 GASKET

DIAL AND MECHANISM
BAROMETER--SEE DWG NO. 18145
ABSOLUTE PRESSURE
INDICATOR--SEE DWG NO. 8965

P-39462 HOUSING

FU-3523 FILTER PLUG

FU-3229 PROTECTOR
CHECK VALVE
(FA-160094, 124, 134, 114 & 133)

FA-160114 } ABSOLUTE PRESSURE
FA-160153 } INDICATORS
FA-160094 }
FA-160124 } BAROMETERS
FA-160134 }
FA-160174 }
FA-160184 }



25 MAIN ST., BELLEVILLE 9, N. J.

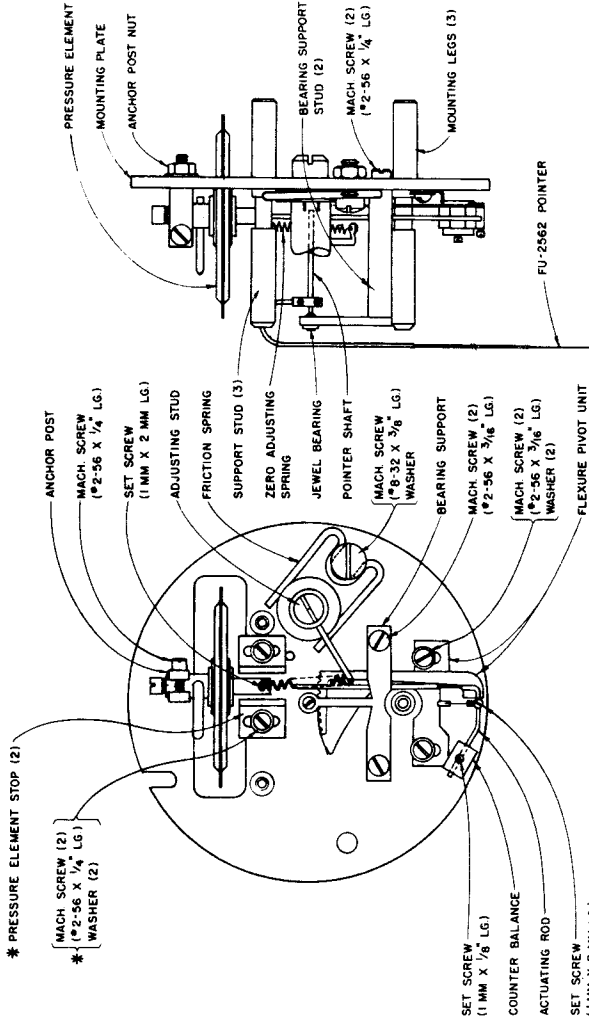
DWG NO. 18144

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WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS

Used In Series FA-160 Barometer

18145



NOTE...IF REPAIRS TO THE MECHANISM ARE REQUIRED, THE COMPLETE INSTRUMENT SHOULD BE RETURNED TO THE FACTORY.

* INCLUDED IN FU-4173 AND FU-4174 ONLY.

WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS.

FU-4170 TO FU-4175



25 MAIN ST., BELLEVILLE 9, N. J.

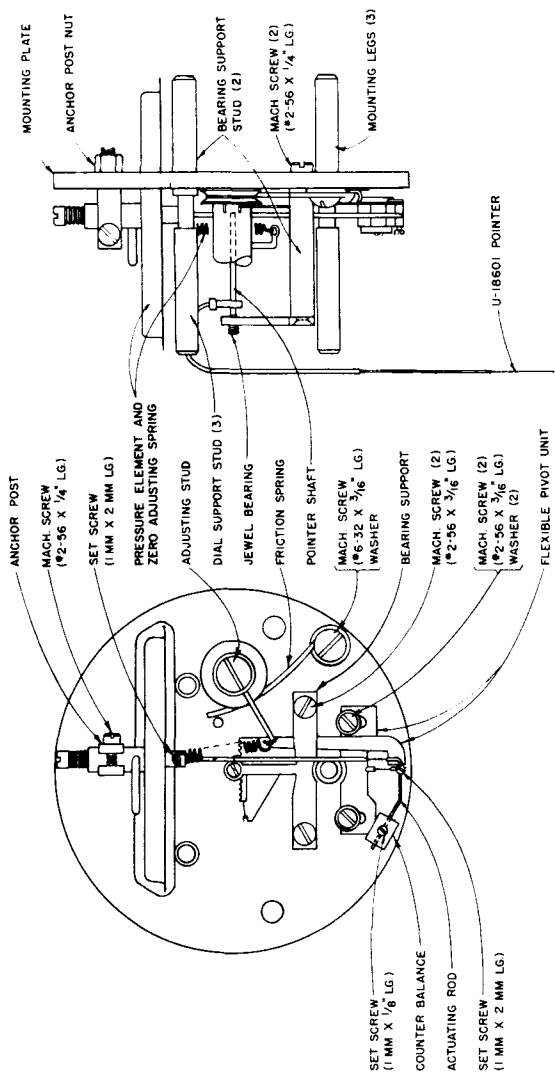
DWG. NO 18145

12-62

66877

MECHANISM | PARTS

Used in Series FA-160 Absolute Pressure Indicator | 8965-3



NOTE:
 IF REPAIRS TO THE MECHANISM ARE REQUIRED, THE COMPLETE INSTRUMENT SHOULD BE RETURNED TO THE FACTORY.

WHEN ORDERING MATERIAL ALWAYS SPECIFY SERIAL NUMBER OF APPARATUS

U-18787
 U-18598



25 MAIN ST., BELLEVILLE 9, N. J.

REV 12-62

DWG NO 8965-3

8-59

GUARANTEE AND WARRANTY

Seller warrants for a period of one year after shipment that the apparatus of its manufacture is free from defects in workmanship and materials but its liability is limited to the replacement f.o.b. Belleville, N.J., of the defective parts thereof. Corrosion or other decomposition by chemical action is specifically excluded as a defect covered hereunder, except that this exclusion shall not apply to chlorination equipment. Where circumstances permit, Seller will invoke, for the benefit of Purchaser, the guarantee or warranty of Seller's vendor for equipment or material furnished hereunder. In the event the apparatus or equipment furnished hereunder shall be used in any capacity in connection with any nuclear facility, Buyer agrees to hold Seller harmless from all claims for damages arising out of injury to or destruction of the nuclear facility, or property thereat. Seller shall not be liable for any direct or consequential damages arising from the sale or use of the apparatus or equipment other than as expressly provided herein.

NEW PARTS

We carry in stock all parts that for any reason might require renewal. In ordering new parts, please designate each desired part by the name shown on the cut shipped with the apparatus, and state the type of apparatus as specified thereon, giving type designation and serial number.

Mechanism parts shown are primarily for identification purposes. It is recommended that replacement parts for mechanisms be purchased only if recalibration facilities are available. Wallace & Tiernan offers repair and recalibration facilities at its factory in Belleville, N. J.