INTER-OFFICE MEMO **TENNECO CHEMICALS, INC.**

TO P.R. Scarito AT Burlington DATE April 17, 1975

FROM F.W. Kanzler AT Burlington COPY TO W.C. Champion
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SUBJECT Method Draft
for Teledyne Oxygen Analyzers

As you requested, attached is a method draft for the subject analyzers. I understand that you would like to incorporate this method as an AOP.

If there are any further questions, please feel free to call on me.

Fred W. Kanzler

F.W. Kanzler

Attachment

FWK/jst

TELEDYNE TRACE OXYGEN ANALYZERS

SCOPE: The oxygen analyzers are designed to monitor oxygen levels in the recovery compressor gas streams. The analyzer charts must be read periodically so that action can be taken if the 2% oxygen level in the recovery stream is exceeded. Furthermore, to assure correct level analyses, periodic calibrations are required.

This procedure, as written, is to provide a short outline of run, calibration and shutdown procedures. In-depth description of the system is outlined in the Teledyne manual and is available from the Maintenance Shop and the Analytical Laboratory.

PROCEDURE: I. General Description

The instrument is designed to allow a sample stream of gas suspect to contain oxygen to flow over an electrolytic cell. If oxygen is present, a signal caused by the oxygen atoms defusing into the electrolytic cell, is amplified and may be read on the meter of the instrument or on the 24-hour recorder round chart. To assure proper functioning of the electrolytic cell, periodic calibration - once every two to three weeks - is required under normal operating conditions.

II. Sample Supply and Flow

To allow for analyses of the compressor stream, a sample loop has been installed to assure continuous gas flow at a constant pressure to the analyzer. The flow diagram (Figure I) shows the sample flowing from the second stage compressor discharge to a primary scrubber. The larger part of the stream is returned to the suction side of the compressor, while a split stream is allowed to be reduced in pressure via a needle valve and run out through a secondary scrubber to the analyzer unit.

The following abnormalities may cause malfunctions in the sample supply lines:

A. Liquid

By nature of the gas stream - particularly copolymer - liquids may be precipitated in the secondary scrubber. Drain valves have been installed at the secondary scrubbers and periodic draining of the scrubber - once per day - must be performed.

Note: Liquid will damage the electrolytic cell and must not be allowed to reach the oxygen analyzers.

B. Solids

Solids may cause plugging of the feed lines to the analyzers and is mainly caused by the carryover of solids from filled compressor knock-out pots.

C. Pressure

Pressure changes, which result in flow changes to a given instrument, are primarily caused by problems listed under II.A. and B. above. A pressure gauge mounted at the secondary scrubber discharge must be checked and should be adjusted to read no more than 20 psig.

D. Flow

The flow may best be checked at the exit rotameter mounted at the left bottom side of the oxygen analyzer sub-panel. The rotameter ball must be kept at a reading no greater than 2. Readings at flow rates greater than 2 will cause erroneous outputs due to shortened residence times of the gas when passing the electrolytic cell. No-flow conditions will cause oxygen to defuse upstream into the vent line. The oxygen, when reaching the cell, will also cause erroneous readings eventually showing about 21% oxygen at the recorder output - the oxygen level in air.

III. Operation

The physical appearance of the analyzer panel is shown in Figure II while the internal flow diagram is attached as Figure III. To start calibration and analysis, as well as shutting down of the analyzers requires the following steps:

A. Calibration

Calibration of the instrument is achieved with instrument air provided for the converters and is assumed to contain 20.9% oxygen. To calibrate the analyzer, take the following steps:

1. Make sure that the instrument air supply is set at 20 psig.
2. Turn the "Range Selector" switch to "High".
3. Open the "Span" toggle valve and adjust the air flow with the sample rotameter valve to read 2 at the sample rotameter.
4. Allow the air to purge through the analyzer for at least two to three minutes.

5. If adjustment is needed, loosen the hold down ring of the "Span Adjust" knob and turn the knob until the meter is at the "Calib" position.

6. Turn off the "Span" toggle valve. The instrument is now calibrated.

B. Stream Selection

Each analyzer is fitted with a solenoid-operated stream selector system. This allows for automatic switching of each of the two streams to be analyzed. When the stream selection is in the "Auto" mode, the sample stream will be switched every thirty minutes. Sample streams can also be manually selected. Pilot lights provide indication as to which sample stream is being analyzed. The stream not analyzed is "by-passed", which may be monitored at the by-pass rotameters.

C. Sample Flow and Analysis

To start analysis, the sequence is as follows:

1. Select manually sample stream #1 - the appropriate stream indicator light should be lit.

2. Open the "Sample" toggle valve and adjust the flow rate with the rotameter valve to read 2. The sample stream pressure must previously be set at 20 psig.

3. Adjust the "by-pass" flow of the sample stream #2, not analyzed, with the valve for the by-pass rotameter.

4. Repeat steps 1. to 3. with the opposite streams.

5. With the range selector switch, select the oxygel level range expected.

   Note: Three ranges are available: a. 0 - 5% "Low"

   b. 0 - 10% "Medium"

   c. 0 - 25% "High"

   At present, copolymer and homopolymer compressors may be set to "Medium" while a setting of "High" is required for the dispersion compressor analyzer.

D. Shutdown

If the sample streams must be shut off for any reason, the following steps should be taken to avoid damage to the electrolytic cells.

1. Shutdown of One Stream Only

With the manual stream selector, turn on the sample stream still to be analyzed to be run continuously.

2. Shutdown of Both Analyzer Streams

Hook up the nitrogen line to the air intake connection, substituting nitrogen for instrument air. Use the same procedure as outlined in "Calibration" except read nitrogen for air.

Note: Any time both sample streams are shut off for a period longer than 24 hours, the nitrogen purge must be instituted.

F.W. Kanzler
4/17/75

COMPRESSOR SAMPLING SYSTEM

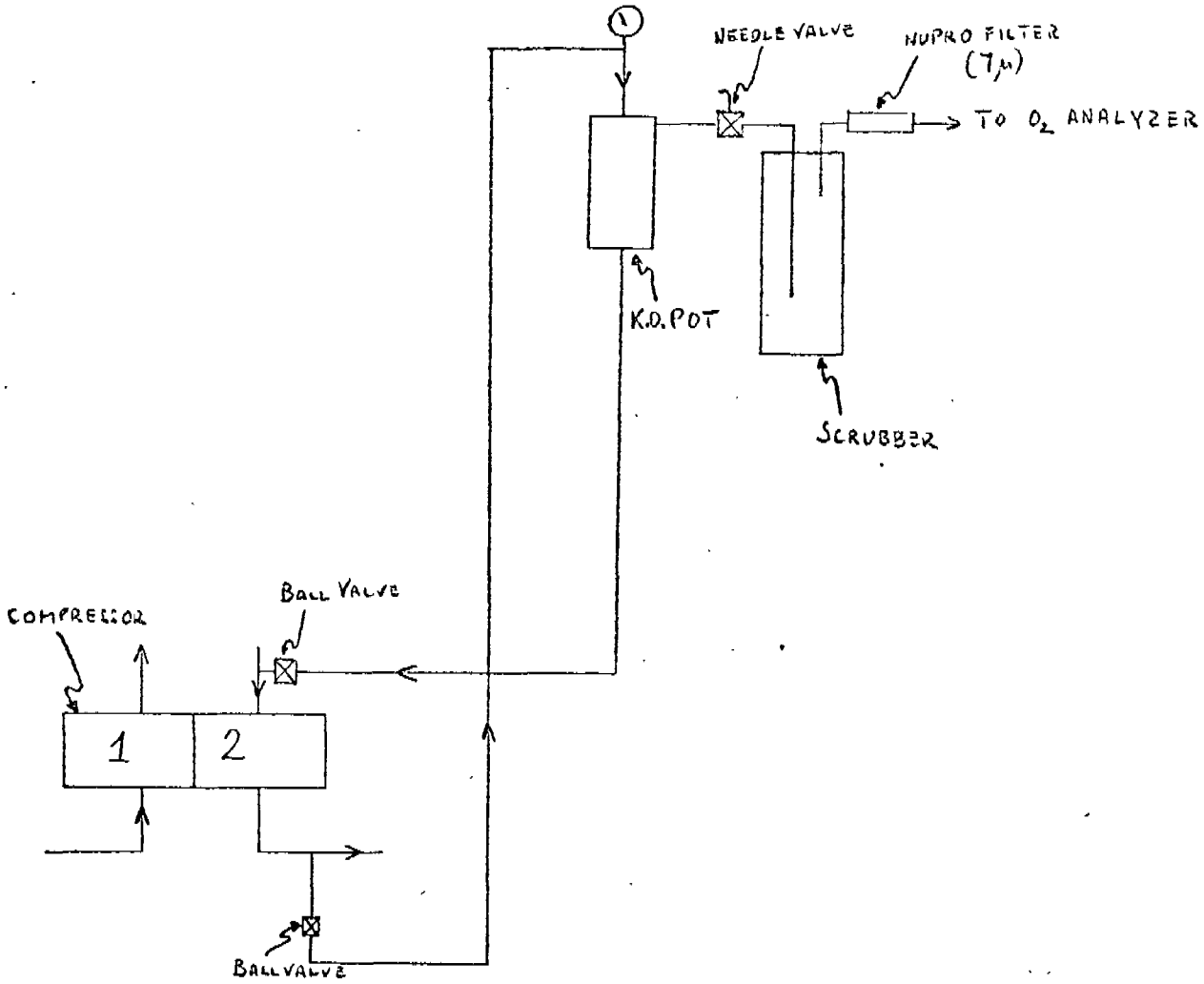

FIGURE 1

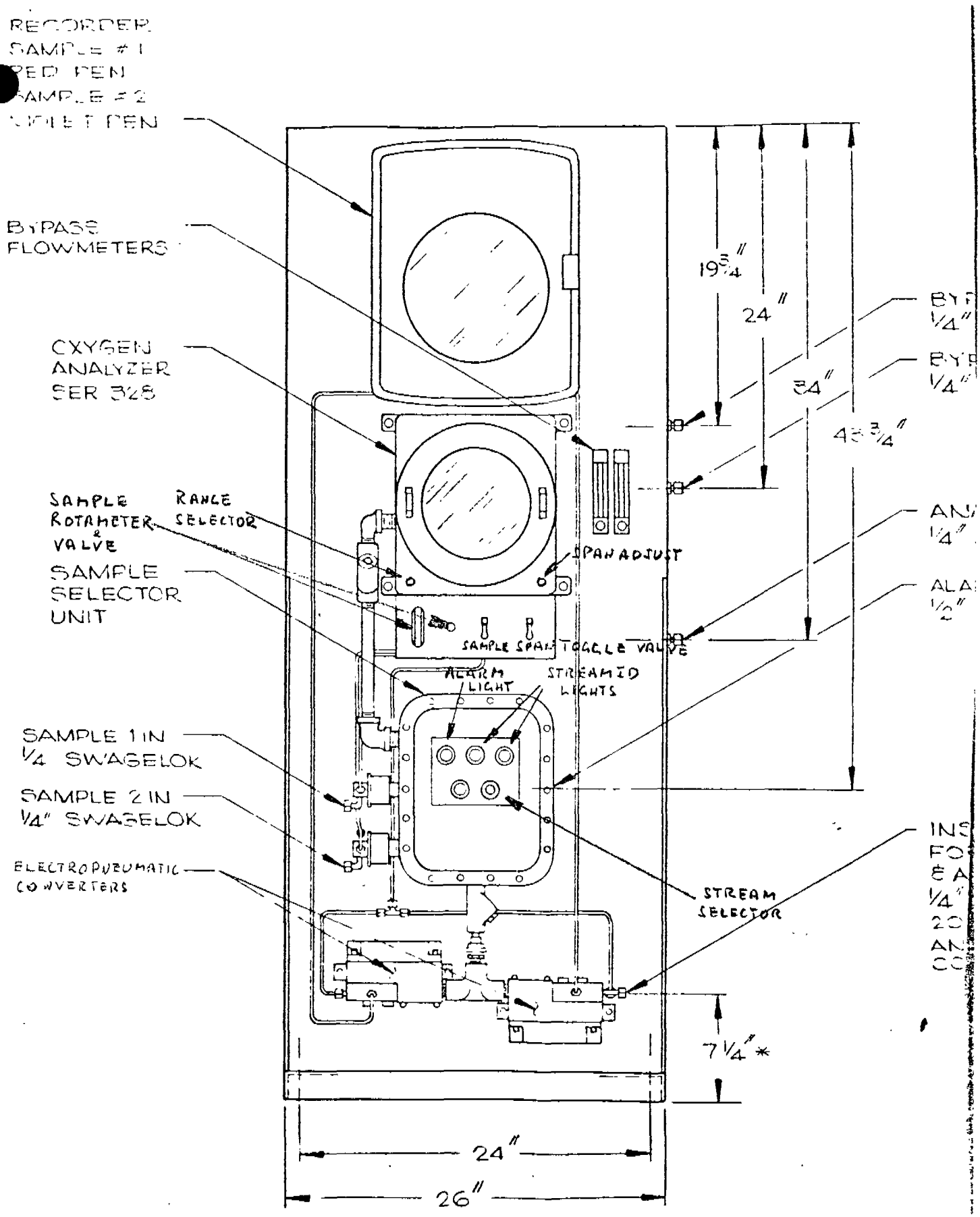
RECORDER
SAMPLE #1
RED PEN
SAMPLE #2
INLET PEN
BYPASS
FLOWMETERS
OXYGEN
ANALYZER
SER 328
SAMPLE
ROTAMETER
&
VALVE
RANGE
SELECTOR
SAMPLE
SELECTOR
UNIT
SPAN ADJUST
SAMPLE SPAN TOGGLE VALVE
ALARM
LIGHT
STREAM ID
LIGHTS
SAMPLE 1 IN
1/4 SWAGELOK
SAMPLE 2 IN
1/4" SWAGELOK
ELECTROPNEUMATIC
CONVERTERS
STREAM
SELECTOR
19 3/4"
24"
34"
7 1/4"*
24"
26"

FIGURE II

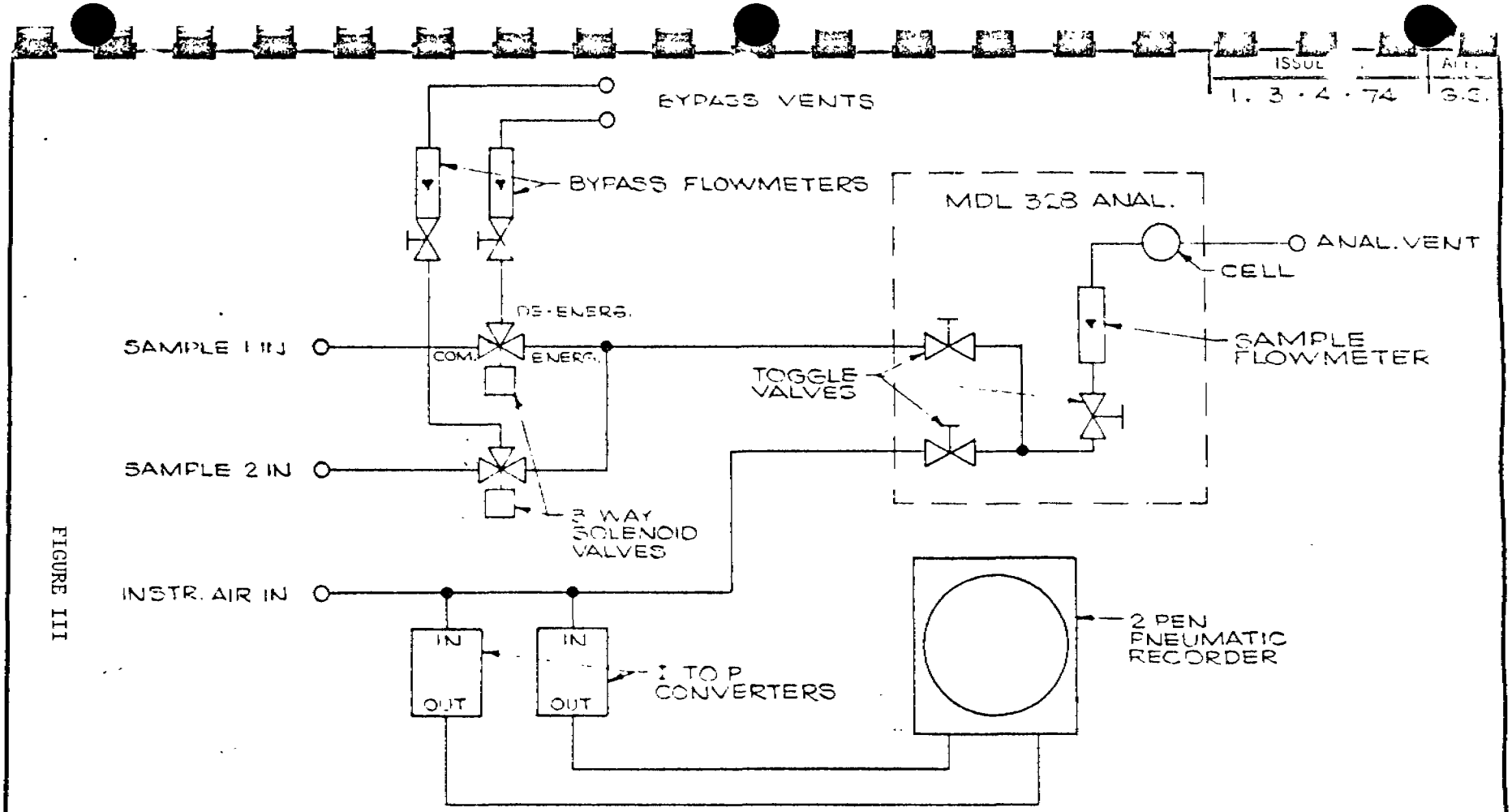

FIGURE III

TOLERANCE UNLESS OTHERWISE SPECIFIED	FRACT. ± 1/64	DEC. ± .005	ANGULAR ± 1/2°
ANALYTICAL INSTRUMENTS A TELEDYNE COMPANY SAN GABRIEL, CALIFORNIA		SCALE ~	DATE 3 · 4 · 74
		MATL: ~	
		FINISH: ~	
		DR [illegible]	ENGR / APP

OXYGEN MONITORING SYSTEM
S.O. 76346
PIPING SCHEMATIC

A-12012

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