



Manual Addendum

Model T360U

CO₂ Analyzer

(Addendum to T360 Manual, PN 07272)

© Teledyne API (TAPI)
9970 Carroll Canyon Road
San Diego, CA 92131-1106
USA

Toll-free Phone: 800-324-5190

Phone: +1 858-657-9800

Fax: +1 858-657-9816

Email: api-sales@teledyne.com

Website: <http://www.teledyne-api.com/>

ABOUT THIS ADDENDUM

This addendum, part number 07273, is to be used in conjunction with the Model T360 operation manual, part number 07272. Where operation of the Model T360U diverges from that of the Model T360, this addendum takes precedence.

Please note that the T360 operation manual contains important SAFETY messages and the WARRANTY information for this instrument. It is strongly recommended that you read the T360 operation manual in its entirety as well as this addendum, before operating the instrument.

REVISION HISTORY

Date	Rev	DCN	Change Summary
09 July 2013	A	6707	T-Series initial release

This page intentionally left blank

TABLE OF CONTENTS

About This Addendum	i
Revision History	i
Table of Contents	iii
1. Overview	5
2. Specifications and Agency Approvals	5
3. Electrical Connections	6
4. Pneumatic Connections.....	7
4.1. Basic and Zero/Span Valve Option Configurations	8
4.2. Making the Pneumatic Connections.....	10
5. RelayAlarm Outputs (Standard configuration).....	11
6. Relay Alarm Outputs (Air Products Configuration).....	11
7. Control inputs (Air Products Configuration only)	11

Figures

Figure 4-1. T360U Pneumatic Flow Diagram.....	7
Figure 4-2. Pneumatic Connections–Basic Configuration	8
Figure 4-3. Pneumatic Connections–Configuration with Zero/Span Valve Option	9

Tables

Table 2-1. T360U Specifications and Agency Approvals.....	5
Table 4-1. Model T360U Pneumatic Connections	9
Spare Parts List.....	13

This page intentionally left blank.

1. OVERVIEW

The Model T360U is a close derivative of the Model T360 CO Analyzer. The main differences are as follows:

- The optical bench is longer (14 m), making the instrument more sensitive at low CO₂ levels.
- The instrument has a user-selectable full scale range of 0-100 PPB to 0-100 PPM of CO₂.
- The rear panel has an extra pneumatic port for the exhaust of the purge gas to the GFC wheel.

Because the T360U is a close derivative of T360, the Model T360 Operation Manual continues to be valid as the reference manual covering the details of the instrument's components and operation.

2. SPECIFICATIONS AND AGENCY APPROVALS

Table 2-1 presents the specification parameters and values, as well as agency approvals.

Table 2-1. T360U Specifications and Agency Approvals

PARAMETER	SPECIFICATION
Ranges	User selectable to any full scale range from 0-100 ppb to 0-100 ppm
Measurement Units	ppb, ppm, µg/m ³ , mg/m ³ (user selectable)
Zero Noise	≤ 2.5 ppb RMS ⁽¹⁾
Span Noise	< 0.5% of reading RMS over 5 ppm ^{(1) (3)}
Lower Detectable Limit	< 5 ppb ⁽¹⁾
Zero Drift (24 hours)	< 0.25 ppm ⁽²⁾
Span Drift (24 hours)	< 0.5% of reading ^{(2) (4)}
Linearity	1% of full scale ⁽⁵⁾
Precision	0.5% reading ^{(1) (5)}
Lag Time	<10 sec ⁽¹⁾
Rise/Fall Time	<60 sec to 95% ⁽¹⁾
Sample Flow Rate	800 cc/min. ± 10%
Temperature Range	5 - 40°C operating
Humidity Range	0-95% RH, Non-Condensing
Temp Coefficient	< 0.05 % of reading per °C (5 ppb/°C minimum)
Voltage Coefficient	< 0.05 % of reading per V
Dimensions (HxWxD)	7" x 17" x 23.5" (178 mm x 432 mm x 597 mm)
Weight	40 lb (18.1 kg)

PARAMETER	SPECIFICATION
AC Power	100 – 120V 50/60 Hz (120W) 220 – 240 V 50/60 Hz (144W)
Environmental Conditions	Installation Category (Over voltage Category) II Pollution Degree 2
Standard I/O	1 Ethernet: 10/100Base-T 2 RS-232 (300 – 115,200 baud) 2 USB device ports 8 opto-isolated digital status outputs 6 opto-isolated digital control inputs 4 analog outputs
Optional I/O	1 USB com port 1 RS485 8 analog inputs (0-10V, 12-bit) 4 digital alarm outputs Multidrop RS232 3 4-20mA current outputs
Analog Output Resolution	1 part in 4096 of selected full-scale voltage
Certifications	CE: IEC 61010-1:2001, EN61326 - Class A
¹ As defined by the USEPA ² At constant temperature and voltage ³ Or 0.2 ppm, whichever is greater ⁴ Or 0.1 ppm, whichever is greater ⁵ Above 10 ppm range, otherwise 0.2 ppm for lower ranges	

3. ELECTRICAL CONNECTIONS

Follow the instructions for unpacking, inspecting, and making electrical connections presented in the T360 operation manual.

4. PNEUMATIC CONNECTIONS

This section provides information on the pneumatic configurations. Figure 4-1 shows the basic pneumatic flow of the T360U.

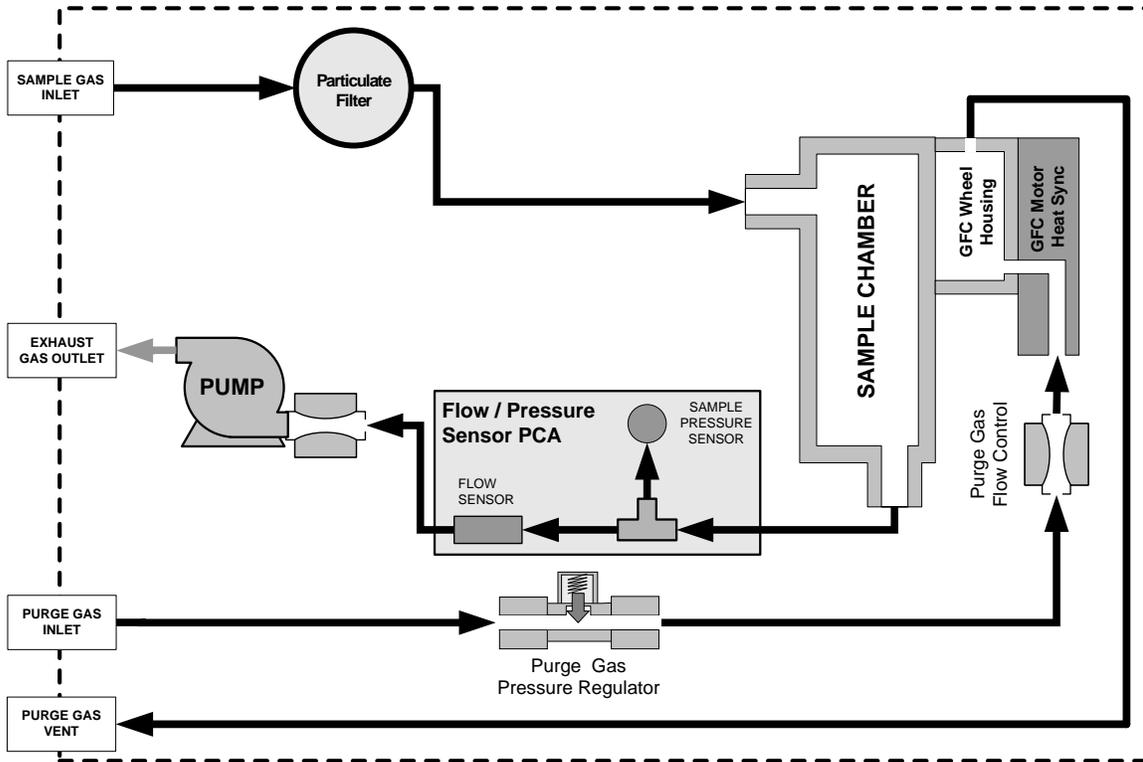


Figure 4-1. T360U Pneumatic Flow Diagram

4.1. BASIC AND ZERO/SPAN VALVE OPTION CONFIGURATIONS

	<p>CAUTION</p> <p>Sample and calibration gases should only come into contact with PTFE (Teflon), FEP, glass, stainless steel or brass.</p> <p>Do NOT operate without first removing dust plugs from rear panel fixtures.</p>
---	---

<p>NOTE</p> <p>To prevent dust from entering the gas flow channels, your analyzer was shipped with small plugs inserted into each of the pneumatic fittings on the back panel. Remove these dust plugs and store for future use before proceeding.</p>

Figure 4-2 illustrates the most common configuration for gas supply and exhaust lines to the Model T360U Analyzer. Figure 4-3 illustrates the pneumatic connections for optional configuration with zero/span valves. Table 4-1 describes the pneumatic ports.

Note that the flowmeter could also be configured upstream of the instrument. Since most flowmeters are calibrated at ambient pressure, ensure that the flow going through the flow meter is at ambient pressure, when it is placed upstream.

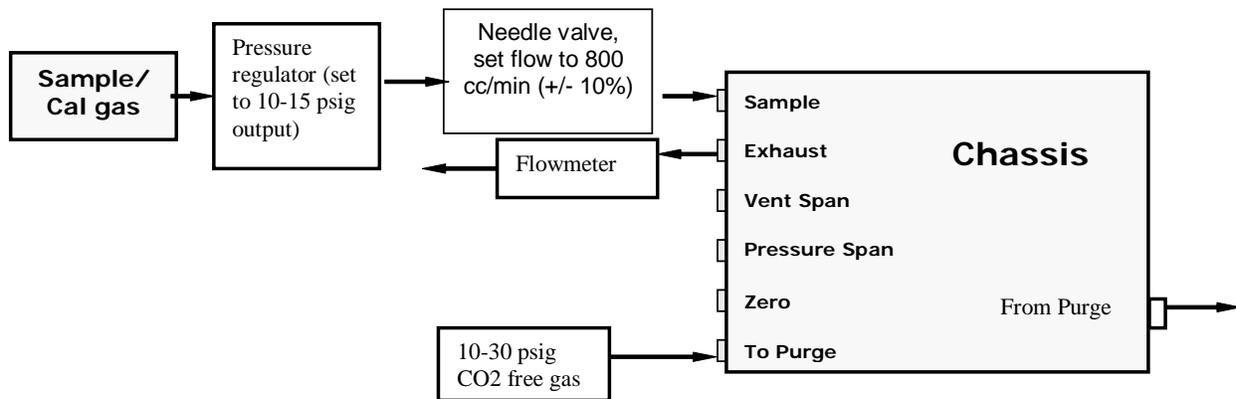


Figure 4-2. Pneumatic Connections–Basic Configuration

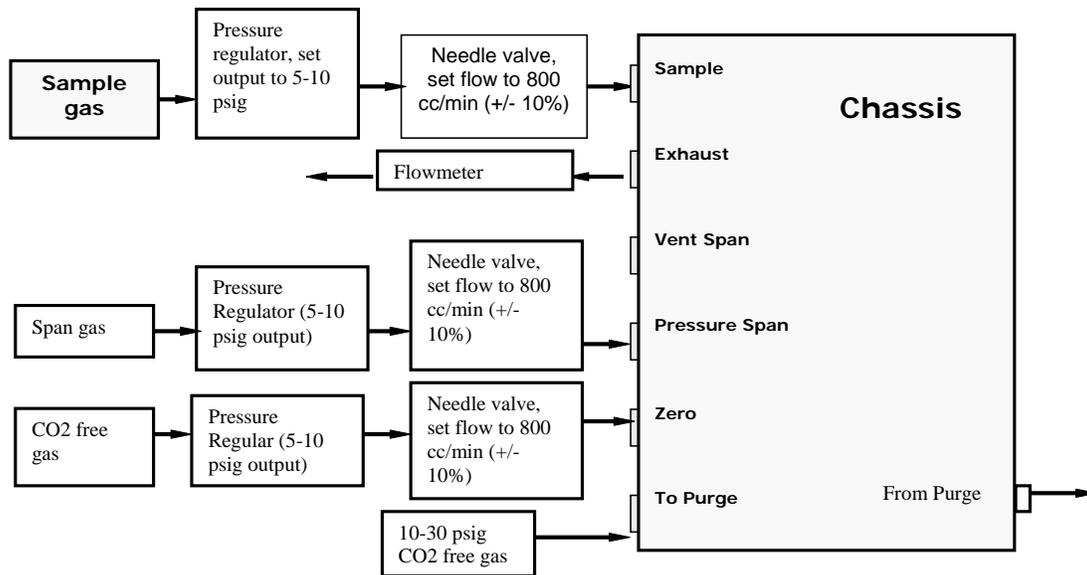


Figure 4-3. Pneumatic Connections—Configuration with Zero/Span Valve Option

Table 4-1. Model T360U Pneumatic Connections

Rear Panel Label	Function
SAMPLE	Connect a gas line from the source of sample gas here. Calibration gasses are also inlet here on units without zero/span valve option installed.
EXHAUST	Connect an exhaust gas line of not more than 10 meters long here.
PRESSURE SPAN	On units with zero/span valve option installed, connect a gas line to the source of calibrated span gas here.
VENT SPAN	Not used
ZERO	On units with zero/span valve option installed, attach a gas line to the source of zero air here.
TO PURGE	This inlet supplies purge air to the GFC wheel housing. Connect a source of dried air that has been scrubbed of CO ₂ .
FROM PURGE	This exhausts purge air from the GFC wheel housing. Connect an exhaust gas line of not more than 10 meters long here.

4.2. MAKING THE PNEUMATIC CONNECTIONS

	<p style="text-align: center;">CAUTION</p> <p>Venting should be outside the shelter or immediate area surrounding the instrument.</p>
---	---

1. Attach a sample inlet line to the sample inlet port. The SAMPLE input line should not be more than 2 meters long.
2. Attach sources of zero air and span gas
3. Span Gas is a gas specifically mixed to match the chemical composition of the type of gas being measured at near full scale of the desired measurement range.

In the case of CO₂ measurements made with the Teledyne Instruments Model T360U Analyzer it is recommended that you use a gas calibrated to have a CO₂ content equaling 80% of the range of compositions being measured.

EXAMPLE: If the application is to measure between 0 ppm and 50 ppm, an appropriate Span Gas would be 40 ppm. If the application is to measure between 0 ppm and 100 ppm, an appropriate Span Gas would be 80 ppm.

Zero Air is similar in chemical composition to the earth's atmosphere but scrubbed of all components that might affect the analyzer's readings. In the case of CO₂ measurements this means CO₂ less than 0.1 ppm of CO₂ and Water Vapor.

Zero Air can be purchased in pressurized canisters or created using a Teledyne Instruments Model 701 Zero Air Generator in combination with a canister of indicating soda-lime.

4. Attach an exhaust line to the exhaust outlet port.

The exhaust from the analyser and vent lines should be vented to atmospheric pressure using maximum of 10 meters of ¼" PTFE tubing.

5. Attach a source of dried air scrubbed of CO₂ to the purge inlet port

The source of purge gas should be at least 10 psig and capable of maintaining a flow of at least 1 liter/min.

Purge source gas pressure should not exceed 30 psig

6. Once the appropriate pneumatic connections have been made, check all pneumatic fittings for leaks.

5. RELAY ALARM OUTPUTS (STANDARD CONFIGURATION)

There are 4 relay alarm outputs (AL1-AL4) on the rear panel.

- AL1 is for system okay,
- AL2 is for concentration limit 1 exceeded and
- AL3 is for concentration limit 2 exceeded.
- AL4 is not used

The relay alarm output AL1 is enabled all the time, whereas the AL2 and AL3 can be enabled/disabled by going into the diagnostics menu (with 929 password), then factory options, then turning conc. Alarm Relays ON or OFF.

When the concentration alarm relays are enabled, concentration alarms status is no longer available through the “Status output” pins. So, either the alarm relays or the status bits could be used to monitor the concentration alarms but not both at the same time. The default factory setting is to enable the concentration alarm relays.

The AL1 relay is energized when the system is okay and de-energized when the system has a fault. The AL2 and AL3 relays energize when the corresponding concentration limits are exceeded.

6. RELAY ALARM OUTPUTS (AIR PRODUCTS CONFIGURATION)

There are 4 relay alarm outputs (AL1-AL4) on the rear panel.

- AL1 is for “system okay”,
- AL2 is for “high range status” and
- AL3 is for “zero calibration status”
- AL4 is not used

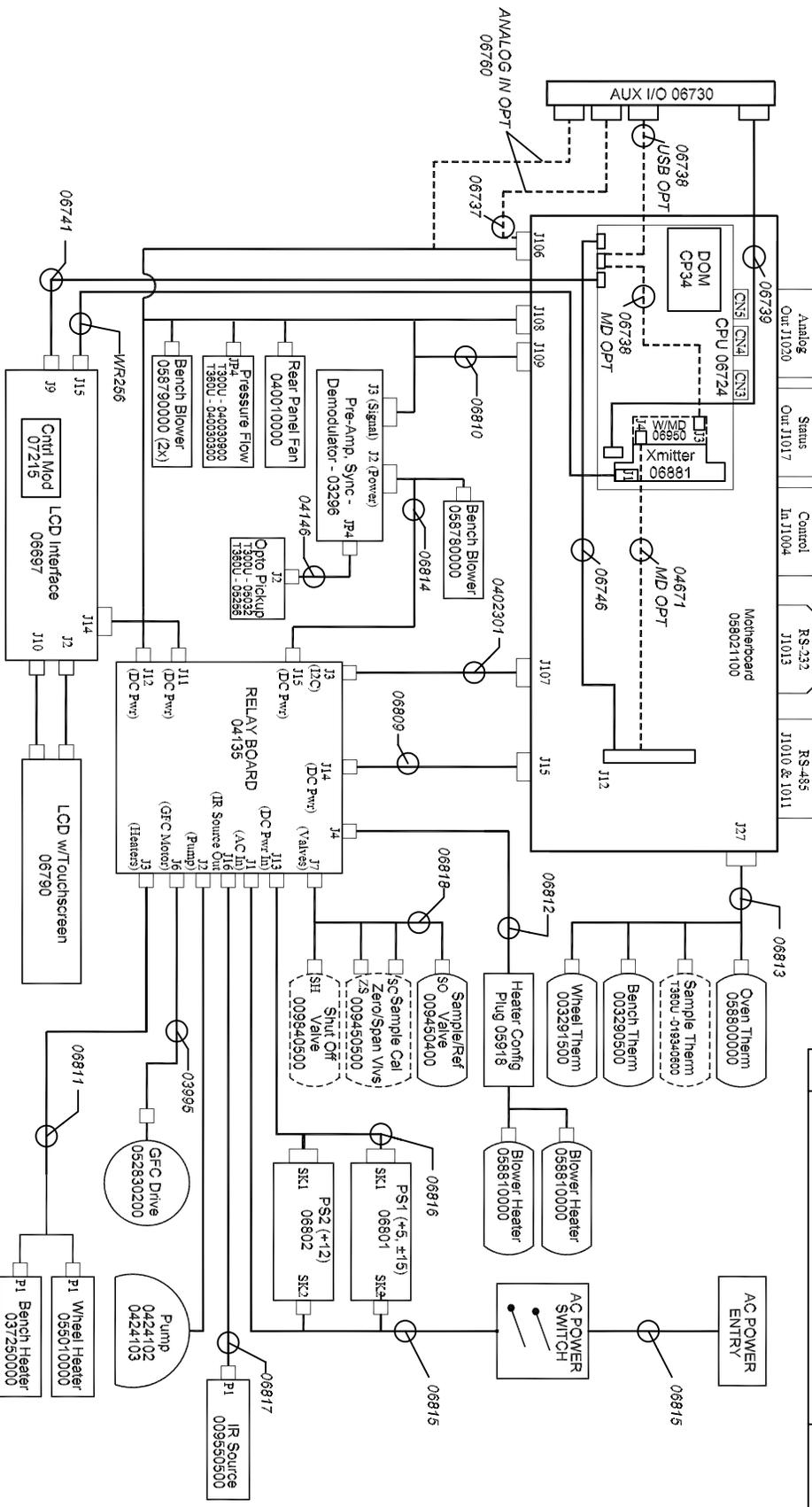
The AL1 relay is energized when the system is okay and de-energized when the system has a fault. The AL2 relay is energized when the high auto-range is in use and AL3 relays energize when the the instrument is in zero calibration mode.

7. CONTROL INPUTS (AIR PRODUCTS CONFIGURATION ONLY)

An additional control input is available on this instrument. Control input “C” is used to select the range for remote calibration. When input C is low, the instrument selects high range during contact closure calibration.

This page intentionally left blank.

REVOLUTIONS			
REV	DESCRIPTION	DATE	APPROVED
A	PRODUCTION RELEASE	9/1/11	BW



PRINTED DOCUMENTS ARE UNCONTROLLED



Advanced Pollution Instrumentation
A TeleDyne Technologies Company

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ANGULAR ± 30°	
TOLERANCES ARE:		FRACTIONS ± 0.0005	
DECIMALS ± 0.0002		DIMS ± 0.0005	
DO NOT SCALE DRAWING		FINISH NA	
TREATMENT NA		SIMILAR TO	
CONTRACT: NA		APPROVALS: KV	
DATE: 11/10		CHECK: CGB	
ISSUED:		SCALE: DNS	
FILE: 07364		SHEET: 1 OF 1	
TITLE: INTERCONNECT DRAWING		SIZE: GAGE CODE NO. DWG. NO.	
T300U, T360U		B 1JZF4 07364	
REV: A		REV: A	

KEY:
1. All part numbers in *italic* identify cables that are referred to in the accompanying document 073640100.
2. All items in Dashed boxes are optional.