

How to use the Ultraflow 150 Checklist (MS Word)

The Ultraflow 150 Installation Checklist with its active MS Word features may be completed, saved and submitted via email to TELEDYNE Monitor Labs at lferrari@teledyne.com. In order for the various selection options to function properly MS Word "MACROS" must be enabled. When submitting several checklists for multiple stack locations at a single site, please use a file-naming convention that provides some ability to discriminate between analyzer locations. Although less desirable, the checklist may be printed and faxed to 724.444.5050.

**** Your order cannot be scheduled for production until accurate information is provided for all fields marked with an asterisk.*** TML cannot provide an estimated delivery date until the necessary site specific information is provided.

<http://www.teledyne-ml.com/drawings/150install.pdf>

1. CUSTOMER CONTACT INFORMATION:

Fill out your name, phone number, email address and other information. The Stack Identification should be a 10-character (maximum) name that describes the stack, duct or process on which the monitor will be located. Example: "UNIT1 STK", "KILN1 DUCT", etc. Indicate if this is a replacement or an upgrade from an Ultraflow 100. If so, please supply the serial number of the Ultraflow 100 being replaced.

2. APPLICATION INFORMATION

Use the drop-down box to select the Process Type that best describes the application for the Ultraflow 150 installation.

Indicate the elevation above mean sea level where the Ultraflow 150 will be installed and select the appropriate button for the elevation units: FEET or METERS.

Let us know if the process to be measured is after a WET SCRUBBER and/or a Selective Catalytic Reduction (SCR) control system.

On occasion, there might be need for a fully redundant system. When this occurs, two completely separate Ultraflow 150s will be installed in the same stack or duct.

Indicate if this order is for a two path X-Pattern system utilizing a single Transducer Interface Enclosure (TIE).

3. PROCESS VARIABLES

Record the typical operating temperature of the process at the measurement location; indicate the units entered with the appropriate button.

Enter the maximum and minimum velocities of the process. For the minimum value record the minimum velocity at which the Ultraflow will be certified, not offline conditions. Please indicate the units used.

Individual gas constituent information is important if you want to use the Internal temperature calculated by the Ultraflow 150. If the effluent composition varies drastically due to changing fuel types or other routine process conditions you should consider using the External Temperature option. This option is explained in detail in a later section. If you are using the External Temperature option, please at least provide the typical % H₂O value for signal attenuation considerations.

The maximum temperature range of the process is an important factor in determining the transducer type for the Ultraflow 150. Select the appropriate button that describes your maximum process temperature.

The process pressure is the static pressure of the stack or duct at the proposed monitor location. It is the differential pressure (positive or negative) compared to ambient conditions.

Indicate the typical particulate level of the process.

4. GEOMETRY OF STACK OR DUCT

The geometry of the stack or duct is the most vital information needed to properly configure the Ultraflow 150 for dependable operation. Example illustrations can be found in Attachments B and C at the end of the Installation Checklist.

For rectangular stacks or ducts, the monitor should always be mounted across the “**Width**” dimension.

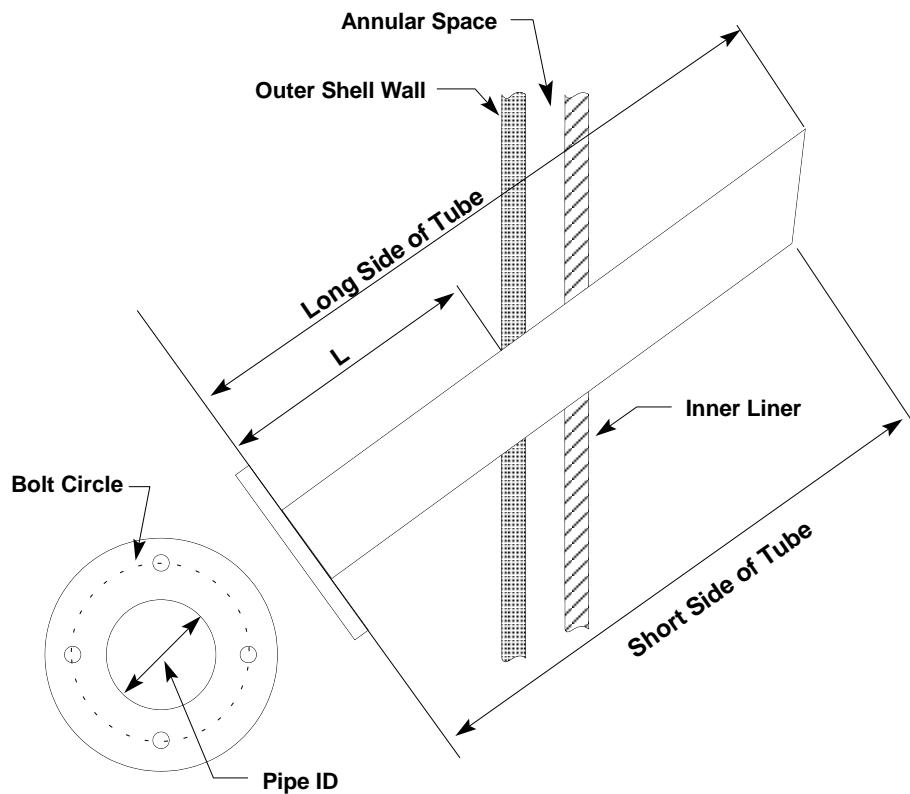
The Offset is the upstream vs. downstream displacement between the two transducers. This will provide the information necessary to calculate the mounting angle. This distance is equal to the distance between the centers of the holes cut into the **inner stack liner**. After reviewing the information submitted on the Installation Checklist, TML will recommend the optimum offset distance.

The wall thickness measurements are important in order to determine the length of the probes. If the probes will be serviced from inside of the annular space, please note this in the comment section - otherwise we will supply probes long enough to extend through the outer shell wall.

The **“MPC”** or “Mounting Plate Clearance” as shown in Attachment C should be at least 5 inches. Teledyne Monitor Labs will assume a 5 inch MPC in our calculations unless you tell us otherwise.

Attachment C also depicts the **“Horizontal Port Extensions”**. The ports extend into the stack in order to protect the transducers from debris falling from the wall. We measure the length that extends into the stack horizontally on a typical, vertical stack. Port extensions should be 6 inches on stack diameters 10 feet or greater; 3 inches on stack diameters less than 10 feet.

If existing ports are to be used for the Ultraflow 150 include some detailed measurements of the ports in the notes area on the Installation Checklist. The figure below illustrates the information needed to manufacture the proper length probes for use with existing ports. Please include this information for both the Upstream and Downstream ports.



5. DISTANCE FROM DISTURBANCES

Any breaching, bend or opening in the stack or duct is a disturbance. Usually the farther downstream from a disturbance, the better it is for the location of the flow monitor. Optimum limits would be at least 8 diameters downstream and at least 2 diameters upstream from any obstructions. If the stack or duct has flow straighteners or structural braces inside, describe them in the COMMENTS section. Record the distances from stack or duct inlets, bends, exits or obstruction. See Attachment C at the end of the Installation Checklist for illustration.

Multiple inlets or sources of flow into the stack or duct can create flow pattern issues at the measurement location. Please indicate if the stack or duct has multiple inlets and give some description of the location of the inlets in the COMMENTS section. If necessary, attach a drawing of the stack or duct.

6. INPUT AND OUTPUTS

- Barometric Pressure Transducer Options: We strongly recommend using the Barometric Pressure Transducer option. It is necessary to provide readings that are corrected to standard conditions. A pressure sensor can be purchased from Teledyne Monitor Labs that is integrated into the Transducer Interface Enclosure or we can accept a 1 to 5 VDC or a 4 to 20 mA input signal from an existing Barometric Pressure Sensor. If you choose to supply your own sensor please include the type and scaling of the device. Example: Current, 4mA = 25 in Hg, 20mA = 35 in Hg.
- External Temperature Options: The Ultraflow 150 will calculate the process temperature via the time of flight of sound and molecular weight of the stack gas. Since the speed of sound is directly proportional to the square root of the absolute temperature, a temperature measurement can be made based on this data provided the concentrations of major constituent gases (usually O₂, CO₂, H₂O and N₂) are either relatively constant or change predictably as a function of the speed of sound. Examples of applications where this is true include flow monitoring of single fuel utility boiler stack gas emission, cement kiln combustion emissions, secondary combustion air and process steam boiler emissions. An alternate approach is to use an external temperature input. A 1000 ohm platinum RTD can be purchased from Teledyne Monitor Labs or you can supply your own sensor. The Ultraflow 150 is capable of accepting a 1 to 5 VDC, 4 to 20 mA, 1000 ohm RTD or a 100 ohm RTD. If you choose to supply your own sensor please include the type and scaling of the device. Example: Current, 4mA = 0 degrees F, 20mA = 500 degrees F.

7. SYSTEM CONFIGURATION:

(Select one) ***Direct Interface*** or ***Enhanced Remote***

The Ultraflow 150 is available in two basic configurations.

- The Direct Interface configuration does not have the Enhanced Remote Panel. The Direct Interface requires more wires to be run from the stack or duct.
- The Enhanced Remote Panel option gives the user more information down at the 'remote' location and offers more inputs and outputs than the Direct Interface. The Enhanced Remote option requires only one cable with two wires to be run from the stack or duct to the Enhanced Remote Panel's location.

This section is for a Direct Interface option:

Two analog outputs are available from the Direct Interface. These outputs can easily be reprogrammed using the PC-MODBUS program that accompanies the Direct Interface option. Each of the analog outputs can display calibration values or hold the last NORMAL mode reading when the monitor is in a calibration mode. See Attachment A at the end of the Installation Checklist for a list of common analog output selections.

The Direct Interface provides two digital outputs (relays) that can be configured to actuate on various output modes or monitor conditions. These functions are set via the PC-MODBUS program and jumper settings. Contacts are SPDT Form C. The two relays available can be configured as either Normally Open or Normally Closed via jumper settings. See Attachment A at the end of the Installation Checklist for a list of common digital output selections.

Two discrete inputs are provided to allow monitor output mode control by user-supplied circuits. These optical isolators are activated by either dry contact closures or +5VDC signal from a user-supplied circuit. This configuration is field selectable via jumper settings. The table below lists 4 available mode commands, any two of which can be configured by way of jumper settings.

Calibration Zero
Calibration Span Low
Calibration Span High
Calibration Cycle

This section is for the Enhanced Remote Panel option:

Four analog outputs are available from the Enhanced Remote Panel. These outputs can easily be reprogrammed through the menu system in the Enhanced Remote Panel. Each of the analog outputs can display calibration values or hold the last NORMAL mode reading when the monitor is in a calibration mode. See Attachment A at the end of the Installation Checklist for a list of common analog output selections.

There are eight digital outputs (relays) available on Enhanced Remote Panel to interface with user circuits. These relays can be configured as either NO or NC via jumper settings. Each relay is SPST with one normally open contact rated 3A max. These relays can easily be reprogrammed through the menu system in the Enhanced Remote Panel. See Attachment A at the end of the Installation Checklist for a list of common digital output selections.

The Enhanced Remote Panel has eight isolated inputs available. A simple jumper setting on the Multi-I/O board determines if they are activated by a dry contact or +5VDC input. Dry contact closure is the standard configuration. The designation of each input is fixed and the table below lists the function of each input.

Input 1	Calibration Span High TIE 1
Input 2	Calibration Zero TIE 1
Input 3	Calibration Cycle TIE 1
Input 4	Calibration Span High TIE 2
Input 5	Calibration Zero TIE 2
Input 6	Calibration Cycle TIE 2
Input 7	Test Zero Scale
Input 8	Test Full Scale

The Ethernet Module in the Enhanced Remote Panel can be configured with a Dynamic IP address or a Static IP address.

Consult your IT department. Many IT departments may want to assign a Static IP address. If this is the case, you will need to supply a Static IP address, a Subnet Mask and a Default Gateway.