Instruction Manual • September 2003

milltronics

L-300

SIEMENS

Safety Guidelines

Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel

This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Warning: This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.

Note: Always use product in accordance with specifications.

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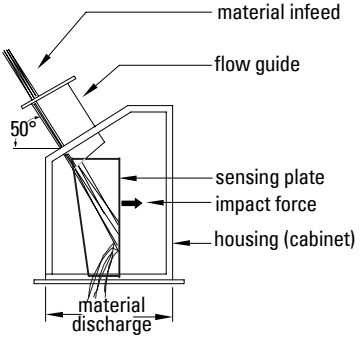
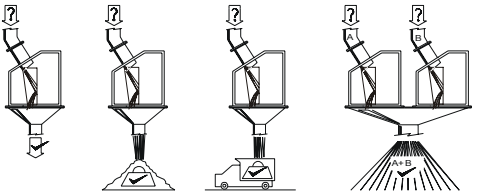
Milltronics L-300 Solids Flowmeter

Milltronics L-300 solids flowmeter is a medium-capacity flowmeter for various product sizes, densities, and fluidities. The sloped flowguide design conditions the material into a repeatable flow pattern.



The flowmeter load cells output signals are processed by the flowmeter integrator (ordered separately) to:

- monitor material flow
- maintain accurate material inventory
- provide batch control for process or loadout purposes[1]
- control the ratio of materials in continuous blending processes [1]



Components of the Milltronics V Series flowmeter system:

- L-300 flowmeter housing and flowguide consisting of force sensing mechanism consisting of two parallelogram load cells and stainless steel sensing plate
- electronic flowmeter integrator (ordered separately)

The Manual

This instruction manual covers the installation, operation and maintenance of the Milltronics L-300 solids flowmeter.

Please refer to this manual for proper installation and operation of any component of the system to which the L-300 is being applied. Adhering to the installation and operating procedures will ensure a quick, trouble-free installation and allow for the maximum accuracy and reliability of your weighing system. Because the L-300 solids flowmeter is used in conjunction with an integrator, refer to the integrator's manual as well.

If you have any questions, comments, or suggestions about the manual contents, please email us at techpubs@siemens-milltronics.com.

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1. additional equipment required

Specifications

Particle Size

- fine powder to 25 mm (1")

Product Temperature

- -40 to 85 °C (-40 to 185 °F)

Ambient Temperature

- -40 to 65 °C (-40 to 150 °F)

Accuracy

- ±1 %, 33 to 100 % of design capacity; extended accuracy range with linearization function of integrator

Repeatability

- ± 0.2 %

Capacity Range

- 100 t/h (110 STPH) to 300 t/h (330 STPH)

Maximum Volumetric Capacity

- 300 m^3/h (10,600 ft^3/h)

Maximum Tonnage

- 0 to 300 t/h (330 STPH) at 1 t/m^3 (62.4 lb/ft^3)
- Up to 0 to 500 t/h (550 STPH) at higher bulk densities

Construction

- painted mild steel flowguide and housing (cabinet) with 304 (1.4306) stainless steel sensing plate
- optional special linings for flowguide and sensing plate

Load Cells

- construction: 50 lb stainless steel parallelogram
- excitation: 10 V DC nominal, 15 V DC maximum
- output: 2 mV / V excitation at rated load cell capacity
- non-linearity: 0.02 % of rated output
- hysteresis: 0.02 % of rated output
- non-repeatability: 0.01 % of rated output
- overload: safe 150% of rated capacity, ultimate 300% of rated capacity

Connection

- Flexible conduit to customer's junction box

Wiring

- 6 conductor #20 (0.5 mm^2) shielded cable, or equivalent, for cable runs less than 150 m (500 ft)
- 8 conductor #20 (0.5 mm^2) shielded cable, or equivalent, for cable runs from 150 m (500 ft) to 300 m (1000 ft)

Classification

- CE
- For use in hazardous areas, use IS barrier strips (see your Siemens Milltronics representative for details

Installation

The L-300 flowmeter system includes:

- main body (flowguide and sensing plate housing assembly)
- sensing plate (complete with mounting hardware)
- calibration pulley
- calibration weights
- calibration weight cable
- electronic integrator (ordered separately)

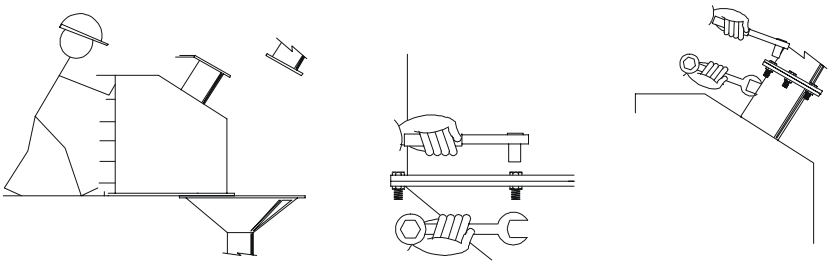
Install the Milltronics L-300 flowmeter in an area that is suitable for the system classification rating. Position the flowmeter to permit opening the housing doors for sensing plate access.

Installing the Flowmeter

Make sure the flowmeter inlet and outlet mounting surfaces are free from excessive vibration.

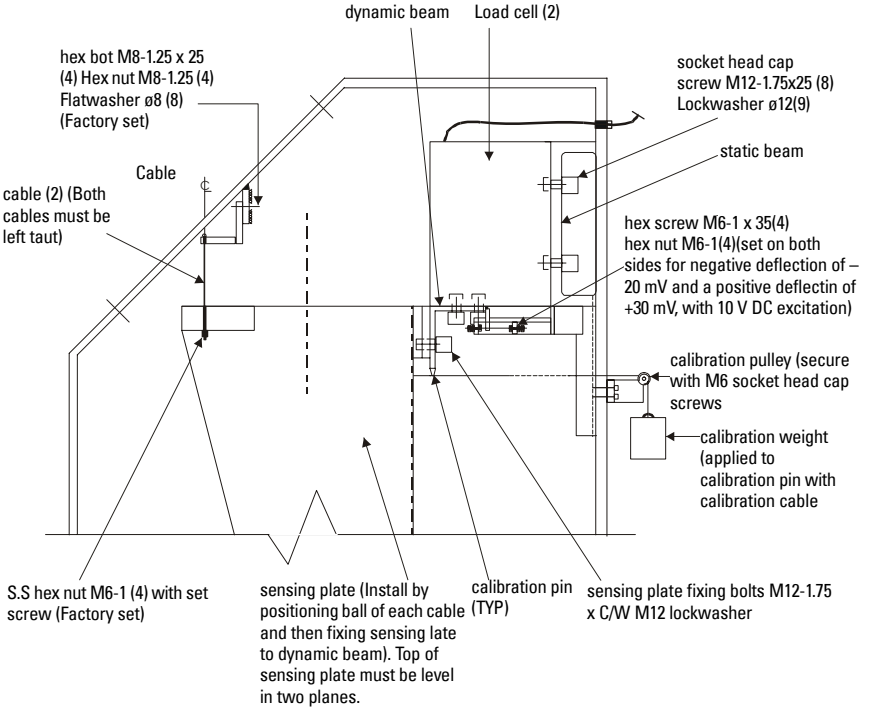
1. Position the flowmeter into the desired location.
2. If necessary, shim the housing base to level the flowmeter.
3. Fasten the housing discharge to the downstream material chute.
4. Fasten the flowguide to the material infeed chute.

Note: Provide sufficient mechanical support for the flowmeter and chutework.



5. Install the sensing plate. Refer to the appropriate instruction manuals for levelling, sensing plate installation and integrator interconnection instructions.
   If the sensing plate has been shipped already installed, remove the shipping blocks on the lower surface of the sensing plates.

Sensing Plate Mounting Details



Dual Load Cell Balance

Verify the load cell signal balance before the initial start up of the flowmeter. Repeat this procedure when one or both load cells are replaced.

Remove the cover plate on the back of the flowmeter and identify load cell "A" and load cell "B." When doing the load cell balance, as described in the integrator manual, suspend a test weight from calibration position "B" and "A" as required using the calibration pulley.

Follow the balancing instructions provided in the integrator instruction manual.

Calibration

Calibration weights are normally supplied with the Milltronics L-300. The following is the basis for determining the weight(s) value in t/h for initial calibration. The value of the calibration weight will be different after material tests have been completed and the calibration factored to the same.

Program and calibrate the flowmeter/integrator system as described in the integrator manual. However, before a system can be calibrated, a calibration weight should be selected. The mass of this weight is based on a nominal value of 45 g per t/h[1] and should be selected for 60 to 80% of the design flowrate.

Example:

Design rate = 300 t/h
Test rate to equal 70% of design rate
Test weight value = 300 t/h x 70% = 210 t/h
Test weight mass = 210 t/h x 45 g per t/h = 9.45kg

With the calibration weight selected, the integrator can be programmed and the system calibrated as described in the integrator manual. For span calibration purposes, the calibration weight should normally be applied at the center position.

After calibration, remove the calibration pulley and replace the cover plate. If possible, perform material tests after calibration to verify the accuracy of the span calibration.

Material Tests

After installation, perform a material test using a known amount. Run the material through the flowmeter and check the flowmeter integrator totalized value against the known amount.

Use the manual span adjustment feature in the flowmeter integrator to make adjustments for greatest accuracy.

1. Free flowing, high velocity, granular products such as wheat and corn will produce higher g per t/h forces.

Applications

Note: For best performance and limited maintenance requirements, keep in mind material compatibility and flow patterns.

Materials

Material characteristics for best results:

- Low cohesion (flows well through chutes angled 50° or higher, similar to a liquid)
- Low adhesion (does not stick to surfaces)
- Low abrasion (will not wear out chutes, flowguide or sensing plate)
- Low causticity (will not damage internal flowmeter components)

Most materials with low moisture content have excellent flow and adhesion characteristics. In processes where material moisture content varies, select a flowmeter location where the moisture content is lowest. Sensing plate and flowguide non-stick linings are often used for fertilizer, wheat flour, sugar, and other materials with similar properties.

Abrasive materials are best monitored at low velocity. Sensing plate and flowguide abrasion resistant linings are often used for alumina, asbestos, barley, corn, limestone, soya beans, wheat, and other materials with similar hardness and particle mass.

Standard flowmeter components are resistant to chemical reaction with most materials. Special paint or coatings on exposed flowmeter components are often used for carbide, fertilizer, phosphate, salt, sodium chloride, urea, and other materials with similar properties.

The L-300 is best applied to free flowing, granular material that will not re-crystalize and build up in the presence of moisture or high humidity.

Material Feed

Ideal material infeed characteristics:

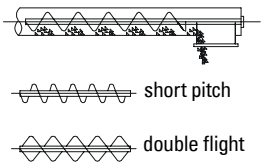
- constant and relatively low material velocity
- uniform material flowrate (not pulsing)
- negligible air flow through the flowmeter
- flowguide 17 to 50 % full during operation

For best results, use material from an elevated bin, gravity fed to the flowmeter. If the material is to be monitored after some process has been performed, choose the feeder device that provides the most consistent material flow.

Use a reverse flowguide transition when high or variable velocity feeder material discharges are anticipated. Refer to Flowmeter Infeed Chutes on page 9. Position the flowmeter discharge chute so material cannot back up into the flowmeter housing.

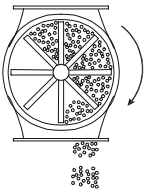
For heavily pulsing feeder discharges, at less than 1 pulse per second, consult your local Siemens Milltronics representative.

Screw Conveyor



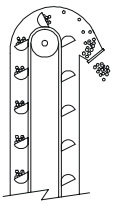
- most common type of material feeder
- short pitch and/or double flight screws preferred to reduce the batch size (and increase the frequency) of the material discharge pulse, or cut back the flights of a standard screw so it ends before the discharge opening
- use reverse flowguide transition for variable operating speeds or constant speeds above 40 rpm

Rotary Feeder



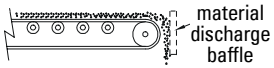
- provides an air seal between the upstream and/or downstream process, and the flowmeter
- required if the material is pneumatically conveyed or flowmeter/process isolation is required
- use reverse flowguide transition for variable operating speeds or constant speeds above 10 rpm

Bucket Elevators



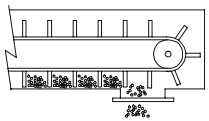
- commonly used for grain applications
- feeder discharge damping required when slow elevators (typically chain drive) produce heavily pulsing material discharge
- use deadbox if required to reduce material velocity from fast elevators (typically re-inforced belt drive)

Conveyor Belt



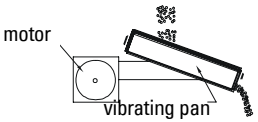
- produces a non-pulsing material discharge
- reverse flowguide transition (and/or material discharge baffle) often required for variable belt speeds or constant speeds in excess of 1 m/s (200 feet/minute)

Drag Conveyor



- operates at a constant (and relatively low) velocity
- reverse flowguide transition not normally required but use feeder discharge damping or a discharge baffle to minimize the pulsing material discharge

Vibratory Feeder

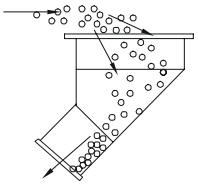


- produces a non-pulsing material discharge
- use reverse flowguide transition for variable speed varieties

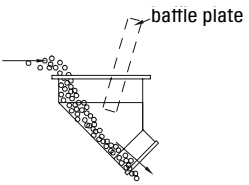
Flowmeter In-Feed Chutes

The flowmeter in-feed chute delivers the material from the bin or feeder discharge to the flowmeter flowguide. The ideal in-feed chute pre-conditions the material flow to minimize the effect of abrasion, velocity variation, feeder discharge trajectory variation, and pulsing.

Feeder/Flowguide Transition

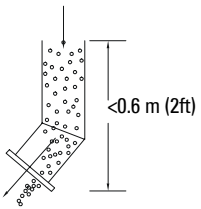


- reverse flowguide transition reverses direction of the bin or feeder material discharge before the material enters the flowmeter flowguide
- reversing direction forces the material into a desirable flow pattern rather than permitting material to be flung from the feeder, directly into the flowguide
- transition is especially important for high or variable speed feeders



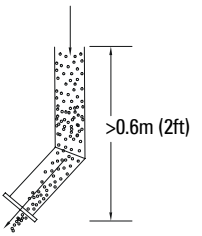
- forward flowguide transition maintains the material in the same direction between the bin or feeder discharge and the flowmeter flowguide
- transition is acceptable for a low and constant velocity feeder
- if a forward flowguide transition must be used for a high or variable speed feeder application, install a baffle plate

ShortFall Chute



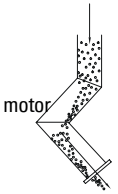
- material in-feed chute where the bin or feeder discharge to flowmeter flowguide fall is less than 0.6 m (2 ft)
- material velocity due to gravity minimumized
- chute centreline and angle should coincide with that of the flowguide, for a distance greater than or equal to the flowguide diameter (before the flowguide inlet)

Long Fall Chute



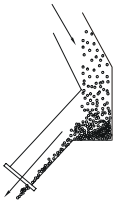
- material in-feed where the bin or feeder discharge/ flowguide fall is more than 0.6 m (2 ft)
- less desirable than the short fall chute because material velocity is greater, increasing flowmeter component abrasion
- greater distances after chute angle changes required to settle material into desirable flow patterns

Dogleg



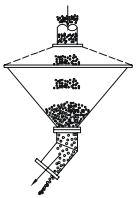
- used to reduce the detrimental effect of high or variable material velocity, especially when using a long fall chute
- for abrasive materials, line the chute with an abrasion resistant material, or use an in-feed deadbox

Deadbox

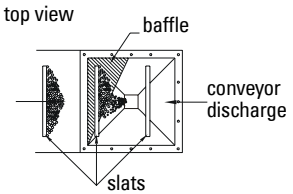


- installed where the chute angle changes. This will cause the material to impact upon itself, rather than the chute surface.
- used when the feeder discharge velocity is high, variable, where long fall chute angles change, and if the material is particularly abrasive

Pulsing Feeder Discharge Damping

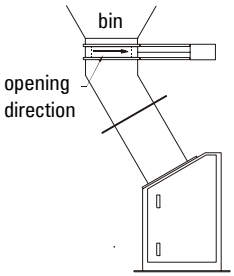


- install a temporary holding bin to receive pulsing material discharge from a feeder. Then the material is gravity fed from the bin to the flowmeter flowguide.
- provide manual or automatic control to ensure the holding bin is neither emptied nor overfilled while the feeder is in operation.
- bin could also be used for the integrator on-line calibration, (if so equipped). Refer to the integrator instruction manual for bin requirements.



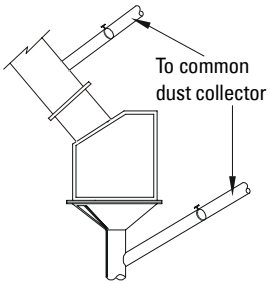
- for drag conveyors, use a baffle plate installed at the conveyor discharge to reduce the heavy material pulsing associated with this type of feeder

Knife Gate



- For knife gates which supply on-off control from supply bins or silos, open as shown in relationship to flowguide.

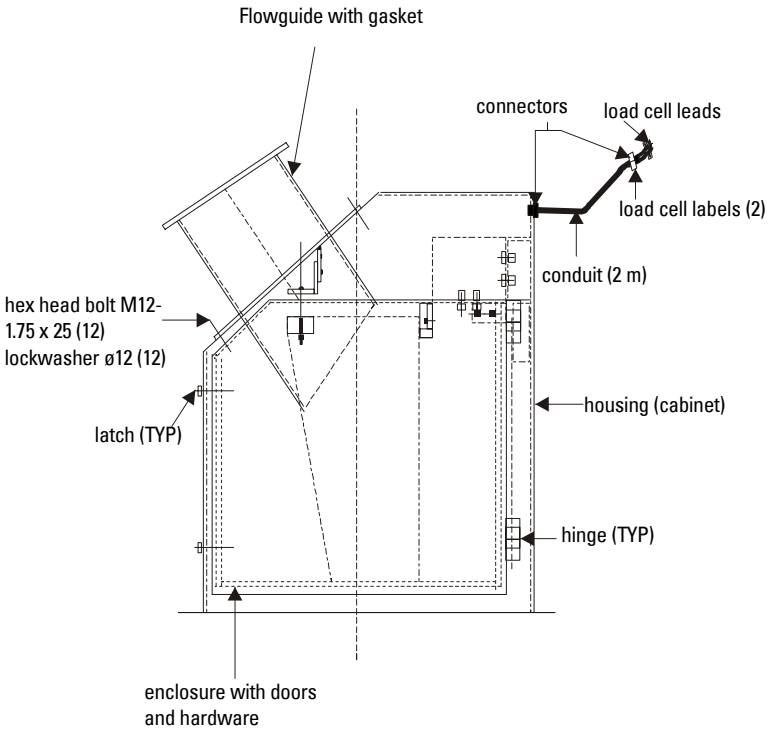
In-Feed/Discharge Air Pressure



- If a material in-feed/discharge differential air pressure is anticipated and rotary airlock feeders are not used, vent the in-feed and discharge chutes to a common dust collector.
- Install a tuning gate in each vent to balance the air pressure.
- If a dust collector is not used, install an air bypass chute between the flowmeter in-feed and discharge chutes.

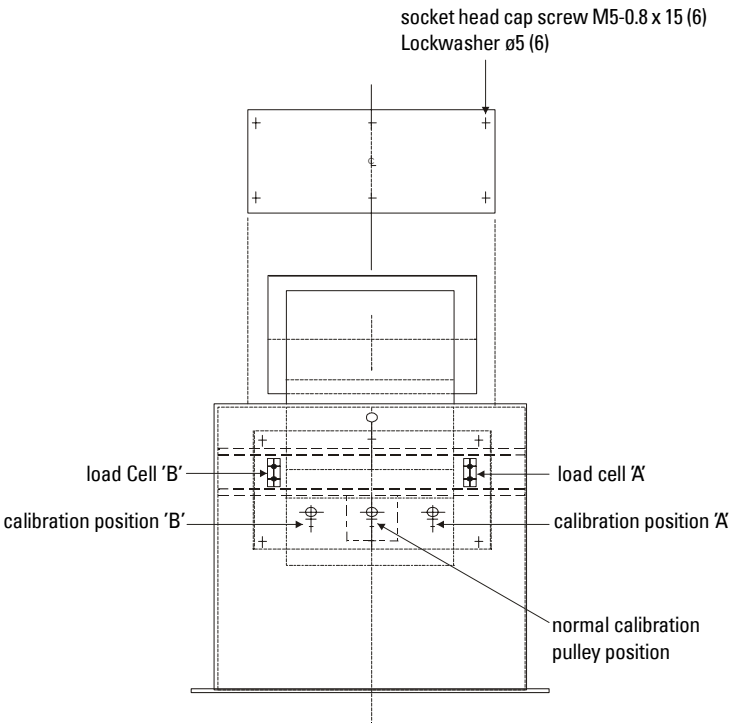
L-300 Outline and Details

Flowmeter Details



Flowmeter details are continued on the next page.

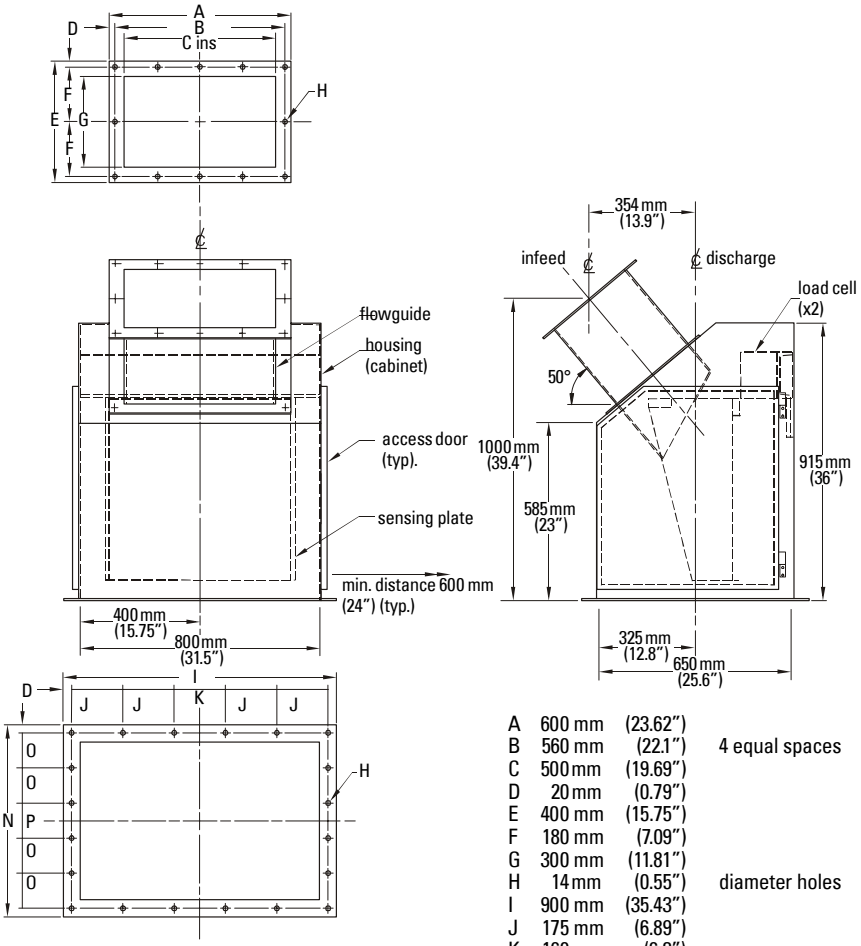
Cover Plate: Remove for calibration pulley mounting



Outline Dimensions

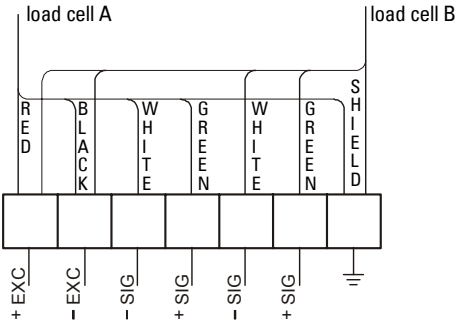
Notes:

- mild steel or stainless steel construction
- flowmeter should be rigidly supported with discharge flange level
- any modification or change should be approved by Siemens Milltronics



A	600 mm	(23.62")	
B	560 mm	(22.1")	4 equal spaces
C	500 mm	(19.69")	
D	20 mm	(0.79")	
E	400 mm	(15.75")	
F	180 mm	(7.09")	
G	300 mm	(11.81")	
H	14 mm	(0.55")	diameter holes
I	900 mm	(35.43")	
J	175 mm	(6.89")	
K	160 mm	(6.3")	
N	750 mm	(29.53")	
O	145 mm	(5.71")	
P	130 mm	(5.12")	

Wiring



Note: When installing the L-300 in a hazardous area, use suitable intrinsically safe barrier strips.

Maintenance

Checks

If material sticks to the sensing plate, incorporate a program to ensure that the impingement area remains clean. If sticking persists, contact your Siemens Milltronics representative.

Check for wearing of the sensing plate. If wear is excessive, contact your Siemens Milltronics representative.

Unit Repair and Excluded Liability

All changes and repairs must be done by qualified personnel and applicable safety regulations must be followed. Please note the following:

- The user is responsible for all changes and repairs made to the device.
- All new components must be provided by Siemens Milltronics Process Instruments Inc.
- Restrict repair to faulty components only
- Do not re-use faulty components.

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Notes

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