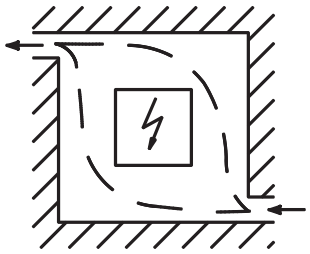


Function: A pressurized enclosure system comprises a **control unit**, **pressure monitor** and **solenoid valve** and a **housing** which contains the actual apparatus.
Air or an inert gas such as nitrogen is fed into the enclosure housing, thus producing a non-explosive atmosphere so that any ignition sources present cannot trigger an explosion. The control unit, in conjunction with the pressure switch, monitors the circulation process and the pressure. When purging is complete, it allows the electrical apparatus to be switched on.
If the pressurized enclosure is opened, the pressure is released and the control unit isolates the apparatus mounted in it from the power supply.

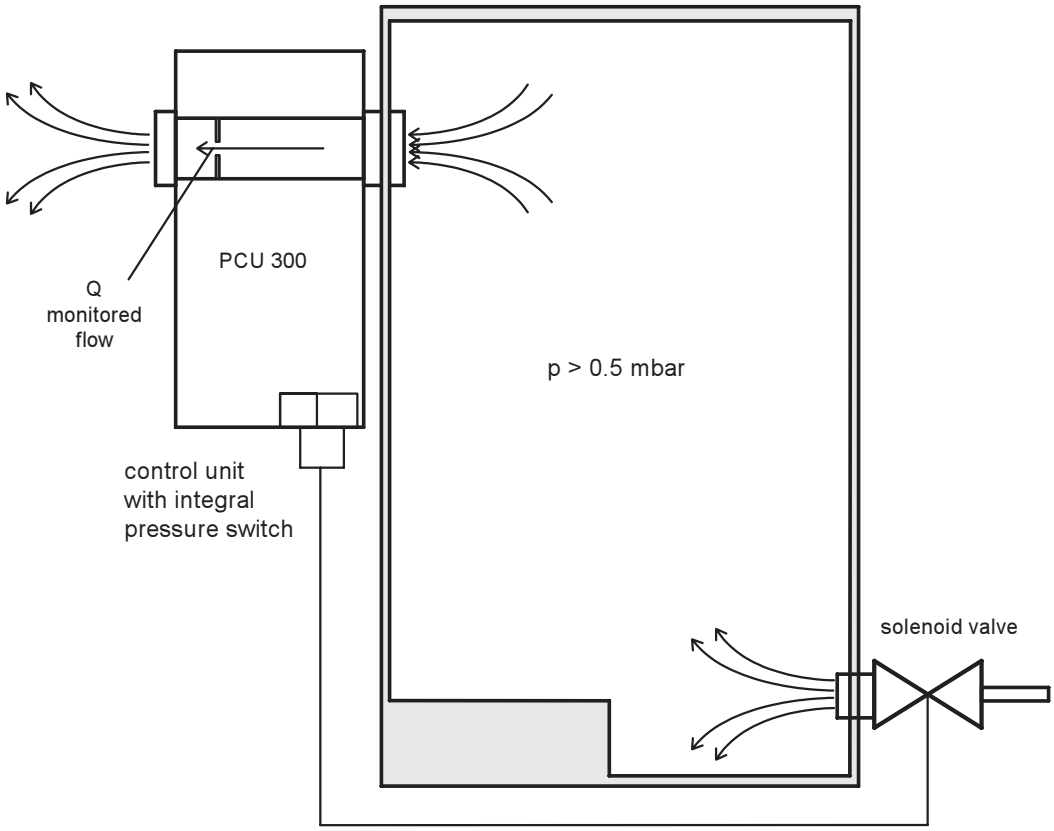
Pressurized enclosures can be divided into two types, depending on the application:
1. Leakage compensation
2. Constant purging circulation

1. **Leakage compensation:** After circulating a defined quantity of inert gas, as specified in EN 50 016, the casing is hermetically sealed on the outlet side. Possible leaks are compensated by feeding in inert gas. This ensures minimum consumption of the inert gas.

2. **Constant purging** (dilution): After pre-circulation, purging continues with a reduced quantity of air. This method is used with internal gas sources (e.g. analytical devices) in order to achieve a dilution of the gas mixture below the lower explosion ignition limit to achieve a non-explosive concentration. A further effect is the reduction of a possible temperature rise within the casing due to the heat given off by the device.

If internal gas sources are present ("Containment System") it is preferable to use nitrogen as the ignition-inhibiting gas.

General design of a pressurized enclosure system:



The service we offer you:
In addition to offering advice on the components in our product range we also advise on the choice of housing, and can take undertake the design and manufacture of complete functional units to the point of TÜV acceptance.

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The following types of purging and operation can be achieved with the components supplied by Pepperl+Fuchs:

Purging

With a **digital valve**
After purging with a large nozzle cross-section the valve closes. A mechanically-adjustable bypass guarantees the minimum pressure necessary for operation.

With a **proportional valve**
The **PCU 300** control unit (with integral pressure switch) adjusts the pressure in the housing to the programmed target value and records the gas discharge volume.

Time-dependent process
A programmable **fixed purging period** determines the purge-gas quantity as a function of the selected nozzle size and admission pressure, at the same time monitoring the pressure inside the housing.

In the hitherto standard purging process, the quantity of inert gas consumed is substantially **in excess** of the minimum required for adequate operating safety and availability.

Cumulative process
The volumetric flow at the housing outlet is measured and **cumulated**. When the programmed **purge-gas quantity** is reached, purging is terminated.

As compared with the time-dependent process, the cumulative process substantially **reduces** the excess gas quantity. Other advantages:
- **cost saving**, as the purge-gas quantity is exactly equal to the quantity prescribed,
- **no overloading** of pressure-sensitive components such as seals, viewing windows, membrane keypads and the like, since a defined pressure is guaranteed.

Operating mode

Constant purging
This operating mode with an increased consumption of inert gas is selected if the apparatus mounted in the housing (e.g. an analytical instrument) itself generates an explosive atmosphere which must be diluted, or if the apparatus requires additional cooling.

Preferred solenoid valves: PV 321 or PV 322 proportional valve
Alternative: DV 311 digital valve

Leak compensation
The pressure and flow control equipment which regulates the inlet pressure guarantees that only sufficient purge gas to compensate for the leakage rate passes through the proportional valve.
Advantages:
- **minimum consumption of inert gas**
- **low flow noise**
- **automatic correction of increased leakage rate due to ageing.**

Preferred solenoid valves: PV 321 or PV 322 proportional valve

Choice of control unit orifice meter and solenoid valve nozzle diameter

Digital valve: The purging volume required by EN 50 016 and the desired purging period determine the purge-gas flow (in litres/hour) at the solenoid valve. In the middle section of the table, below, select a volumetric flow rate corresponding to the available admission pressure, which is greater than the pre-determined value, taking leakage losses from the housing into account. The diameter of the digital valve nozzle and the control unit orifice meter will be found on the same line, in the right and left-hand columns, respectively.
Proportional valve: Experience has shown that a control unit with a 14 mm orifice meter covers a broad range of applications (preferred type).

PCU 300 orifice meter ∅ [mm]	purge-gas volumetric flow [litres/hour] at solenoid valve							DV 311-Ex nozzles ∅ [mm]
4	500 ... 1100							
6	1100	1350	1560	1750	1908	2063	2203	1
10	2495	3017	3485	3827	4302	4608	4921	1,5
14	4349	5328	6149	6869	7513	8107	8654	2
18	9634	11772	13532	15070	16448			3
	1,5	2	2,5	3	3,5	4	4,5	
	purge-gas admission pressure [bar]							

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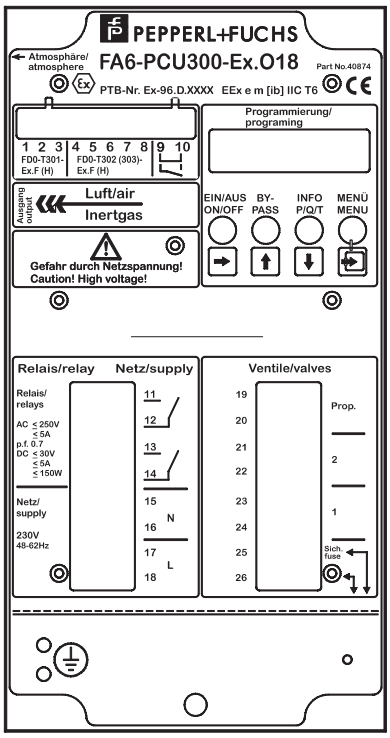
- **Compact design**
- **Low installation costs**
- **Economical purging method**
- **High safety standard**
- **LCD indication of operating status**
- **Menu-driven programming**

Control unit F l l - PCU 300 - Ex.O l

Operating voltage	230 VAC	A 6
	115 VAC	A 5
	24 VAC	A 2
	24 VDC	D 2
Orifice meter *	4 mm	4
	6 mm	6
	10 mm	10
	14 mm (preferred size)	**14**
	18 mm	18

* for assistance with selection see the table at the foot of page 2

Function:
The control unit and integral pressure switch monitor the purge-gas pressure and throughput. Operating modes and parameters can be programmed and called-up with 4 keys; they are displayed in an 8-character LC Display.
Optimum adaptation to the application is provided by the choice of orifice meters.



Technical data **Approvals / Certificates**	PTB No. Ex-96.D.2181 / KEMA No. Ex-97.D.1985 U
General	
Installation	inside or outside the Pressurised housing
Explosion protection	EEx em [ib] IIC T6
Dimensions: H, W, D	220 mm, 120 mm, 90 mm
Material	painted aluminium
Ambient operating temperature range	-10 °C ... +50 °C (263 K ... 323 K)
Electrical data	
Operating voltage	24 VDC 24 VAC, 115 VAC, 230 VAC 48 Hz ... 62 Hz
Power consumption	ca. 2.5 VA
Operating circuits (terminals 11,12 and 13,14)	AC: U_{max} = 250 V, I_{max} = 5 A, cos φ = 0.7 DC: U_{max} = 30 V, I_{max} = 5 A, P = 150 W
Control circuits (terminals 1 ... 10)	EEx ib IIC protection (intrinsically safe)
Pneumatics	
Pressure measurement range	0 ...18 mbar
Volumetric flow measurement range	depending on the orifice meter
Solenoid-valve circuit breakers	In control unit, order separately (for selection see table on page 6)

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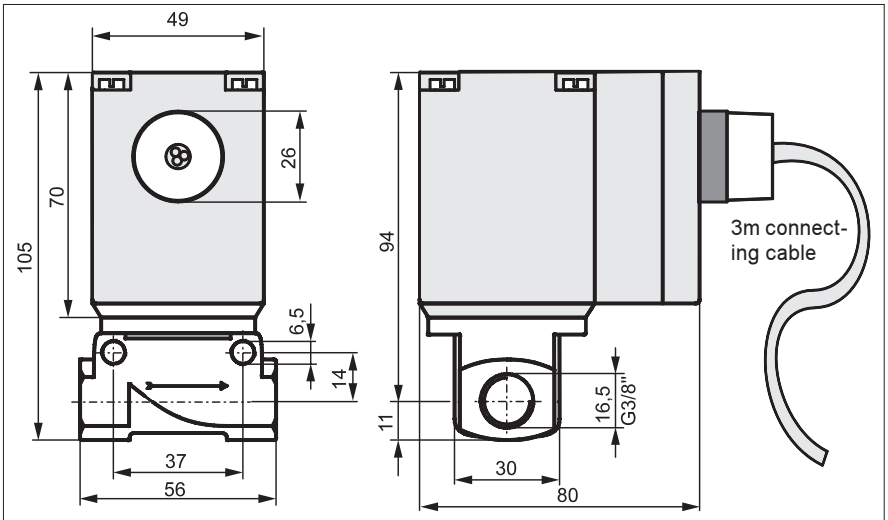
- **Minimum purge-gas consumption**
- **High level of operating safety**
- **Low flow noise**
- **Defined pressure during purging**
- **EEx de IIC T4**
  PTB No.: Ex-92.C.1030

Function:
The valve functions as an actuator for the pressurized enclosure system.
It admits only sufficient purge gas to compensate for leakage losses from the housing .
The defined pressure during purging ensures that pressure-sensitive components such as membrane keypads and viewing windows are not overloaded.
The valve can be mounted inside or outside the casing.

Proportional valve F □ □ - PV 32 □ - Ex

Operating voltage	230 VAC / DC	U 6
	115 VAC / DC	U 5
	24 VAC / DC	U 2
Housing volume	< 300 litres (NW 4)	1
	> 300 litres (NW 6)	2



IP 65
Operating pressure: **PV 321** 0-7 bar, **PV 322** 0-3.5 bar

- **Adjustable bypass**
- **Compact design**
- **Various nozzles available**
- **EEx de IIC T4**
  PTB No.: Ex-89.C.1034

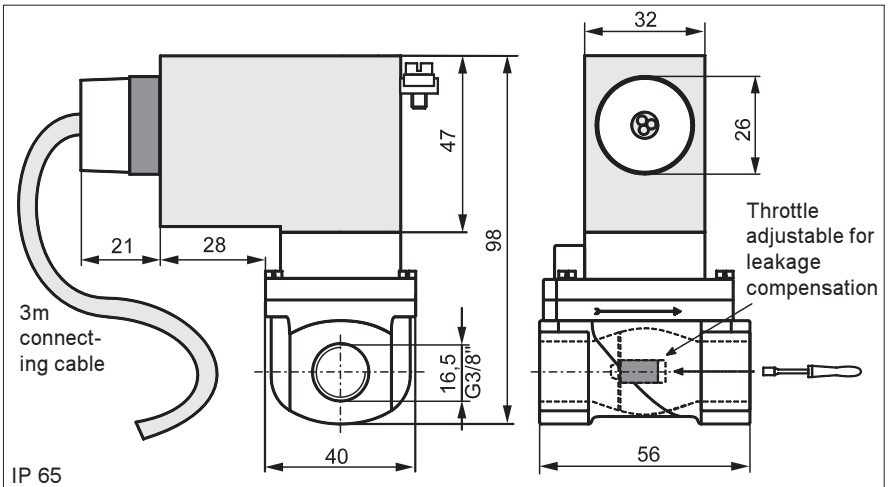
Function:
The valve functions as an actuator for the pressurized enclosure system.
During purging, the large port (nozzle) is opened. Then the digital valve closes and compensates for leakage losses with a small, mechanically-adjustable bypass .
The valve can be mounted inside or outside the housing.

Digital valve F □ □ - DV 311- Ex

Operating voltage	230 VAC / DC	U 6
	115 VAC / DC	U 5
	24 VAC / DC	U 2

Nozzle *	1.0 mm	Part number: 41953
	1.5 mm	41954
	2.0 mm	41955
	3.0 mm	41956
	4.0 mm	41957
	5.0 mm	41958
	6.0 mm	41959

* The nozzle must be ordered separately.
For assistance with selection see the table at the foot of page 2.



IP 65
Operating pressure: 0.2-12 bar

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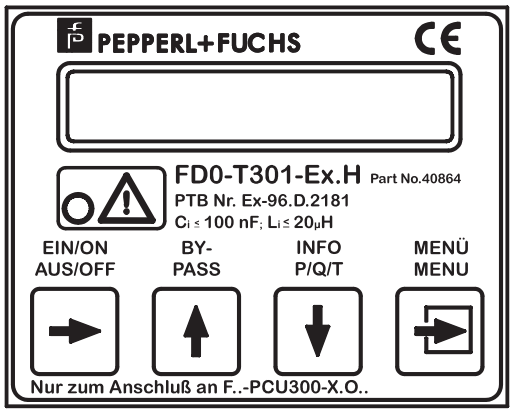
- **Intelligent control panel**
- **Operating and error messages in clear text**

Control Panel FD0-T301- Ex. l

EEx ib IIC T6,
with LC display

Front assembly ..... F
IP 65 housing ..... H

Function:
The panel should preferably be used with the PCU 300 control unit mounted in the pressurized housing.
It is used to operate the control unit and to call-up all operating parameters.



STOP
Danger

When the bypass button is pressed the operating safety instructions must be complied with (e.g. production of a 'hot working' permit).

- **Standard control panel**
- **System-bypass key switch**

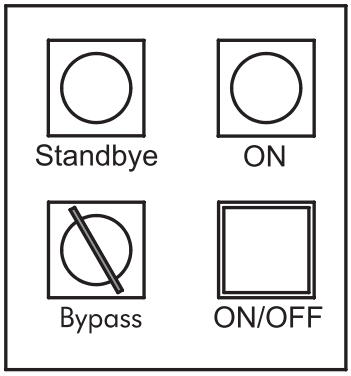
Control Panel FD0-T303- Ex. l

EEx ib IIC T6,
with key switch

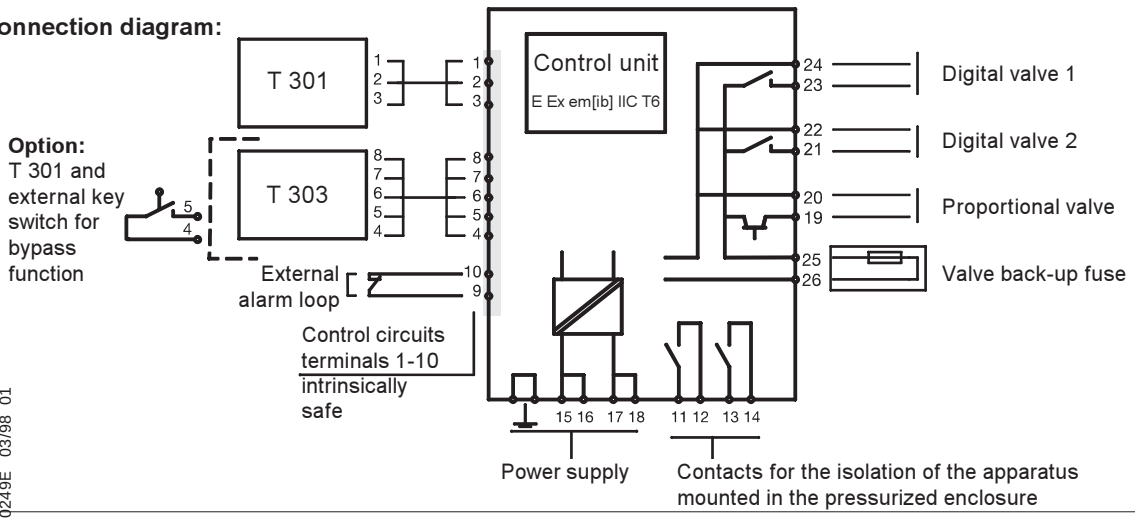
Front assembly ..... F
IP 65 housing ..... H

STOP
Danger

When the bypass button is pressed the operating safety instructions must be complied with (e.g. production of a 'hot working' permit).



Connection diagram:



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The fusing protection is built into the control unit. It must be selected according to type (DV/PV) and operating voltage and ordered separately.

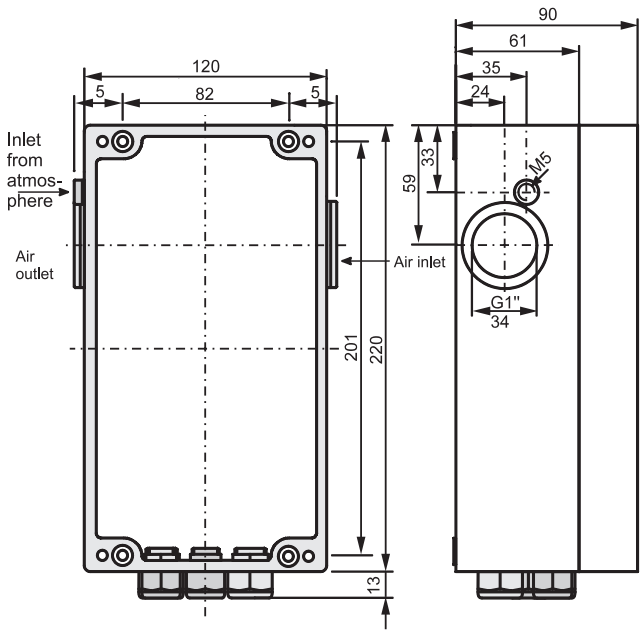
Maximum fusing values when using other solenoid valves:

230 VAC ..... 200 mA
115 VAC ..... 315 mA
24 VAC / DC ..... 2000 mA

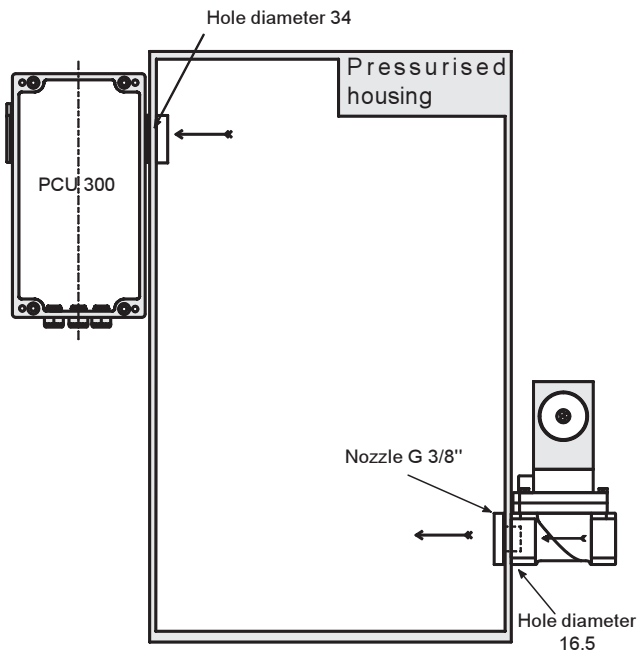
Back-up fuses for solenoid valves PCU-F-Ex.□□□□ mA

	DV	PV	
80 mA	230 V		..... 8 0
100 mA			..... 1 0 0
160 mA	115 V		..... 1 6 0
200 mA		230 V	..... 2 0 0
315 mA			..... 3 1 5
400 mA		115 V	..... 4 0 0
630 mA	24 V		..... 6 3 0
1000 mA			..... 1 0 0 0
1600 mA		24 V	..... 1 6 0 0
2000 mA			..... 2 0 0 0

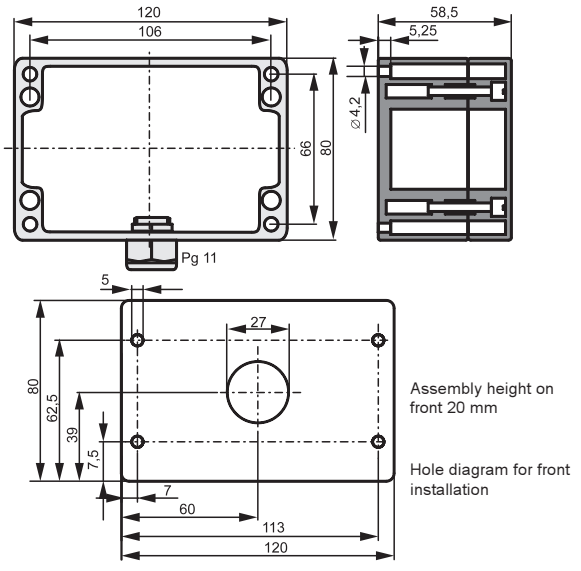
PCU 300 control unit - dimensions



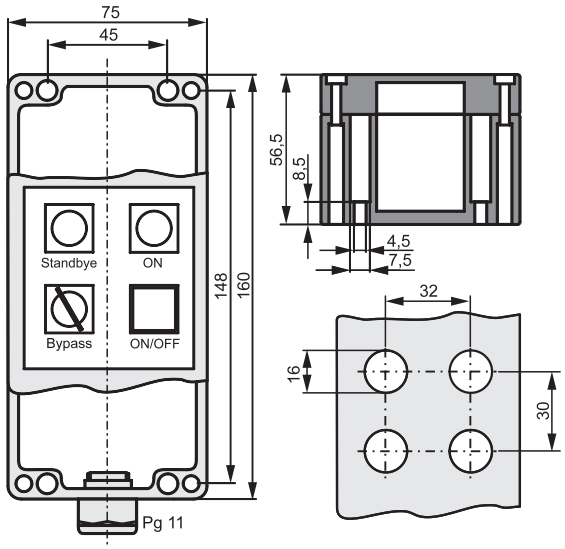
Mounting example: externally mounted



T 301 dimensions and hole locations



T 303 dimensions and hole locations



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