



Installation Manual

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NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product. For technical assistance, contact Customer Support 796 Tek-Drive Crystal Lake, IL 60014 USA Tel: +1 847 857 6076, +1 847 655 7428

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1 Safety Instructions

1.1 Intended Use

The Tek-DP 16111 Compact Orifice Flow Meter is the next version of orifice assembly used for accurate flow measurement for closed-loop and general-purpose monitoring of liquid, gas, steam vapours. Built on the oldest and proven differential pressure measurement technique.

The Tek-DP 16111 Compact Orifice Flow Meter gives the advantage of most simple installation & direct mounting of DP transmitter thereby eliminating the need of tube, fittings & other accessories. This flow meter uses corner tap design of ISO-5167.

1.2 Safety Instructions from the Manufacturer

1.2.1 Disclaimer

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without the express written permission of Tek-Trol LLC. All pertinent state, regional and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

Before installation, commissioning, and operation, ensure that the appropriate model has been selected in terms of measuring range, design, and specific measuring conditions. Non-observance can result in serious injury and/or damage to the equipment.

1.2.2 Product Liability and Warranty

Tek-Trol warrants these products for a period of two years from the date of shipment and 18 months from the date of installation. All products manufactured by the seller are free from defects of material and workmanship when used within the service, range, and purpose for which they were manufactured.

Seller will, at its option, repair, replace, or refund the purchase price of parts if found to be defective in material or workmanship provided that Seller receives a written notice of such defect requesting repair, replacement, or refund within the warranty period and provided that any instructions thereafter given by Seller are complied with. This warranty does not extend to anyone other than the original Buyer from the Seller.

1.2.3 Information Concerning the Document

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute and is not to be used



for determining suitability or reliability of these products for the specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation, and testing of the products with respect to the relevant specific application or use thereof. Neither Tek-Trol LLC nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

1.3 Safety Precautions

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation and on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies the procedure.

Warnings and Symbols Used

The following safety symbol marks are used in this operation manual and on the instrument.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

1.4 Packaging, Transportation and Storage

1.4.1 Packaging

Do not remove packaging until just before mounting the instrument. It is recommended to store the packaging, as it will provide optimum protection during transport (e.g. change in location, sending for repair).

- 1. Tek-DP 16111 Compact Orifice Flow Meter (1 Unit)
- 2. Accessories
- 3. Documentation: Instruction Manual, Quick Start, Guide



1.4.2 Transportation

Check the Tek-DP 16111 Compact Orifice Flow Meter for any damage that may have been caused during transport. Obvious damages must be reported immediately.

- Avoid impact shocks to the device and prevent it from getting wet during transportation.
- Verify local safety regulations, directives, and company procedures with respect to hoisting, rigging, and transportation of heavy equipment.
- Transport the product to the installation site using the original manufacturer's packing whenever possible.

1.4.3 Storage

- Permissible storage temperature at the place of storage
- Store the Tek-DP 16111 Compact Orifice Flow Meter and all other components (gaskets, bolts, screws etc.) in the original packing material.

1.4.4 Nameplate

• The nameplate lists the order number and other important information, such as design details and technical data.

NOTE

Check the device nameplate to ensure that the device is delivered according to your order.

2 Product Description

This section covers the reference and specification data, as well as the ordering information.

2.1 Introduction

Tektrol's Compact Orifice Flow Meter is the next version of orifice assembly, It produces the most accurate & repeatable measurement when used in single phase flow or steam flow. The compact flow meter gives the advantage of most simple installation & direct mounting of DP transmitter thereby eliminating the need of tube, fittings & other accessories. This flow meter uses corner tap design of ISO-5167.

Compact orifice plates can be used without difficulty for the measurement of liquids, gases and vapours. Differential pressure flow meters are used in many technical applications. As primary flow elements, orifice plates represent the most common solution. Orifice plates are notable for their easy installation and management. The differential pressure generated by the primary flow element is normally transformed into an electrical signal proportional to the flow rate by a differential pressure transmitter.



Compact orifice plates enable the simple assembly of the measuring arrangement as a plug-and-play solution, through which significant cost savings can be achieved. Differential pressure transmitters and valve manifolds are attached via compact pressure tapings. These measuring arrangements have the advantage that differential pressure lines can be eliminated. The compact orifice plates are offered as standard in two beta ratios. In the case of customer-specific requirements for the beta ratio, our software simplifies the design and selection process.

2.2 Technical Specifications

Beta Ratio	Standard 0.40 or 0.65 Customer-specific values are							
	individually calculated, 0.4 / 0.65							
Line Sizes	½" to 16″							
Accuracy	0.5% to 1.50%							
Pipe size	2 16" per ANSI/ASME, DN 50 400 per EN Other sizes on request							
Pressure Ratings	Class 150, 300, 600 raised face (RF) per ANSI/ASME B16.5 Class 150 2500 with raised face (RF) and ring-type joint (RTJ) per ANSI/ASME B16.							
Pressure Limit	Maximum Pressure retention per ANSI B16.5 600# or DIN PN100							
Design	Square Edged Concentric							
Material	AISI 316/SST , Special alloys on request (Orifice plate body Welded or turned from one piece Main body thickness: 25 65 mm)							
Pressure Taps	Options • NPT thread • Weld stub • Nipple Same shape and dimensions for all sizes and connection options							
Service	Liquid / Gas / Vapor							

2.3 Customer Specification On Request

- Mounted differential pressure gauge or transmitter
- Mounted thermowell with thermometer
- Flat gaskets and valve manifold seal in Graphoil (standard: PTFE)
- Studs and nuts for pipelines in accordance with customer requirements



2.4 Dimensional Drawing

Differential pressure transmitters and valve manifolds are attached via compact



Arrangement for Direct Mounting Of DPT

2.5 Model Chart

Example	Tek-DP	S	05	1	W	1	S	40	1	D	Ν	1	MTR	Tek-DP 16111-S-05-1-
_	16111													W-1-S-40-1-D-N-1-
														MTR
Series	Tek-DP													
	16111													
Туре		S												Standard Compact
														Orifice
Pipe Size			05											¥2″
			10											1″
			15											1 1⁄2″
			20											2″
			30											3″
			40											4″
			60											6″
			80											8″
			100											10″
			120											12″
			140											14″
			160											16″
Pipe				1										STD (Factory Standard)
Schedule														
				XX										Special (Please
														Specify)
Counter					W									No Flanges
Flanges														
					F									With Counter Flanges
Pressure						1								150#
Rating						_								
						2								300#
						3								600#
						4								900#
						XX								Special

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Material of				S							316 SST
Construction											
				н							Alloy C-276
				x							Special
Deta				 ^	40						0.4
Bela					40						0.4
					69						0.65
					XX						Special
Standard						1					Standard Compact Option
Compact											only
Option											
Mounting							D				Direct Mount
							R				Remote Mount
							х				Special
Temperature								N			None
Connection											
								т			Remote Thermowell and
								-			RTD
								R			Integrated RTD
Flow									1		None (Customer Supplied)
Transmitters /									-		
Computers											
									2		Tek-Bar 3110 (Liquids) -
											Smart DP
									3		Tek-Bar 3800 (MVT Steam
											& Compressed Gases)
									4		Tek-FC 8000 (Natural Gas
											- Flow Computer)
									XX		Special
Options										MTR	Material Test Report EN3.1
										MC	Material Cert EN2.1
										PMI	Positive Material
											Identification (NDE)
										COC	Certificate of Conformity
										HYD	Hydro Test
										XRT	X-Rav
											Dve Penetrant
										MDT	Magnetic Particle Testing
										020	
										IAG	SS Tag Plate
										CDE	Certified Drawing
											Electronic (As Built)
										MRB	Manufacturing Record
										DET	BOOK
										DEL	
										000	Custom Paint Spec
										CPC	
										3WH	3 way manifolds (Type H)
	1	1		1						5WHP	5 Way Manifolds (Type H)



3 Installation

This section covers instructions on installation and commissioning of the instrument. Trained, and qualified specialists authorized to perform such work must carry out installation of the device.



CAUTION

- Ensure that the operating staff is competent and trained to operate this pressurized equipment.
- Ensure that the installation personnel confirm the maximum allowable operating pressure of each item in the system before pressurizing the system.

3.1 General Instructions

Straight Run Meter Requirements

	Beta	0.40	0.50	0.65
	Reducer	5	8	12
llet) ary	Single 90° bend or tee	16	22	44
ime i	Two or more 90° bends in the same	10	18	44
am f Pr	planes			
tre. le o	Two or more 90° bends in different	50	75	60
Sid	planes			
	Expander	12	20	28
	Ball/Gate valve fully open	12	12	18
Dowr	nstream (outlet) side of primary	6	6	7

3.1.1 Location and Installation

The primary element can be installed in any position around the circumference of the pipe, provided the vents are positioned properly for bleeding or venting. Optimal results for liquid in a vertical line or steam are obtained when flow is up.

The Tek DP 16111 Compact Orifice Flow Meter should not be used in vertical liquid or steam applications if the fluid is flowing down









The Tek DP 16111 Compact Orifice Flow Meter should not be used in vertical liquid or steam applications if the fluid is flowing down





4 Maintenance



WARNING

Severe personal injury or damage to property may result if:

- Do not remove the instrument cover in explosive environments when the circuit is live.
- When working with a hot medium, the individual steps described below must be performed in quick succession, otherwise the valves and transmitter may overheat and can be damaged.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.
- Before connecting a communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incentive field wiring practices.
- Avoid contact with the leads and the terminals.



Tek-Trol is a fully owned subsidiary of TEKMATION LLC. We offer our customers a comprehensive range of products and solutions for process, power and oil & gas industries. Tek-Trol provides process measurement and control products for Flow, Level, Temperature & Pressure Measurement, Control Valves & Analyzer systems. We are present in 15 locations globally and are known for our knowledge, innovative solutions, reliable products and global presence.