DANIEL®
SIMPLEX ORIFICE FITTINGS
USER MANUAL

SIZE 2” - 8” 150 - 2500

DANIEL®

Decades Proven. Field Chosen.™

SIGNAL WORDS AND SYMBOLS

Pay special attention to the following signal words, safety alert symbols and statements:

Safety alert symbol

This is a safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

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

CAUTION

Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Notice is used to address safety messages or practices not related to personal injury.

IMPORTANT

Important is a statement the user needs to know and consider.

TIP

Tip provides information or suggestions for improved efficiency or best results.

NOTE

Note is “general by-the-way” content not essential to the main flow of information.

IMPORTANT SAFETY INSTRUCTIONS

Daniel Measurement and Control, Inc. (Daniel) designs, manufactures and tests products to function within specific conditions. Because these products are sophisticated technical instruments, it is important that the owner and operation personnel must strictly adhere both to the information printed on the product and to all instructions provided in this manual prior to installation, operation, and maintenance.

Daniel also urges you to integrate this manual into your training and safety program.

BE SURE ALL PERSONNEL READ AND FOLLOW THE INSTRUCTIONS IN THIS MANUAL AND ALL NOTICES AND PRODUCT WARNINGS.

⚠ WARNING

Failure to follow the installation, operation or maintenance instructions for a Daniel product could lead to serious injury or death from explosion or exposure to dangerous substances.

To reduce the risk:

- Comply with all information on the product, in this manual, and in any local and national codes that apply to this product.
- Do not allow untrained personnel to work with this product.
- Use Daniel parts and work procedures specified in this manual.

PRODUCT OWNERS (PURCHASERS):

- Use the correct product for the environment and pressures present. See technical data or product specifications for limitations. If you are unsure, consult your Daniel representative.
- Inform and train all personnel in the proper installation, operation, and maintenance of this product.
- To ensure safe and proper performance, only informed and trained personnel should install, operate, repair and maintain this product.
- Verify that this is the correct instruction manual for your Daniel product. If this is not the correct documentation, contact Daniel at 1-713-827-6314. You may also download the correct manual from: https://www.Daniel.com/en-us/automation/daniel.
- Save this instruction manual for future reference.
- If you resell or transfer this product, it is your responsibility to forward this instruction manual along with the product to the new owner or transferee.
- ALWAYS READ AND FOLLOW THE INSTALLATION, OPERATIONS, MAINTENANCE AND TROUBLESHOOTING MANUAL(S) AND ALL PRODUCT WARNINGS AND INSTRUCTIONS.
- Do not use this equipment for any purpose other than its intended service. This may result in property damage and/or serious personal injury or death.

PRODUCT OPERATION (PERSONNEL):

- To prevent personal injury, personnel must follow all instructions of this manual prior to and during operation of the product.
- Follow all warnings, cautions, and notices marked on, and supplied with, this product.
- Verify that this is the correct instruction manual for your Daniel product. If this is not the correct documentation, contact Daniel at 1-713-827-6314. You may also download the correct manual from: https://www.Daniel.com/en-us/automation/daniel.
- Read and understand all instructions and operating procedures for this product.

- If you do not understand an instruction, or do not feel comfortable following the instructions, contact your Daniel representative for clarification or assistance.
- Install this product as specified in the INSTALLATION section of this manual per applicable local and national codes.
- Follow all instructions during the installation, operation, and maintenance of this product.
- Ensure that all connections to pressure and electrical sources are secure prior to and during equipment operation.
- Use only replacement parts specified by Daniel. Unauthorized parts and procedures can affect this product’s performance, safety, and invalidate the warranty. “Look-a-like” substitutions may result in deadly fire, explosion, release of toxic substances or improper operation.
- Save this instruction manual for future reference.

WARRANTY AND LIMITATIONS

1. LIMITED WARRANTY:

Subject to the limitations contained in Section 2 herein, Daniel Measurement & Control, Inc. (“Daniel”) warrants that the licensed firmware embodied in the Goods will execute the programming instructions provided by Daniel, and that the Goods manufactured by Daniel will be free from defects in materials or workmanship under normal use and care and Services will be performed by trained personnel using proper equipment and instrumentation for the particular Service provided. The foregoing warranties will apply until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Daniel, whichever period expires first. Consumables and Services are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Daniel from a third party for resale to Buyer (“Resale Products”) shall carry only the warranty extended by the original manufacturer. Buyer agrees that Daniel has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Daniel there of in writing during the applicable warranty period, Daniel shall, at its option, correct any errors that are found by Daniel in the firmware or Services or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Daniel to be defective, or refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources or environmental conditions, accident, misuse, improper installation, modification, repair, the use of unauthorized replacement parts, storage, handling, or any other cause not attributable to Daniel is not covered by this limited warranty and shall be at Buyer’s expense. Daniel shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by Daniel. All costs of dismantling, reinstallation and freight and the time and expenses of Daniel’s personnel and representatives for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Daniel. Goods repaired and parts replaced by Daniel during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Daniel and can be amended only in a writing signed by Daniel. THE WARRANTIES AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES. Buyer acknowledges and agrees that corrosion or erosion of materials is not covered by this warranty.

2. LIMITATION OF REMEDY AND LIABILITY:

Daniel shall not be liable for damages caused by delay in performance. The remedies of Buyer set forth in this agreement are exclusive. In no event, regardless of the form of the claim or cause of action (whether based in contract, infringement, negligence, strict liability, other tort or otherwise), shall Daniel’s liability to Buyer and/or its customers exceed the price to Buyer of the specific goods manufactured or services provided by Daniel giving rise to the claim or cause of action. Buyer agrees that in no event shall Daniel’s liability to Buyer and/or its customers extend to include incidental, consequential or punitive damages. The term “consequential damages” shall include, but not be limited to, loss of anticipated profits, revenue or use and costs incurred including without limitation for capital, fuel and power, and claims of Buyer’s customers.

CONTENTS

PART I PLAN

1 INTRODUCTION

1.1 DEFINITION OF ACRONYMS

TABLE 1-1: ACRONYMS AND THEIR DEFINITION

ACRONYM	DESCRIPTION
AGA	American Gas Association
AISI	American Iron and Steel Institute
API	American Petroleum Institute
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
GPA	Gas Processors Association
ISO	International Organization of Standardization
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc
NACE	NACE International (formerly National Association of Corrosion Engineers)
MPMS	API Manual of Petroleum Measurement Standards
API-14.3	API-AGA joint flow measurement code (API MPMS Chapter 14, Section 3, Part 2:2000 (R2011) - also AGA Report No. 3, Part 2 and GPA 8185-00, Part 2)
ISO 5167	ISO flow measurement code (ISO 5167-2:2003(E))
U/S	Upstream
D/S	Downstream
DP	Differential pressure (ΔP) - differences of static pressures fo und on the U/S and D/S faces of an orifice plate during the flow measurement process
CRS	Cold rolled steel
CS	Carbon steel
SS	Stainless steel
YP	Gold (yellow chromate) zinc plated
ZP	Silver (clear chromate) zinc plated
MAOP	Maximum allowable operating pressure
NPSM	National pipe straight mechanical thread
NPT	National pipe tapered thread
HBR	Butadiene rubber
HNBR	Hydrogenated nitrile-butadiene rubber
NBR	Nitrile-butadiene rubber
FFKM	Perfluoroelastomer rubber
FKM	Fluoroelastomer rubber
PTFE	Polytetrafluoroethylene
SBR	Styrene-butadiene rubber
TFE	Tetrafluoroethylene

1.2 PURPOSE OF THIS MANUAL

This manual provides guidance to owners and personnel in the installation, operation and maintenance of the *Daniel™ Simplex™ Orifice Fitting.*

To ensure safe and proper installation, operation and maintenance, it is imperative that product owners and operation personnel read and follow the information contained in this manual.

1.3 DESCRIPTION

The Daniel Simplex Orifice Fitting (Simplex) is an orifice plate holding device that houses, and accurately positions, an orifice plate within a pipe or tube to measure fluid flow. It is just one component in a flow measurement system. Daniel designed Simplex Orifice Fitting (Simplex) allowing users to:

- Position an orifice plate, concentric to flow moving through a line, within API-14.3, Part 2 or ISO 5167 installation requirements.
- Isolate the Simplex with upstream and downstream block valves, avoiding removal of the Simplex from the piping system for orifice plate changes or inspections. To prevent interrupting service during an orifice plate operation, measurement system designers may add bypass piping around the Simplex.

The orifice plate within a Simplex restricts the fluid moving through a pipe. This restriction creates a change in static pipe pressure of the fluid. Instrumentation measures the difference in change of the fluid entering orifice plate bore, and once again after it exits the plate bore. That instrumentation then combines that information, along with other data gathered from the flowing fluid, and calculates the amount of fluid that passes through the system.

The Simplex’s single-chamber design allows for the inspection and the replacement of orifice plates without removing the fitting from the flow line. Use of the Simplex eliminates the effort required to remove and inspect an orifice plate housed in conventional orifice flange installations.

Daniel manufactures all Simplex units to applicable API-14.3 recommendations and in accordance with selected ANSI, ASME and ASTM specifications. As an option, Daniel also designs and manufactures fittings in compliance with ISO 5167.

Simplex’s bearing the “CE” mark are designed and manufactured in compliance with the European Union Pressure Equipment Directive (PED) 2014/68/EU (available on the Internet).

1.3.1 TECHNICAL DATA

NOTICE
Follow all the safety and equipment limits recommended in Technical data of this manual. It is the owner’s and/or purchaser’s responsibility to comply with these parameters.

⚠ WARNING
PERSONAL PROTECTION HAZARD
Follow all parameters for the Simplex Orifice Fitting indicated below.
Failure to comply may result in injury or equipment damage.

TABLE 1-2: TECHNICAL DATA

PRODUCT PARAMETERS AND LIMITATIONS	
Fluid static pressures	Refer to ASME/ANSI B16 standards, and your fitting’s material of construction, to determine the maximum operating temperature and pressure of your Simplex. Both the fitting’s materials of construction and ASME/ANSI ratings information can be found on the product nameplate.
Fluid phases	Gas, liquid, vapor
Fluid measured	Most fluids
Fluid temperature parameters	-20° / +160° F (-29° C / +71° C) is the fluid temperature range for this product based upon the materials of construction (Refer to ASME codes (1)). Consult factory before operating this product outside of the specified temperature range.

TABLE 1-2: TECHNICAL DATA (CONTINUED)

Temperature and operating pressure limitations of Orifice Plate Seal materials	-20° / +160° F (-29° C / +71° C) is the fluid temperature range for this product based upon the materials of construction (Refer to ASME codes (1)) . The following list describes the most common Orifice Plate Seal material and their available forms offered for use in Daniel Senior fittings. Consult factory before operating this product outside of the specified temperature range.	
	HNBR:	-20° / +160° F (-29° C / +71° C) is the fluid temperature range for this product based upon the materials of construction (Refer to ASME codes (1)) . The following list describes the most common Orifice Plate Seal material and their available forms offered for use in Daniel Simplex fittings. Consult factory before operating this product outside of the specified temperature range.
	HBR	Loose or Bonded: Material available for "loose" seal rings (2"-10") or "bonded" seal to orifice plates (12" and larger). Operating pressure is limited to lesser of ANSI Class MAOP or 1500 psig.
	FKM:	Loose or Bonded: Material available for "loose" seal rings (2"-10") or "bonded" seal to orifice plates (12" and larger). Operating pressure is limited to lesser of ANSI Class MAOP or 1500 psig. "O"-ring: Used with Snap Seal Ring assemblies (2" and larger). Operating pressure is limited to ANSI Class MAOP.
	PTFE:	Loose: Material used for orifice plate seal rings (2" and above). Operating pressure is limited to ANSI Class MAOP.
	PTFE:	"O"-ring: Used with Snap Seal Ring assemblies (2" and larger). Operating pressure is limited to ANSI Class MAOP.
Diferential pressure	Refer to API -14.3 or ISO 5167, as appropriate to your system.	
Space Limits		
See Product Datasheet “Simplex Orifice Plate Holders: DAN-Simplex-DS”		
Time parameters		
See Plate change procedure instructions		
Components:		
Maintenance intervals	The owners and users of these products should perform regular scheduled intervals of maintenance activities. The recommended intervals are every month or as directed by the owner’s maintenance procedures. Examine components during each scheduled maintenance period, site visits and during each orifice plate change. Replace any component that shows signs of wear or when damaged with parts specified for Daniel products.	
Seal replacement	Examine seals during each scheduled maintenance period, site visits and during each orifice plate change. Replace any worn or damaged or non-functioning seals with parts specified for Daniel product.	
Fastener torque verification	Examine seals during each scheduled maintenance period, site visits and during each orifice plate change. Replace any worn or damaged or non-functioning seals with parts specified for Daniel products.	

TABLE 1-2: TECHNICAL DATA (CONTINUED)	
Fastener torque verification	Check all fasteners for tightness during each scheduled maintenance period, site visits and during each orifice plate change. Use information provided in Torque information as a starting point in establishing the proper fastener torque values for your particular service environment.
Corrosion allowance	The factory machines the meter bore of each fitting to close tolerances. This is to conform to industry measurement standards. The fitting’s meter bore dimensions DO NOT include an allowance for corrosion. It is the end user’s responsibility to specify a fitting’s material of construction based upon their knowledge of the process fluid and environmental conditions of an intended service. Therefore, it is important that the end user to monitor any change in the gas or liquid composition during monthly exercises, site visits and plate changes that may create a corrosion concern (Reference: U.S. DOT, CFR Title 49: Part 192.477).
Space Limits	
Application	Surface and Off-shore (not for use in subsea applications)
Confined/open	Designed for outdoor use. May be used in well ventilated spaces (buildings / enclosed meter houses). Installation at product owner’s discretion.
Site temperature	Recommended atmospheric temperature ranges Maximum: +120° F (+49° C), Minimum: -20° F (-29° C).
Site humidity	No limit
Site elevation	No limit
Proximity to population	Reference: Class 1 location: U.S. DOT, CFR Title 49: Part 192.5
Proximity to traffic	The owner must protect the fitting from accidental damage by vehicular traffic or other causes, by either placing the unit at a safe distance from the traffic, or installing barricades around the unit.
Proximity to equipment	Install the Simplex in a well ventilated place, not less than 3 feet (914 millimeters) from any source of ignition or any source of heat which might damage the unit.
Interface parameters	
Replacement parts	Use only replacement parts specified for Daniel products. Unauthorize parts and procedures can affect this product’s performance and place the safe operation of your process at risk.
Aftermarket attachments	Use of pressure sensing equipment, drain valves, and other accessories (e.g., needle valves, multi-port valves, transmitters, 3-pin recorders, etc.) are permissible. The use of aftermarket equipment must be installed and operated as directed by the aftermarket equipment manufacturer, and their warranties and replacements are not contained within the scope of this document.
Pipe supports	The owner must employ sound engineering principles to design the support systems for the flow measurement system (or meter tube). It is important that the design engineer develop a method to support the entire weight (equipment, piping and fluid) of the system. The method developed must prevent bending to reduce the potential of creating unwanted stress at welded joints and flanges. Unwanted stresses may lead to leaks and may ultimately lead to failure or rupture of the flow measurement system.
Vandalism / Tampering	It is the responsibility of each product owner to protect the Junior from vandalism, tampering or other unauthorized activity.

1.4 PARTS AND MATERIALS LISTS

1.4.1 DANIEL SIMPLEX ORIFICE FITTING SIZES 2”-8” 150-2500

FIGURE 1-1: DANIEL SIMPLEX ORIFICE FITTING SIZES 2”-8” 150-2500

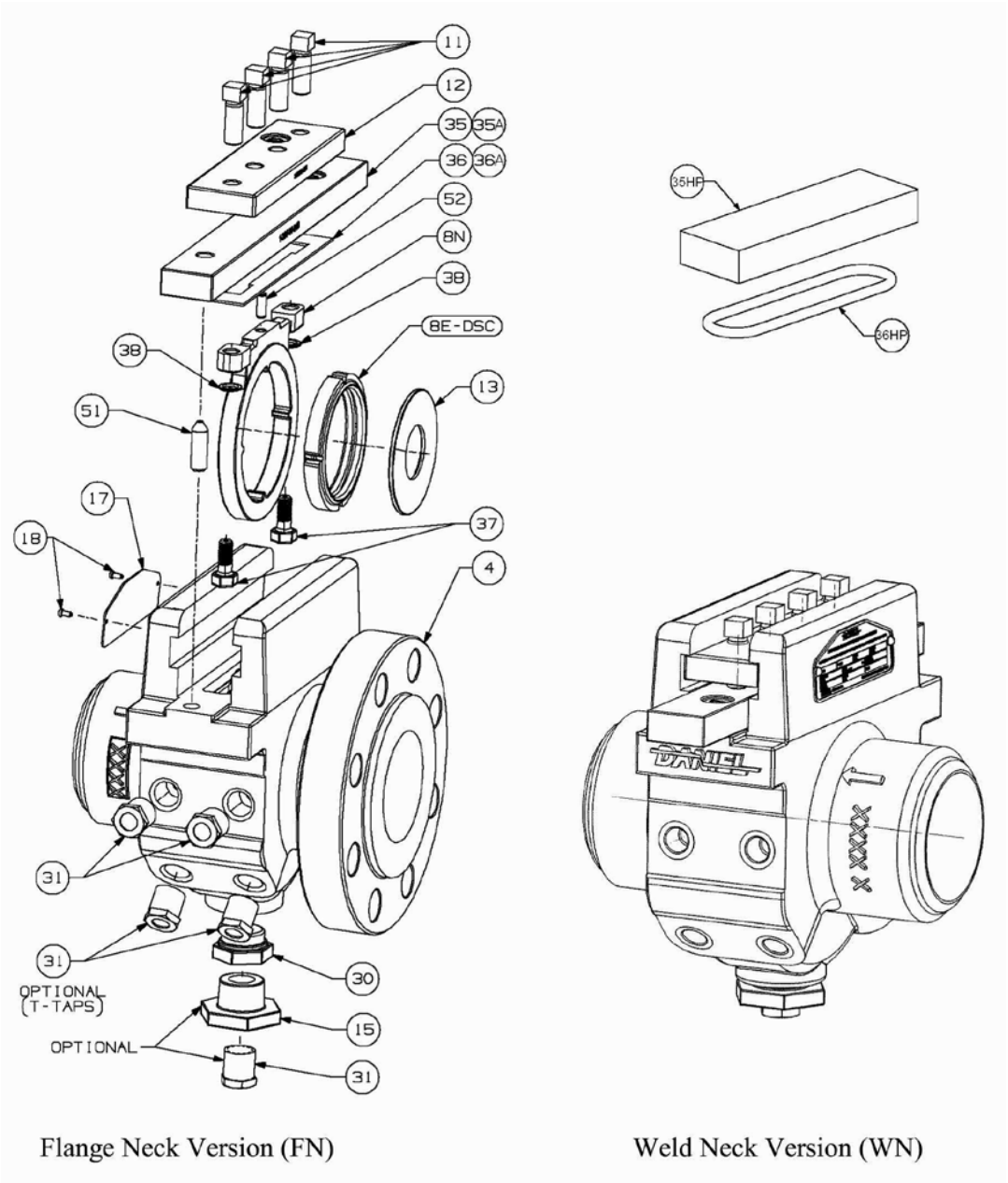


TABLE 1-3: PART AND MATERIAL LISTS

Parts and materials			Number required				
			Size				
Item no.	Description	Material	2"	3"	4"	6"	8"
4	Body	C a s t C S A216WCB(Class150-2500)	1	1	1	1	1
8N	Plate carrier	Type 316 Stainless Steel	1	1	1	1	1
8 E- DSC	Orifice plate sealing unit	DSC - Elastomer (STDf/ Class150-600)	1	1	1	1	1
8TSC	(8TSC, 8SNC and 8MSC are optional seals for all ANSI classes)	T SC - PT FE (STDf/Class900-2500)	1	1	1	1	1
8SNC		SNC - CS or SS w/O-ring seals (HNBR, FMK or FFKM options)	1	1	1	1	1
8MSC		MSC - Type 316 Stainless Steel	1	1	1	1	1
8NSC -14. 3	Sealing bar/orifice plate carrier assembly	(See Table 4-1 for assembly parts list)					
11	Clamping bar screw	Alloy steel (ZP)	4(1)	4(1)	5(1)	6(1)	7(1)
12	Clamping bar	12 - CRS (Chemically treated) (Class150-900)	1	1	1	1	1
12HP		12HP - CRS (Chemically treated) (Class1500-2500)	1	1	1	1	1
13	Orifice plate	Type 304 or 316 Stainless Steel	1	1	1	1	1
17	Nameplate		1	1	1	1	1
18	Nameplate fastener		2	2	2	2	2
30	Drain plug	1” NP T - CRS	1	1	1		
		1 /2” NP T - CRS				1	1
15	(Drain plug option - reducer w/ NPT plug)	1” x 1/2” NPT - CRS	1	1	1		
30 R		1 / 2 “ N PT - CRS	1	1	1		
31*	Meter tap plug	1 / 2 “ N PT - CRS (Body w/T-Taps)	2 (4)2	2 (4)2	2 (4)2	2	2
31P*	Thread protectors	1/2” polymer plugs (Body w/T-Taps)	2 (4)2	2	(4)2	2	2
35	Sealing bar	35 - CRS (Chemically treated) (Class150-600)	1	1	1	1	1
35A		35A CRS (Chemically treated) (Class900)	1	1	1	1	1
35 HP		CRS(Chemically treated) (Class1500-2500)	1	1	1	1	1
52*	Sealing bar/plate carrier dowel pin	CRS	1	1	1	1	1
36	Sealing bar gasket	Composite (Class 150-600)	1	1	1	1	1
36A		Composite (Class 900)	1	1	1	1	1
36HP		Synthetic composition (Class 1500-2500)	1	1	1	1	1
37*	Plate carrier screw	Stainless Steel	2	2	2	2	2
38 *	Plate carrier washer	Stainless Steel	2	2	2	2	2
51*	Sealing bar/Body dowel pin	Type 316 Stainless Steel	1	1	1	1	1

NOTICE

- All Daniel Simplex Orifice Fittings are supplied with pipe plugs on one side only. If additional quantities are required, please contact the factory directly.
- (*) Indicates interchangeable parts for all line sizes of specified pressure rating(s).
- (1) Indicates 1/2” - 13. See Table 5-2 for clamping bar screw recommended torque values.
- (2) Quantity is four for telemetering tap option.

GENERAL NOTES

- The materials listed above indicate standard”A” trim.
- Most parts available in other materials upon customer request.
- Telemetering taps are standard on 2” through 4” ANSI 150 -600 and optional on other sizes.
- CS (Carbon Steel), CRS (Cold Rolled Steel), NPT (Nation al Pipe Thread), DSC (Dual Seal - API-14.3 design), TSC (PTFE Seal - API-14.3 design), MSC (Metal Seal - API-14.3 design), SNC (Metal w/O-ring Seal - API-14.3 design)
- NACE trim in compliance with MR0175-2002 is standard “A /A AS G” trim, except ANSI Class 1500-2500, which is “A” trim .
- Materials are available for applications handling sour process fluids outside of the NACE MR0175-2002 specification upon request.

WHEN ORDERING PARTS, PLEASE SPECIFY:(1)

- Catalog number
- Size
- Serial number
- Part item number
- Material
- Quantity of each part required

(1) Catalog number, size and serial number can be found on the fitting nameplate. Part item numbers and part materials are found in Parts and materials lists

PART II INSTALL

2 INSTALLATION AND COMMISSION

2.1 GENERAL INFORMATION

⚠ WARNING
HIGH PRESSURE HAZARD
Follow all instructions provided in the General Information section when installing the Sealing Bar Gasket (36, 36A, 36HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3), and Clamping Bar (12, 12HP).

Failure to comply may cause pressurized fluids to escape, resulting in death or serious injury.

The Daniel Simplex Fitting is an essential element in any orifice measurement system. Other elements in an orifice measurement system may include a meter tube, a flow conditioner, and various data recording devices.

Here are some options available to purchasers of a Simplex fitting from Daniel:

- Purchase the fitting alone
- Purchase the fitting with a meter tube
- Purchase a complete flow measurement system that contains a Junior Orifice fitting

Regardless of purchase option, Daniel personnel perform a unique test on each Simplex fitting for fluid retention. This test is an internal hydrostatic SHELL test on BODY (4) to a minimum pressure of 1.5 times its rated maximum allowable operating pressure.

IMPORTANT
When purchasing only a Daniel Simplex fitting, it is the responsibility of the both the product owners and product operating personnel to perform an internal hydrostatic shell test of the final meter tube assembly prior to service.

IMPORTANT
The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex, prior to performing any leak test.

⚠ WARNING
EXPLOSION HAZARD
Never exceed the maximum allow able operating pressure of the lowest rated item in the system. Failure to comply may result in death or serious injury.

When assembling a flow measurement system that will contain a Simplex, end users must pay particular attention to the requirements for permanent joining of components and the non-destructive testing of the completed assembly. See the appropriate code (API-14.3, ISO 5167,etc.) for meter tube requirements.

NOTICE
On installations built to comply with the European Union Pressure Equipment Directive (PED) 2014/68/EU, it is the responsibility of the end user to meet all essential safety requirements of the directive (available on the internet).

End users must pay particular attention to the requirements for permanent joining and non- destructive testing.

2.2 STORAGE

Follow your company’s storage procedures when placing any measurement equipment into inventory. Spraying a light coat of rust inhibitor onto the inside bore of a Daniel Simplex, and to the bore of the meter tube, may protect its surface finish during storage.

2.3 PRELIMINARY INFORMATION

NOTICE
Follow all the safety and equipment limits recommended in Technical data of this manual. It is the owner’s and/or purchaser’s responsibility to comply with these parameters.

The Simplex may arrive at your site in one of two ways, as a component in a meter tube assembly or as a loose fitting. If received as a loose fitting, then see the appropriate code (AGA-3, etc.) for assembly requirements.

It is the responsibility of the product operators to clean the Simplex and all piping components of foreign matter such as welding debris , scale, oil, grease, and dirt before commissioning.

Record the serial plate data on the Simplex for future reference. Always provide the serial number and model number when ordering spare parts.

The factory packages the Orifice Plates (13) and Seal Ring units (8E-DSC or 8E-DS; 8TSC or 8TS; 8MSC or 8MS; 8SNC or 8SN) separately from the fitting.

2.4 SEVERE SERVICE CONDITIONS

If product owner expects to encounter gas or liquid composition where there is a likelihood of sediment accumulation within the fitting, then it is recommended that the owner instruct their operators to remove Drain Valve Plug (30) and install a blow-down valve in its place.

2.5 CORROSIVE SERVICE

Corrosive environments may affect both the external and internal surfaces of the Simplex. External corrosive environments are defined as those conditions that affect the outer surfaces of the Simplex, while an internal corrosive environment is a condition that affects the surface inside the Simplex. Read, understand, and follow instructions in the sections below if an internal or external corrosive environment exists.

2.5.1 EXTERNAL CORROSIVE ENVIRONMENTS

For Simplex fittings located in external corrosive environments (offshore platforms, marine terminals, etc), Daniel recommends replacing the standard carbon steel Drain Valve Plug (30) with the stainless steel versions listed in the “Corrosive service” column (refer to Low temperature service).

2.5.2 INTERNAL CORROSIVE ENVIRONMENTS

For Daniel Simplex Orifice Fittings put into service in internal corrosive environments, Daniel recommends that product owners purchase a Simplex fitting appropriate for the intended application. A number of trim packages are available for severe service to improve durability of the Simplex fitting (refer to Parts and materials lists).

The inside diameter specifications of a Simplex fitting are exact. No allowance is provided for corrosion of the inside diameter.

2.6 LOW TEMPERATURE SERVICE

The fitting’s material of construction is just one factor to consider when placing an orifice fitting into a low temperature service. The Simplex fitting was designed to function within the temperature/pressure ranges, per material, designated in ASME/ANSI B16 standards.

Orifice plate seal material is another factor to consider when selecting components for low temperature services. Refer to Technical data “Orifice plate seal material temperature limitations” to help you to select an orifice plate seal for your application.

For Simplex fittings located in low temperature environments (atmospheric temperature ranges of +32 °F [0 °C] to -20 °F [-29 °C]), Daniel recommends replacing the standard carbon steel Drain Valve Plug (30) with the low temperature version listed in the “Low Temp Service” column (refer to Table 2-1).

TABLE 2-1: ALTERNATE COMPONENTS

Part No.	Description	Plug size	Standard service	Stainless steel corrosive service	Low temperature service
30	Drain Plug	1/2” - 14 NPT	1-507-01-103	1-507-01-143	1-507-01-170
30	Drain Plug	1” - 11.5 NPT	1-501-01-155	1-507-01-145	1-507-01-172

2.7 DESIGN CONSIDERATION

Measurement personnel can select a Simplex for use in a variety of flow measurement systems around the world. Each application has its own unique set of service and environmental condition limitations (refer to Technical data).

IMPORTANT
Product owners and operating personnel must evaluate both process fluid and environmental conditions of an intended service and select the appropriate fitting to match those service requirements. Once selected, the product owners and operating personnel must place the Daniel fitting in a well-designed piping system.

Below is a list of some, but not all, pipe design conditions to consider:

- Service operating pressure
- Service testing pressures
- Service process fluid temperature and ambient site temperatures
- Mass of fluid in process and test conditions
- Chemical composition and toxicity of fluid in operating conditions
- Traffic, wind and earthquake at loading site
- Reaction forces and reaction moments (meter position, supports, attachments, piping, etc.)
- Corrosion, erosion, fatigue, etc.
- Decomposition of unstable fluids in operating and test conditions
- Possible damage from external fire

2.7.1 INSTALLATION CONFIGURATIONS

All ANSI Classes

Product owners and operating personnel may design and install any Daniel Simplex fitting in one of two configurations. One configuration is to install the fitting in piping system with product flowing in a horizontal direction (Figure 2-1: flow running parallel to the ground). The other is to install the fitting in piping system with product flowing in a vertical direction (Figure 2-2: flow running perpendicular to the ground).

FIGURE 2-1: HORIZONTAL FLOW DIRECTION

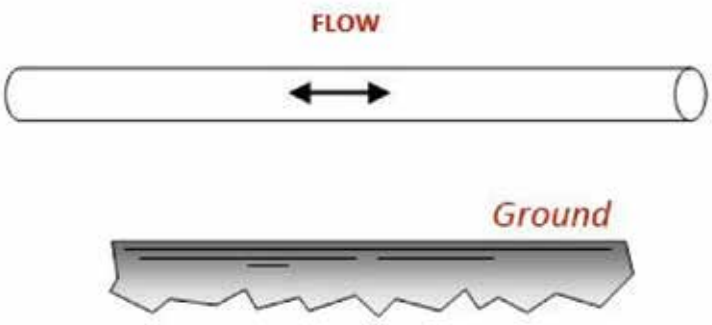
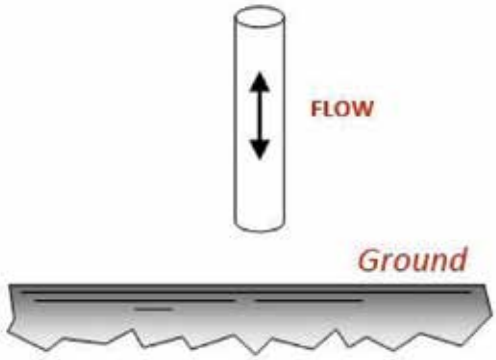


FIGURE 2-2: VERTICAL FLOW DIRECTION



Installing the fitting in a horizontal flow direction gives a product owner and operating personnel the option to fix the final position of the fitting parallel (Figure 2-3 or Figure 2-5), or perpendicular (Figure 2-4), to the ground as shown.

FIGURE 2-3: HORIZONTAL FLOW - “RIGHT SIDE” POSITION (PARALLEL TO THE GROUND)

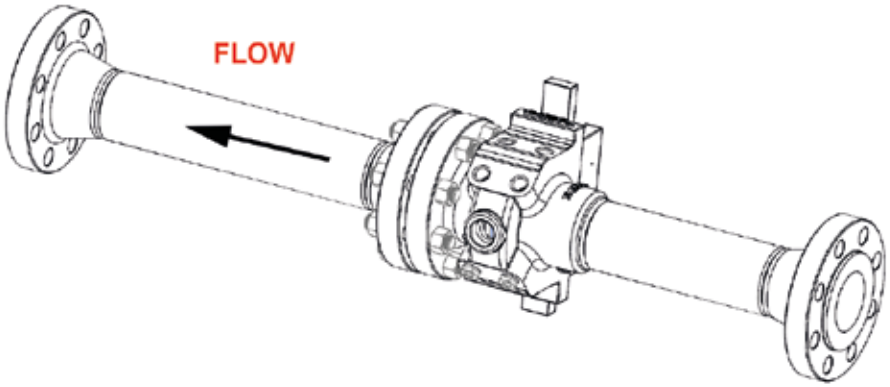


FIGURE 2-4: HORIZONTAL FLOW - “NORMAL” POSITION (PERPENDICULAR TO THE GROUND)

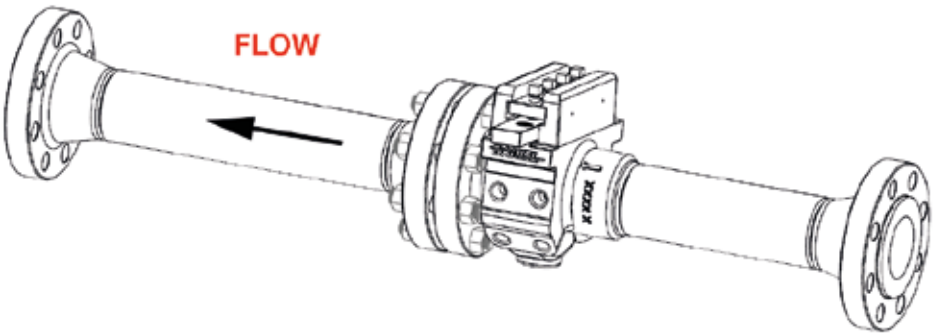
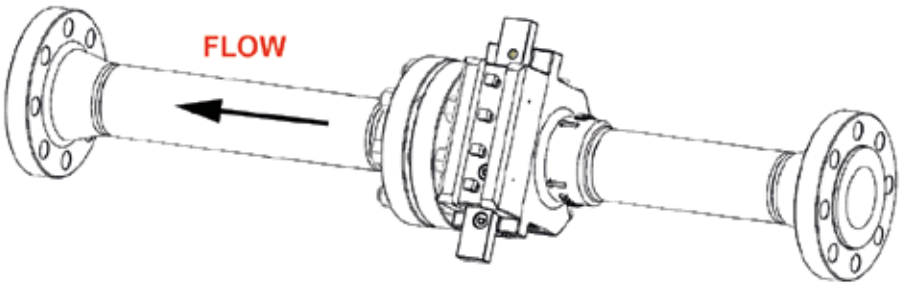


FIGURE 2-5: HORIZONTAL FLOW - “LEFT SIDE” POSITION (PARALLEL TO THE GROUND)



Installing the fitting in a vertical flow direction gives a product owner and operating personnel the option to fix the fitting in any position parallel to the ground. Although the insertion of the fitting in the vertical flow direction can be vertical UP or vertical DOWN, it is recommended the fitting be in the vertical down flow direction to reduce the potential of debris collecting on the orifice plate.

2.8 COMMISSION THE DANIEL SIMPLEX ORIFICE FITTING INSTALLATION

⚠ DANGER
FLUID EXPLOSION HAZARD
The Simplex is a device that contains fluid at elevated pressure.
Failure to follow the instructions in this manual will result in death or serious injury.

Commissioning is the process of verifying that a Simplex fitting performs in accordance with the user’s intended operational, maintenance, and measurement requirements.

The information contained in this section addresses commissioning topics for a Simplex fully, or partially, assembled within an orifice plate flow measurement system.

Purchasers have the option of acquiring a Daniel Simplex fitting for later installation in a flow measurement system, or purchasing a complete orifice plate flow measurement system containing a Simplex.

Daniel Simplex fitting packages have orifice plates and seal rings separately.

Product owners and product operators choosing to install a Simplex fitting into a flow measurement system NOT designed by Daniel must insure that the fabrication techniques and subsequent testing meet recognized industry standards.

Fitting installation personnel must confirm that the line flow direction corresponds to the flow directional indicator (an arrow or **INLET / OUTLET** tags) positioned on the Simplex Body (4).

The Simplex may be installed in any horizontal line with the plate access opening in a vertical (up) position or with the fitting rotated left or right to obtain a horizontal (side) opening position.

PROCEDURE

1. Remove all foreign matter from the meter tube interior and the bore piping section of the Simplex prior to installation.
2. Install the proper end flange gaskets, if required, and tighten all bolting to the appropriate torque, per product operator specifications.
3. Install the Sealing Bar Gasket (36, 36A, 36HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3), and Clamping Bar (12,12HP) on to the Body(4).
4. Tighten and secure all Clamping Bar Screws (11 or 11XP) per the information and procedures contained in Torque information.

IMPORTANT
The correct positioning and installation of the Sealing Bar Gasket (35, 35A, 35HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3), and Clamping Bar (12, 12HP) are essential to providing a pressure barrier between the line pressure and atmospheric pressure.

2.9 COMMISSION - LINE PRESSURE TEST

CONDITIONS:

- The pressure within the Simplex Body (4) and the adjacent metering system is equivalent to atmospheric pressure (0 psig/0 barg).
- The Orifice Plate(13) and Orifice Plate Sealing Unit (8E- DSC or 8TSC or 8MSC or 8SNC) is not installed on the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3)
- The Sealing Bar Gasket (36, 36A, 36HP) is installed on the Sealing Bar/Orifice Plate Carrier Assembly (8NSC - 14.3)
- The Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3) is installed.
- The Clamping Bar (12, 12HP) is installed.
- Tighten each Clamping Bar Screw (11 or 11HP), located on the Clamping Bar (12 or 12HP) (Reference: Torque information).

⚠ CAUTION
LOOSE CLAMPING BAR SCREW HAZARD
The factory assembled and shipped this product with loose clamping bar screws.
Tighten all clamping bar screws before applying pressure to this product. Refer to Torque information for torque values.

Failure to comply may result in injury or equipment damage.

PROCEDURE

1. Clean all fastening and sealing surfaces of all debris.
2. Chase threads by running screw through clamping bar by hand.
3. Assemble unit and apply torque to screws per pattern provided.

   ⚠ DANGER
   FLUID EXPLOSION HAZARD
   The Simplex is a device that contains fluid at elevated pressure.

   Failure to follow the instructions in this manual will result in death or serious injury.

   After installing the Simplex into the service line, personnel may perform a line pressure test of the service line.

2.9.1 LEAK TEST

Perform a leak test after installing the Simplex and securing the Clamping Bar (12, 12HP).

PROCEDURE

1. Install a pressure gauge (calibrated to a recognized standard) on the orifice metering system in a location where the gauge will detect the pressure inside the Simplex. Test personnel must choose a pressure gauge rated for the maximum operating pressure of the system (the Simplex, service line seals (flange gaskets) and the adjacent piping) determined by the product owner and product operator.

   IMPORTANT
   The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex, prior to performing any leak test.

DANGER
FLUID EXPLOSION HAZARD
Never exceed the maximum allow able operating pressure of the lowest rated item in the system.

Failure to comply may result in death or serious injury.

2. Slowly pressurize the orifice metering system at a rate of 1 psig per second (0.07 bars per second) and then stop the pressurization when the pressure inside the plate holder reaches 20 psig (1.4 bar). Hold the system at this pressure for five minutes.

IMPORTANT
The correct positioning and installation of the Sealing Bar Gasket (35, 35A, 35HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3), and Clamping Bar (12, 12HP) are essential to providing a pressure barrier between the line pressure and atmospheric pressure.

3. During this five-minute hold, test personnel should apply a leak detection solution over all connections and joint areas throughout the entire orifice metering system (including the Sealing Bar Gasket (36, 36A, 36HP) and all threaded connections on the Simplex). No leakage should be visibly, or audibly, detected during this fiveminute hold period.

4. If a leak is detected, mark the leak area with a marker and reduce the pressure inside the Daniel Simplex Orifice Fitting to 0 psig (0 bar). Tighten any fastener or connector adjacent to the leak area and repeat the leak test again.

5. If after several attempts to contain the leakage it persists, call your Flow Lifecycle Services for Daniel products for assistance. Contact information is found in the preface of this manual.

WARNING
LEAKAGE HAZARD
Correct all leaks of any size prior to operating the system.

Failure to comply may lead to death or serious injury.

6. Once the 20 psig (1.4 bar) leak test is complete, and no leaks are detected, then slowly raise the pressure inside the orifice metering system at a rate of 10 psig per second (0.70 bars per second) and then stop the pressurization when the pressure inside the Simplex fitting reaches the maximum operating pressure of the system (the Simplex and the adjacent piping) determined by the product operator. Hold the system at that pressure for ten minutes.

IMPORTANT
The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex, prior to performing any leak test.

WARNING
EXPLOSION HAZARD
Never exceed the maximum allow able operating pressure of the lowest rated item in the system.

Failure to comply may result in death or serious injury.

During this ten-minute hold, test personnel shall apply a leak detection solution over all connections and joint areas throughout the entire orifice metering system (including the Sealing Bar Gasket (36, 36A, 36HP) and all threaded connections on the Simplex). No leakage should be visibly, or audibly, detected during this tenminute hold period.

NOTICE
On installations which are required to comply with the European Union Pressure Equipment Directive (PED) 2014/68/EU, the installation must be tested to at least 1.43 times the maximum allowable operating pressure (MAOP) of the lowest rated component in the system as determined by the product operator.

WARNING
EXPLOSION HAZARD
Never exceed the maximum allow able operating pressure of the lowest rated item in the system.

Failure to comply may result in death or serious injury.

7. If a leak is detected, mark the leak area and reduce the pressure inside the orifice metering system to 0 psig (0 bar). If a leak is detected at a fastener or connector, then tighten that fastener or connect or and repeat the entire leak test again.
8. If several attempts to stop a leak fail, call Flow Lifecycle Services for Daniel products for assistance.
9. Slowly release the pressure from the orifice metering system until the pressure gauge reads zero (0) psig.
10. The Simplex fitting, with the orifice metering system, is now ready for orifice plate installation, final pressurization, and operation.

2.10 COMMISSION - ORIFICE PLATE INSTALLATION

CONDITIONS

- The pressure within the Simplex Body (4) and the adjacent metering system is equivalent to atmospheric pressure.
- The Orifice Plate (13) and the Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) is installed into the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3)
- The Sealing Bar Gasket (36, 36A, 36HP) is installed on Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3). The Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) is installed.
- The Clamping Bar (12 or 12HP) is installed.
- Tighten and secure all Clamping Bar Screws (11 or 11HP) per the information and procedures contained in Torque information.

DANGER
FLUID EXPLOSION HAZARD
The Simplex is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual will result in death or serious injury.

PROCEDURE

1. Ensure the pressure inside the Simplex Body (4) and adjacent metering system components is at atmospheric pressure (0 psia) to begin orifice plate installation. When evacuating the metering system, direct fluid and/or gas to a safe area away from the operator and in accordance with local environmental regulations.
2. CONFIRM that the pressure inside the Daniel Simplex Orifice Fitting Body (4) and adjacent metering system components is equivalent to atmospheric pressure.
3. Loosen each Clamping Bar Screw (11 or 11HP) two turns. Do not remove the Clamping Bar (12, 12HP).
4. Lightly tap the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) to break the seal generated between the Sealing Bar Gasket (36, 36A, 36HP) and the Body (4).
5. Once the seal is broken, slide the Clamping Bar (12,12HP) out from the Body (4).
6. Lift the entire Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) out from the Body (4).

NOTE
Tapping the Sealing Bar (35, 35A , 35HP) will loosen the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) from the Body (4).

7. Remove the Sealing Bar Gasket (36, 36A, 36HP) from the Simplex.
8. Install a new Sealing Bar Gasket (36, 36A, 36HP) on to the PC Sub-Assembly. Do not reinstall any gasket once it has been compressed.
9. Install a new Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) on to the Orifice Plate (13).
10. Install the Orifice Plate (13) and new Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) into the PC Sub-Assembly taking into account the flow direction of the metering system. This can be done using the Sealing Bar/Body Dowel Pin (51) located in the Body (4) as a reference.

IMPORTANT
Failure to install the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) in a position properly oriented with the direction of flow will result in measurement error and a possible loss of revenue.

11. Lower the PC Sub-Assembly into the Body (4) aligning the Sealing Bar (35, 35A, 35HP) with the Sealing Bar/Body Dowel Pin (51) located in the Body (4).
12. Continue to lower the PC Sub-Assembly using the Sealing Bar/Body Dowel Pin (51) as a guide until it contacts the Body (4).
13. Install the Clamping Bar (12, 12HP).

IMPORTANT
The correct positioning and installation of the Sealing Bar Gasket (35, 35A, 35HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3), and Clamping Bar (12, 12HP) are essential to providing a pressure barrier between the line pressure and atmospheric pressure.

14. Tighten each Clamping Bar Screw (11HP), located on the Clamping Bar (12 or 12HP) (Reference: Torque information).
15. Remove any commissioning equipment (test instruments, tubing, etc.,) from system.
16. The Daniel Simplex Orifice Fitting is now ready for final pressurization and operation.

PART III MAINTAIN

3 MAINTENANCE RECOMMENDATIONS

3.1 NORMAL OPERATING CONDITIONS

Under normal measurement conditions, a product operator should inspect the Simplex, as well as the meter tube, at intervals established by the product operator.

It is the responsibility of the product owner and product operator to perform inspections at appropriate intervals during the life of their system.

1. An external inspection of the Simplex and metering system shall include a visual assessment o f the entire system for vandalism, or other in advertent damage.
2. Tighten fastener and connector components, if necessary.
3. Natural corrosion and erosion of the orifice metering system internal features require that maintenance personnel perform an inspection of the orifice system’s bore diameter to ensure compliance with a metering code (for example, API-14.3/ AGA-3).

3.1.1 LUBRICATION

Apply a light coat of lubricant on the orifice seal ring to assist in installation and extraction of the plate carrier assembly.

PART IV OPERATE

4 ORIFICE PLATE REMOVAL AND INSTALLATION

4.1 PLATE CHANGE PROCEDURE

Follow these instructions during every plate change.

DANGER

FLUID EXPLOSION HAZARD

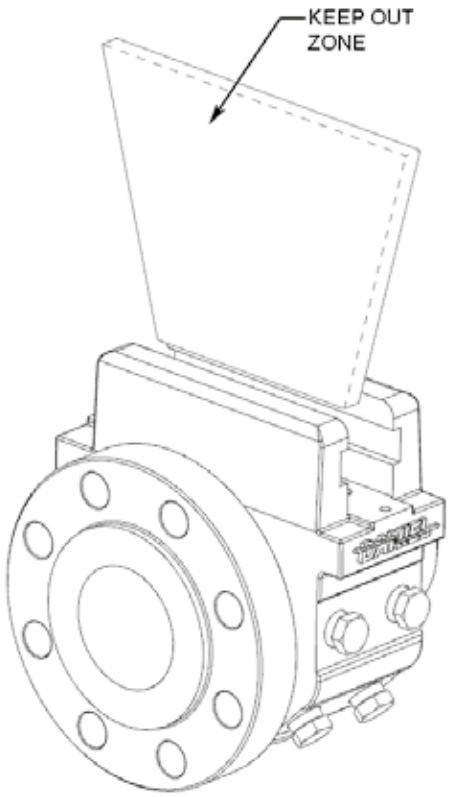
Follow the instructions below to avoid inadvertent or accidental propulsion of fluid or internal components from the Body (4).

Failure to comply will result in death or serious injury.

Never place any part of your body over the slot opening of the Body when the Sealing Bar Gasket (36, 36A or 36 HP), the Sealing Bar (35, 35A or 35HP) and the Clamping Bar (12 or 12HP) are removed from the Daniel Simplex Orifice Fitting and the line is under pressure.

* Daniel Simplex Orifice Fitting is shown in vertical position. The KEEP OUT ZONE includes the plate carrier slot opening o f the Body (4) even when the Simplex is positioned horizontally (laying on its side).

FIGURE 4-1: SIMPLEX KEEP-OUT-ZONE



WARNING

EXPLOSION HAZARD

The Daniel Simplex Orifice Fitting contains fluid at elevated pressure. Ensure to follow the instructions below for proper installation and removal of the plate.

Failure to comply can cause an explosive release and may result in death or serious injury.

IMPORTANT
In order to perform a safe and efficient plate change operation with a Simplex, the on-site personnel must evaluate both the service and environmental conditions prior to beginning this operation.

As stated in the product description section of this manual, the Simplex utilizes a “single chamber” design.

The following are the conditions required to start the removal procedure of the orifice plate:

- The Simplex is at atmospheric pressure
- The Sealing Bar Gasket (36, 36A or 36HP), the Sealing Bar (35, 35A or 35 HP), and the Clamping Bar (12 or 12HP) are fastened to the Simplex.

PREREQUISITES

To remove the Orifice Plate (13) from the Simplex, the operator must first release pressure from the Body (4).

PROCEDURE

1. Wait several seconds while the pressure leaves the Simplex Body (4).

   IMPORTANT
   Although the fluid pressure contained in the Body (4) is reduced to ambient conditions in the following operations, there still remain remnants of the fluid in that chamber. The operator must employ a system to address the remaining fluid based upon the fluids’ chemical composition and toxicity.

2. Loosen each Clamping Bar Screw (11 or 11HP) located on the Clamping Bar (12 or 12HP) approximately two turns with the Operating Wrench (2).
3. Once the Clamping Bar Screws (11 or 11HP) are loose, Slide the Clamping Bar (12 or 12HP) containing the Clamping Bar Screws (11 or 11 HP) from the Body (4).
4. Lift the entire Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3) out from the Body (4).

   NOTE
   Tapping the Sealing Bar (35, 35A, 35HP) will loosen the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3) from the Body (4).

5. Remove the Sealing Bar Gasket (36, 36A, or 36HP) from the Body (4).
6. Remove the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) from the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3).
7. Remove the Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) from the Orifice Plate (13) and perform the scheduled work on the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC).

4.2 OPERATING INSTRUCTIONS

⚠ WARNING
HIGH PRESSURE HAZARD
Follow all instructions provided in General information when installing the Sealing Bar Gasket (36, 36A, 36HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3), and Clamping Bar (12, 12HP).

Failure to comply may cause pressurized fluids to escape, resulting in death or serious injury.

The Simplex design allows an operator to install or remove the Orifice Plate (13) with a minimum amount of metering system shut-down time.

The Simplex Plate Carrier (8N) is just one piece in a larger assembly. That assembly, referred to as the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) contains the following parts:

TABLE 4-1: SEALING BAR/ORIFICE PLATE CARRIER ASSEMBLY (8NSC-14.3)	
Quantity	**Standard service**
1	Plate carrier (8N)
1	Sealing bar (35, 35A, 35HP)
2	Plate carrier screws (37)
2	Plate carrier washers (38)
1	Sealing bar plate carrier dowel pin (52)
1	Orifice plate sealing unit (8E-DSC or 8TSC or 8MSC or 8-SNC)
1	Orifice plate (13)

A product operator can remove the entire Sealing Bar/Orifice Plate Carrier Assembly (8NSC14 .3) from the Body (4).

To change or inspect, an orifice plate or orifice plate seal, simply push on the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) until it pops out of the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14. 3).

By removing the Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) from the Orifice Plate (13), a product operator may then closely inspect both parts for signs of damage or wear.

4.3 PLATE REMOVAL

CONDITIONS:

- The Simplex is operating at working pressure.
- The Orifice Plate (13) is located in flow stream.

PREREQUISITES

Isolate the orifice metering system supporting the Simplex and release the working pressure until the entire system reaches atmospheric (ambient) pressure.

⚠ WARNING
FLUID EXPLOSION HAZARD
Release pressurized fluid into a safe area. The discharge may cause contamination and/or the accumulation of volatile gas mixtures.

Volatile gas mixtures are explosive and/or toxic and may lead to death or serious injury.

⚠ DANGER
FLUID EXPLOSION HAZARD
The Simplex is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual will result in death or serious injury.

PROCEDURE

1. Loosen each Clamping Bar Screw (11) two turns when the system reaches atmospheric (ambient) pressure. Do not remove the Clamping Bar (12, 12HP).
2. Lightly tap the Sealing Bar (35, 35A , 35HP) to break the seal generated between the Sealing Bar Gasket (36, 36A, 36HP) and the Body (4).
3. Once the seal is broken, slide the Clamping Bar (12, 12HP) out from the Body (4).
4. Lift the entire Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) out from the Body (4).

NOTE
Tapping the Sealing Bar (35, 35A , 35HP) will loosen the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3) from the Body (4).

5. Remove the Sealing Bar Gasket (36, 36A, 36HP) from the Simplex.
6. Remove the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) from the Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3).
7. Remove the Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) from the Orifice Plate (13) and perform the scheduled work on the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC).

4.4 PLATE INSERTION

⚠ DANGER
FLUID EXPLOSION HAZARD
The Simplex is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual will result in death or serious injury.

CONDITIONS:

- The Simplex is at atmospheric (ambient) pressure.
- The Simplex is in the orifice metering system.
- The Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3), Clamping Bar (12, 12HP), with Clamping Bar Screws (11, 11HP), are removed from the Body (4).

PROCEDURE

1. Install a new Sealing Bar Gasket (36, 36A, 36HP) onto the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3). Do not reinstall any gasket once it has been compressed.

IMPORTANT
Before performing step 2, inspect the Orifice Plate Sealing Unit for damage or wear, and replace it if necessary.

2. Install the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DSC or 8TSC or 8MSC or 8SNC) into the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3) taking into account the flow direction of the metering system. This can be done using the Sealing Bar/Body Dowel Pin (51) located in the Body (4) as a reference.

IMPORTANT
Failure to install the Orifice Plate (13) and Orifice Plate Sealing Unit (8E-DS) or (8TS) or (8MS) or (8SN) in a position properly oriented with the direction of flow will result in measurement error and a possible loss of revenue.

3. Lower the Sealing Bar/Orifice Plate Carrier Assembly (8NSC-14.3) into the Body (4) aligning the Sealing Bar (35, 35A , 35HP) with the Sealing Bar/Body Dowel Pin (51) located in the Body (4).
4. Install the Clamping Bar (12, 12HP). Tighten each Clamping Bar Screw (11 or 11HP), located on the Clamping Bar (12 or 12HP) (Reference: Torque information).
5. The Simplex is now ready for final pressurization and operation.

IMPORTANT
The correct positioning and installation of the Sealing Bar Gasket (35, 35A, 35HP), Sealing Bar/Orifice Plate Carrier Assembly (8NSC -14.3), and Clamping Bar (12, 12HP) are essential to providing a pressure barrier between the line pressure and atmospheric pressure.

5 SUPPLEMENTAL INFORMATION

5.1 RECOMMENDED SPARE PARTS FOR ONE-YEAR OPERATION

TABLE 5-1: RECOMMENDED SPARE PARTS FOR ONE-YEAR OPERATION

Item No.	Description	Material	Quantity
8E-DSC	Orifice Plate Sealing Unit	Elastomer	5
8TSC	Orifice Plate Sealing Unit	PTFE	1
8M SC	Orifice Plate Sealing Unit	Metallic	1
36	36 Sealing Bar Gasket (ANSI 150-600)	Flat Fiber Sheet	5
	36A Sealing Bar Gasket (ANSI 900)	Flat Fiber Sheet	5
	36HP Sealing Bar Gasket (ANSI 1500-2500)	Elastomer	5
37	Plate Carrier Screw	316SS	2
38	Plate Carrier Washer	316SS	2

5.2 TORQUE INFORMATION

For a fitting to pass all factory tests, factory assembly personnel tighten each fastener used in the Simplex to ensure proper operation and to seal the unit.

Product owners and product operators must realize that both time and service conditions impact the tightness and strength of joints originally assembled in the factory. Some, but not all, of these service conditions are:

- Time in service or storage
- Temperature cycles
- Vibration
- Mechanical loads
- Pressure loads
- Fastener thread condition (dirt/corrosion)
- Condition of joint assembly components (fasteners, gaskets, sealing surface conditions)
- Fastener lubrication and coatings

Daniel publishes these suggested torque values to help owners and users establish a starting point for applying torque to fasteners in service to achieve a seal. The torque value applied to the clamping bar screws, necessary to achieve that seal, maybe greater than, less than or within the suggested torque range in Torque information.

Again, these values are only a reference. They are reference values because it is impossible for Daniel to know all of the variable conditions (some listed above) that your fitting (under your care) will see in actual service. Only the owner or operator, after careful consideration of a fitting’s service conditions, can specify a torque value to achieve an adequate seal. Therefore, owners and operators are ultimately responsible for clamping bar assembly torque specifications. Again, owners and users are to use the torque values given in the following table as reference only.

Apply the torque values that you select using the sequencing patterns provided in this section and in accordance with industry or company bolting procedures.

TABLE 5-2: CLAMPING BAR SCREW (11) SIZE AND SUGGESTED TORQUE VALUES

These values are FOR REFERENCE only.

Screw size	Suggested torque range (lbf·ft [N·m])		Maximum torque (lbf·ft [N·m])
	Lower	Upper	
1/2”-13	75 [101]	120 [163]	130 [176]
5/8”-11	120 [163]	195 [264]	265 [359]

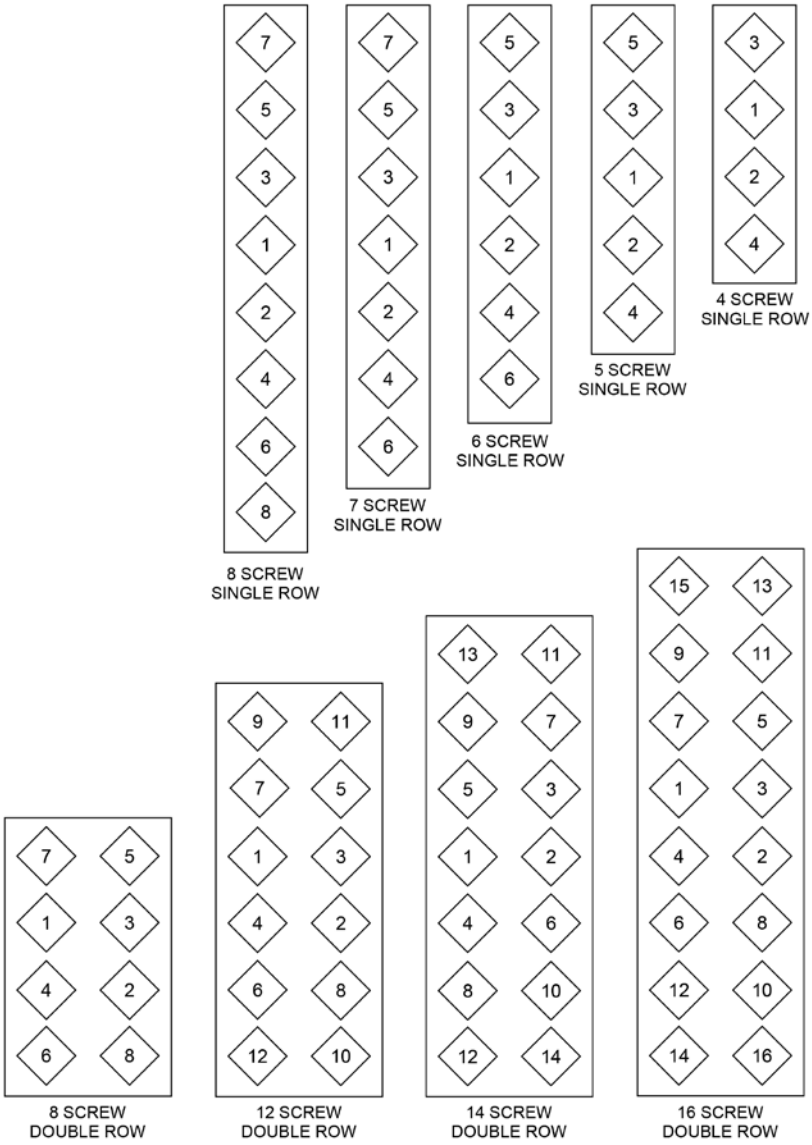
These torques values are to help users establish a starting point to provide adequate assembly and in-service clamping force in most applications. These values are FOR REFERENCE only.

DO NOT apply torque greater than the Maximum Torque value.

These torque values reflect new, heat treated, alloy steel (AISI 4140) screws.

Owners and operators are ultimately responsible for all joint assemblies within their system, including the clamping bar screws of the Simplex fitting.

FIGURE 5-1: TORQUE PATTERN SEQUENCES



With over 90 years of experience, Daniel is the only manufacturer that has the knowledge and experience to engineer and offer superior products that are trusted to provide the most reliable and accurate measurements in the global oil and gas industry.

Contact Us
Email: sales@Daniel.com
Phone: +1 (346) 509-3700

Decades Proven. Field Chosen.™