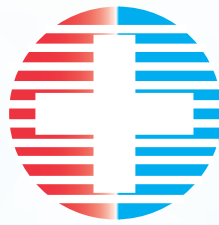


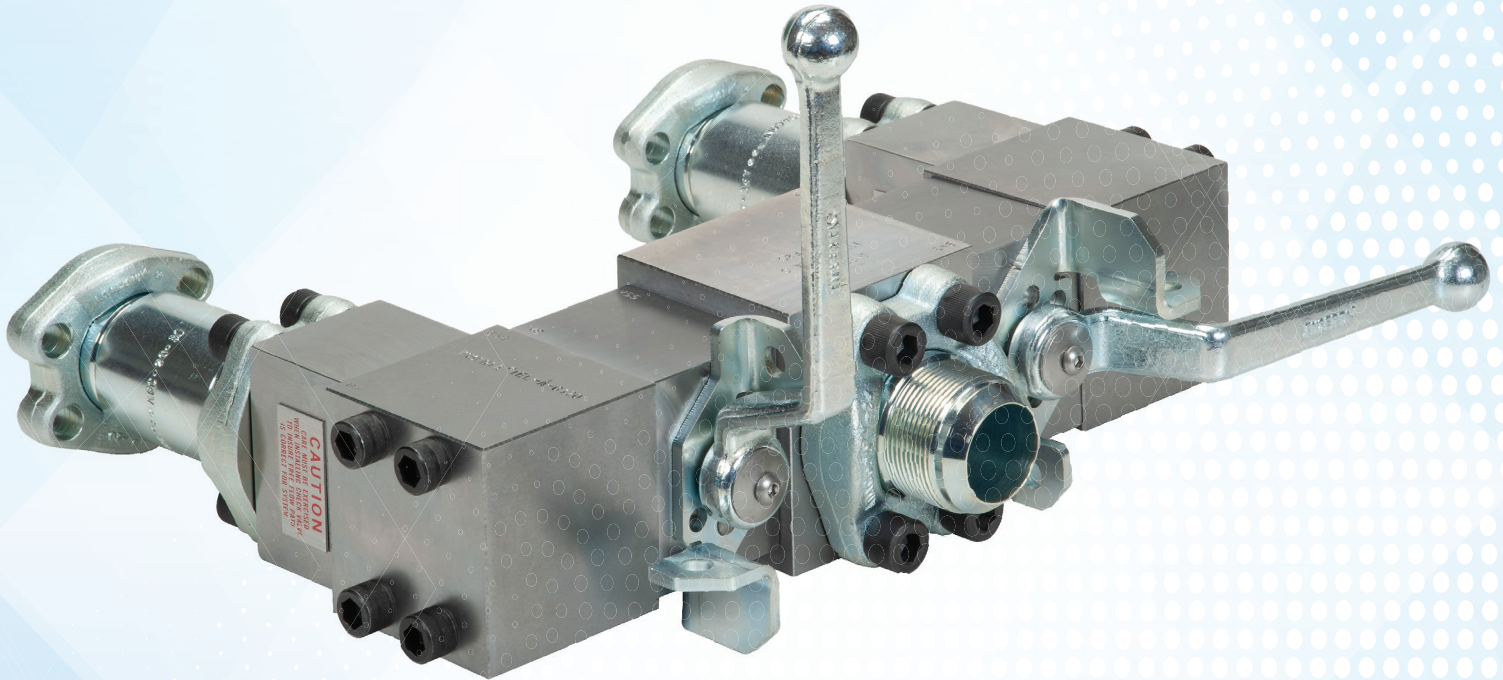
# ADACONN®

ADAPTERS and CONNECTORS



# INSERTA®

MODULAR VALVES and FITTINGS



*Trend Setting Products for  
Integrated Hydraulic Systems*

# TABLE OF CONTENTS

Last Revised 03/23/2020



<b>INTRODUCTION</b>	<b>2-9</b>
<b>MODULAR CONNECTORS</b>	<b>10-23</b>
INSERTA® ICX, IEL, ITR, ITB, IPS Code 61 & Code 62 4-Bolt, Flange Type	
INSERTA® ICX, IEL, ITR, ITB, IPS, IPN UNIFIED Code U61 4-Bolt, Flange Type	
INSERTA® ICX, IEL, IRC, IRT, ITR, ITB, IPS, IPC, IPR UNIFIED Code U61 2-Bolt, Flange Type	
<b>FLANGE PLATES</b>	<b>24-25</b>
INSERTA® IBP, IOP, IGC, ISP	
<b>ADAPTERS &amp; CONNECTORS</b>	<b>26-29</b>
INSERTA® IFRA 90° Rotational Retaining Adapters	
INSERTA® IFRC 90° Rotational Connectors	
<b>ADAPTERS &amp; CONNECTORS - ADACONN®</b>	<b>30-37</b>
ADACONN® AFO ADAFLANGE™, & AFP ADAFLANGEPORT™ Socket Head Flange Adapters	
ADACONN® APC Port Connectors	
ADACONN® AFO UK4 UNIFIED Code U61 4-Bolt Flange Type	
ADACONN® AFO UK2 UNIFIED Code U61 2-Bolt Flange Type	
<b>BALL VALVES</b>	<b>38-45</b>
INSERTA® IBF Ball Valve Flange Type, 2-Port	
INSERTA® IBF Ball Valve Flange Type, 2-Port Stainless Steel	
INSERTA® IBF3D Ball Valve Flange Type, 3-Port Diverter	
INSERTA® IBFP Ball Valve Flange Ported, 2-Port	
<b>CHECK VALVES</b>	<b>46-69</b>
INSERTA® ICS Check Valve, Slip-In Type	
INSERTA® IGS Check Valve, Guided Disc, Slip-In Type	
INSERTA® ICVR Check Valve, Retainer Slip-In Type	
INSERTA® IGSP Slip-In, Check Valve, Retaining Plug, Flange Type	
INSERTA® ICF Check Valve Bodies, Flange Type	
INSERTA® ICFS Check Valve Bodies, with Support Member, Flange Type	
INSERTA® ICC Check Carrier Thread-In Type	
INSERTA® ICD D03 Check Valve Module	
INSERTA® ICT Check Valve, Thread-In Type	
INSERTA® IGT Check Valve, Guided Disc Thread-In Type Stainless Steel	
INSERTA® IGT Check Valve, Guided Disc Thread-In Type	
INSERTA® ICFT Check Valve 4-Bolt, Flange Type	
<b>RETAINING SYSTEM</b>	<b>70-71</b>
INSERTA® ILR LOCKSTACK™ D03 Retaining System	
<b>TOOLS</b>	<b>72-73</b>
INSERTA® IMT Check Valve Tool	
ADACONN® AHB & AHW Wrench	
<b>BOLTS</b>	<b>74-75</b>
ADACONN® ABK or INSERTA® IBK Bolt Kit	
<b>PORT DIMENSIONS</b>	<b>76-78</b>
<b>REFERENCE</b>	<b>79-80</b>
Fluid Power Formulae	
Fluid Power Equivalents and Conversions	
<b>WARRANTY</b>	<b>81</b>

Please consult the **ADACONN® + INSERTA®** website for the most recently updated product information.

Hydraulic Distributors add valuable services to their customers, and add to the vitality of the industry. Hydraulic Distributors stock products to efficiently support the needs of the customers in their marketing area. They are experts in the selection, application and maintenance of the products that they distribute. Their knowledge of various applications of a product is a valuable source of information. Many provide hydraulic integration design, technical assistance, training, repair, and testing as well as fabrication and assembly services. **ADACONN® + INSERTA®** products are available from Hydraulic Distributors.

**ADACONN® + INSERTA®** products are not authorized for use on Aircraft and Space Vehicles, Life support equipment, Ordnance equipment, any end product which, when sold come under the U.S. Nuclear Regulatory Commission rules and regulations, and any product which comes under Federal Highway Safety Act, namely steering or braking systems for passenger-carrying vehicles or on-highway trucks.

Use **ADACONN® + INSERTA®** Smart part numbers to order what you need.

Four-bolt flange mounting patterns conform to SAE J518-1 JAN2013 and SAE J518-2 APR2017. Consult factory for metric fastener compatibility and thread depths.

Straight O-ring Ports conform to SAE J1926/1\_201609.

**DIMENSION NOTES: All Dimensions in catalog are in inches, unless noted otherwise.**

**All Dimensions shown without tolerances are nominal.**

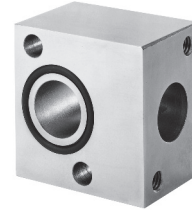
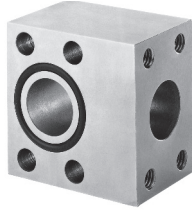
**ADACONN®**  
Blue Bell, PA 19422  
**(215) 643-1900**  
FAX: (215) 643-4017  
[www.adaconn.com](http://www.adaconn.com)  
email: [sales@adaconn.com](mailto:sales@adaconn.com)

**INSERTA®**  
Blue Bell, PA 19422  
**(215) 643-0192**  
FAX: (215) 643-4017  
[www.inserta.com](http://www.inserta.com)  
email: [sales@inserta.com](mailto:sales@inserta.com)

# INTRODUCTION

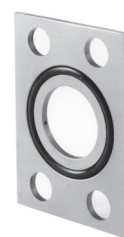
**ADACONN**<sup>®</sup> products include a proprietary line of adapters and connectors, and **INSERTA**<sup>®</sup> products include a proprietary line of modular valves and fittings. These product lines are used in Industrial and Mobile Integrated Hydraulic Systems to save space, time and money, eliminate piping leaks, and add value and integrity to the system. Each component is a building module that is effectively used in prototyping an integrated hydraulic system and once qualified is used on the production machine. Both **ADACONN**<sup>®</sup> and **INSERTA**<sup>®</sup> can provide special variations of these products in small and large quantities, as well as other sizes and configurations in steel and other materials for production volume requirements.

Use **ADACONN**<sup>®</sup> and **INSERTA**<sup>®</sup> products to meet your Integrated Hydraulic system needs.



## 1/8" TO 4" 4-BOLT AND 1/8" TO 2" 2-BOLT MODULAR CONNECTORS

**INSERTA**<sup>®</sup> **ICX, IEL, ITR, ITB, IPN, and IPS Modular Connectors** are used in **UNIFIED CODE U61 4 and 2-Bolt** and **CODE 61 and CODE 62 4-Bolt** Systems.



## 1/8" TO 2" 4-BOLT FLANGE BLANKING, ORIFICE, GENDER CHANGER AND SEAL PLATES

**INSERTA**<sup>®</sup> **IBP, IOP, IGC, and ISP Specialty Plates, Flange Type**, are used for blocking the flow, adding an orifice, converting a seal face to a port face, or inserting a seal face with a supporting ring between flange faces.



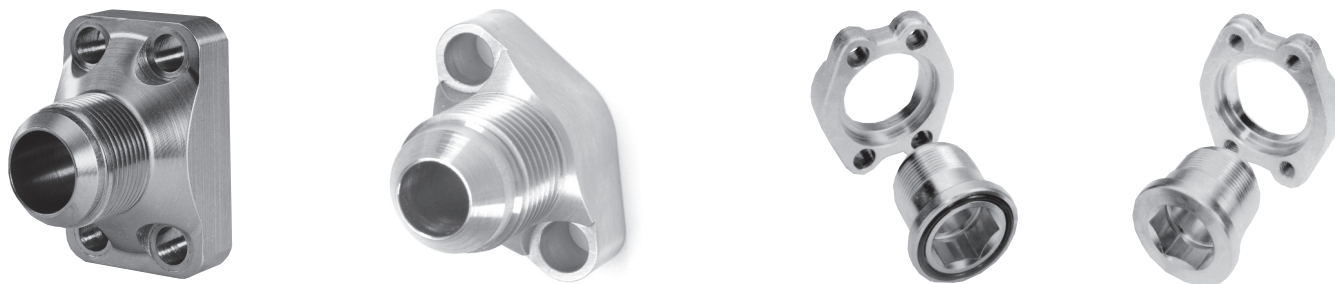
## 90° ROTATIONAL RETAINERS, 4-BOLT FLANGE TYPE

**INSERTA**<sup>®</sup> **IFRA Rotational Retaining Adapters** are used to retain **INSERTA**<sup>®</sup> **Flange Valve Modules** and **INSERTA**<sup>®</sup> **Modular Connectors**. They can be used when a flange code or size needs to be changed. They may also be used whenever the flow plane needs to be rotated 90°.



## 90° ROTATIONAL CONNECTORS, 4-BOLT FLANGE TYPE

**INSERTA**<sup>®</sup> **IFRA Rotational Retaining Connectors** are used to extend flange modules from both flange port faces. They can be used when a flange code or size needs to change or when the flow plane needs to be rotated 90°. They are also used with an **INSERTA**<sup>®</sup> **IFRA Rotational Retaining Adapter** to contain one or more flange modules in a compact flange ported assembly.



### 1/8" TO 5" 4-BOLT AND 1/8" TO 2" 2-BOLT FLANGE ADAPTORS

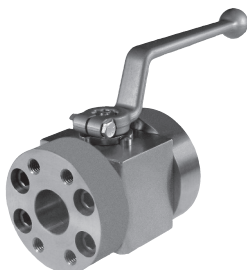
**ADAFLANGE® AFO Adapters, Flange Type**, are used for clamp flange connection for **UNIFIED CODE U61 4- and 2-Bolt** and **CODE 61 and CODE 62 4-Bolt Ports**.

**INSERTA® VALVES** are used by inserting them between 4- and 2-Bolt Flange Ports and their retainers as well as into SAE threaded ports and **INSERTA®** bored cavities.

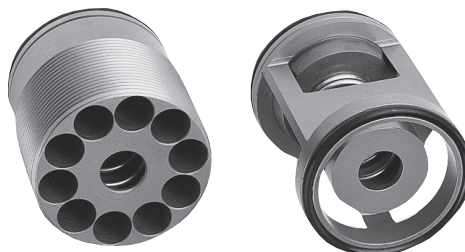


### 1/8" TO 3" BALL VALVES FLANGE TYPE-2 & 3 PORT

**INSERTA® IBF and IBF3D Ball Valves, Flange Type**, are used by mounting them between 4- and 2-Bolt Flange Ports and their retainers.



**INSERTA® IBFP 2-Port Flange Ported Ball Valves** are used in applications requiring threaded flange ports connections, and where full flow porting is required.



### 1/8" to 3" CHECK VALVES THREAD-IN & SLIP-IN TYPES

**INSERTA® ICT Check Valves, Thread-In Type**, are used by threading them into SAE Standard J1926 straight thread ports.

**INSERTA® ICS Check Valves, Slip-In Type**, are used by inserting them into **ICS** bored cavities.



**9/16" to 7/8" CHECK VALVES**

**GUIDED DISC THREAD-IN TYPE STAINLESS STEEL**



**1 5/16" to 2 1/2" CHECK VALVES**

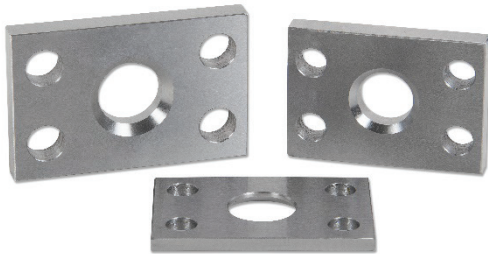
**GUIDED DISC THREAD-IN STEEL**

INSERTA® IGT (Stainless Steel) Check Valves, Guided Disk, thread-In Type, with threads compatible with O-ring port cavities made to SAE J1926-1, can be inserted in manifolds, sub-plates, flanges and integrated valve systems.

INSERTA® IGT (Steel) Check Valves, Guided Disk, thread-In Type, may be considered as an alternative to standard INSERTA® ICT thread-in Type valves for more demanding applications. These valves may be used in conjunction with modified SAE J1926-1 ports in manifolds, sub-plates, flanges and components.



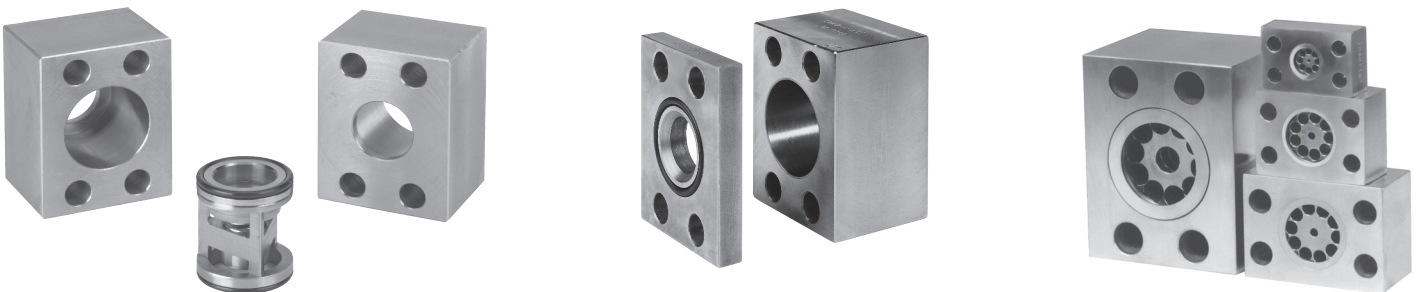
INSERTA® IGS (Steel) Check Valves, Guided Disk, Slip-in Type, may be considered as an alternative to standard INSERTA® ICS slip-in type valves for more demanding applications. The Guided Disc design (patent pending) affords improved longevity in applications prone to turbulence, high flow rate transients, higher cycling, and applications with right angle flow.



INSERTA® ICVR Check Valves, Retainer, Slip-in Type, Code 61 and Code 62 is used with an SAE J518 flange assembly to retain an INSERTA® ICS slip-in type check valve in axial flow applications. The retainer provides a flow transition between the valve and the flange.



INSERTA® IGSP Slip-In Check Valve Retaining Plug, Flange Type, provides an effective means to retain an INSERTA® IGSP Slip-In Check Valve in a cavity for use with a right angle flow path (axial fluid flow at the valve inlet, radial fluid flow at the valve outlet).

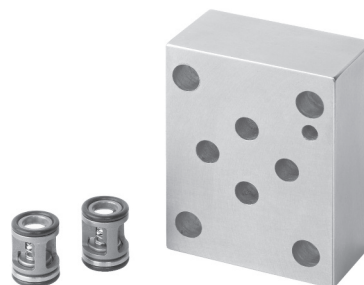


**1/8" to 3" CHECK VALVES FLANGE TYPE**

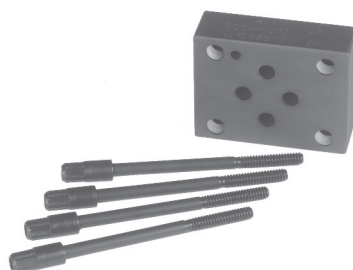
INSERTA® ICF, ICFS and ICFT Check Valves, Flange Type, are used by mounting them between 4- or 2-Bolt Flange Ports and their retainers.



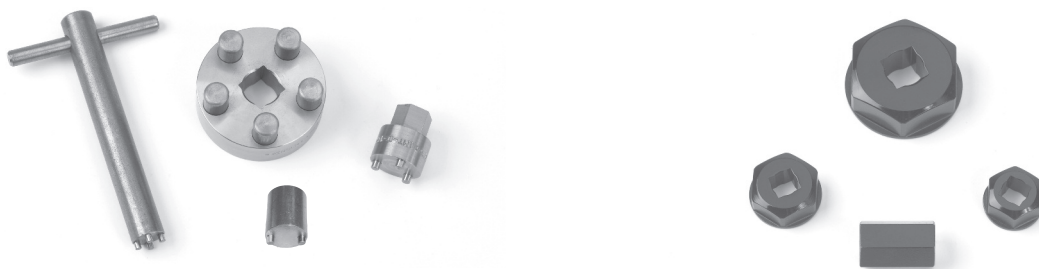
**INSERTA® ICC Check Carriers** are used to install **INSERTA® ICS** Slip-In Check Valves into an SAE threaded port, with free flow in either direction.



**INSERTA® ICD D03 Check Valve Modules** are used to provide check and fixed orifice flow control into a D03 stack assembly.



The **INSERTA® ILR Lockstack™ D03 Retaining System** is used to positively retain components in a D03 valve stack assembly.



**INSERTA® IMT Check Valve Installation Tools** are used to install **INSERTA® ICT** check valves within threaded cavities.

**ADACONN® AHW Wrench and AHB Bit** are used to install **Adaflange™** and **Adaflangeport™** Socket Head Flange Adapters using the patented center hex drive.

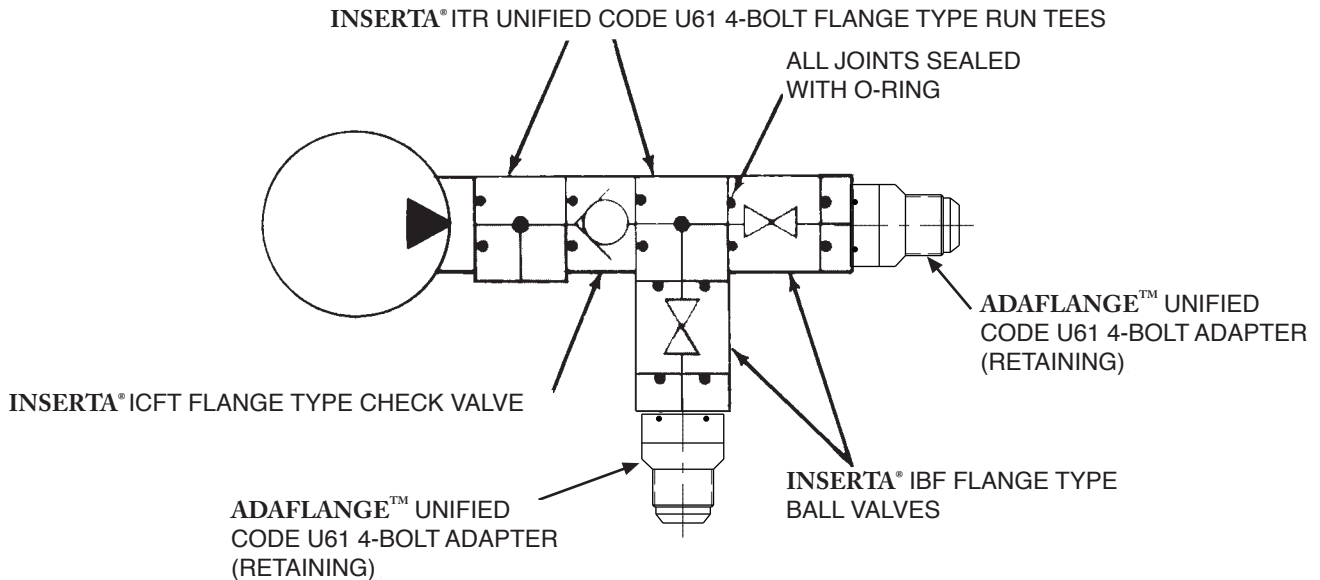


### ADACONN® + INSERTA® Bolt Kits

**ADACONN® ABK AND INSERTA® IBK BOLT KITS** are used for joining **ADACONN® + INSERTA®** products. The length of Socket Head Cap Screw given in the catalog are the minimum length required to fasten to a Unified Code U61, Code 61 or 62 port pattern provides a minimum of 1 1/2 times the nominal bolt diameter for thread engagement. Longer lengths need to be considered when other conditions exist such as fastening to lower strength materials. When one wants to use other **INSERTA®** modules between components longer bolts will also be required to accommodate the stack height of the additional modules.

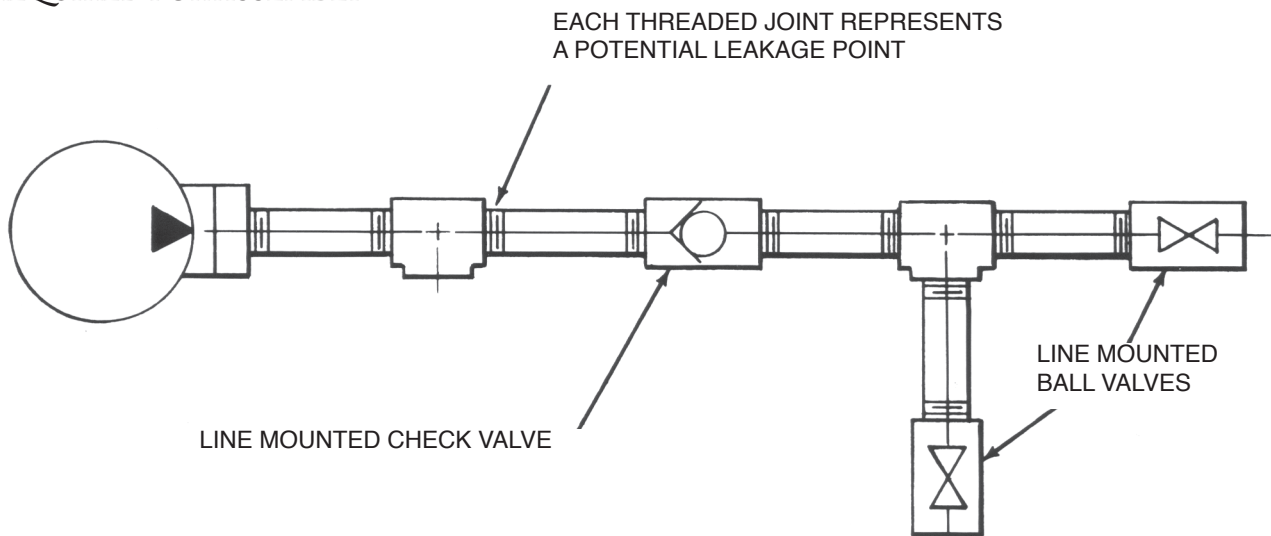
# USE THE ADACONN® + INSERTA® ALTERNATIVES

SMALL WRENCHES ONLY  
REQUIRED FOR ASSEMBLY



## IN PLACE OF THE OLD METHODS OF PIPING

LARGE WRENCHES  
REQUIRED FOR ASSEMBLY



**RESULTS - BULKY, LEAK PRONE ASSEMBLY**

<p><b>ADACONN®</b>  <b>INSERTA®</b> Blue Bell, PA 19422</p>	<p>USE THE <b>ADACONN®</b>  <b>INSERTA®</b> ALTERNATIVES</p>		
--	---	--	--

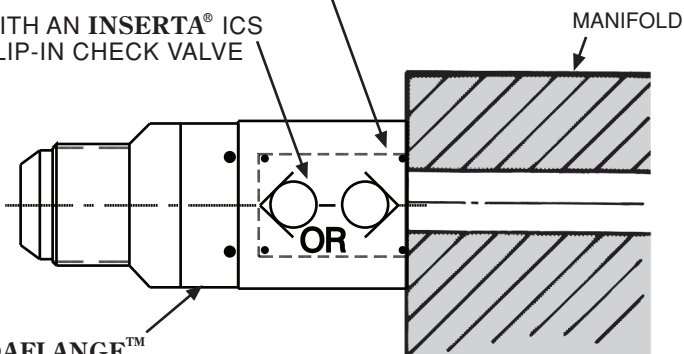


# USE THE ADACONN® + INSERTA® ALTERNATIVES

INSERTA® ICF OR ICFS CHECK VALVE BODY

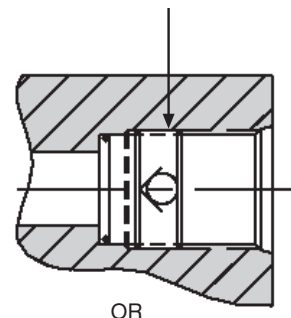
WITH AN INSERTA® ICS SLIP-IN CHECK VALVE

ADAFLANGE™ UNIFIED CODE U61 4-BOLT ADAPTER (RETAINING)

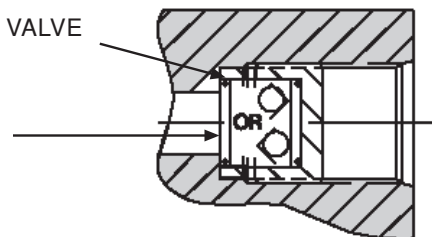


INSERTA® ICT THREAD-IN CHECK VALVE

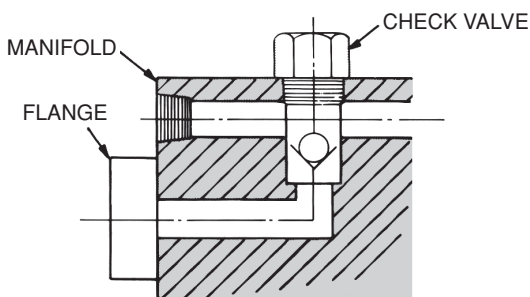
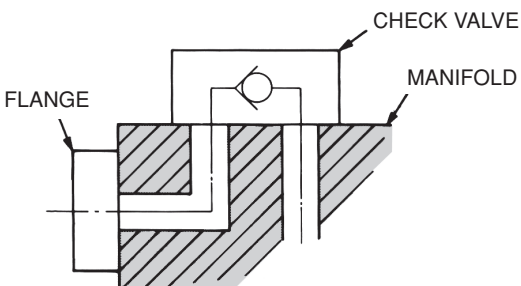
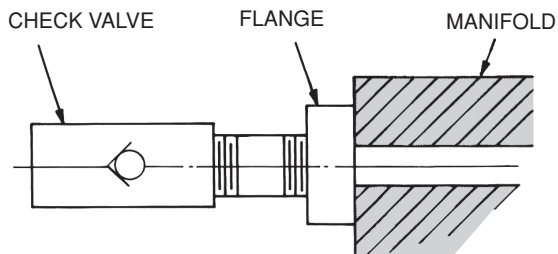
AND



INSERTA® ICC CHECK VALVE CARRIER WITH AN INSERTA® ICS SLIP-IN CHECK VALVE



## IN PLACE OF THE OLD METHODS



THE ADACONN® + INSERTA® ALTERNATIVE:

- Eliminates Leaks and Bulk associated with Line Mounted Valves.

THE ADACONN® + INSERTA® ALTERNATIVE:

- Eliminates cross drilling and tapped mounting holes required with Surface Mount Valves.

THE ADACONN® + INSERTA® ALTERNATIVE:

- Eliminates form tools, tapping and cross drilling required with Cartridge Type Valves.

**ADACONN®**  **INSERTA®**  
Blue Bell, PA 19422

USE THE  
**ADACONN®**  **INSERTA®**  
ALTERNATIVES

## UNIFIED U61 SERIES ADAPTERS AND FLANGE PORTS The next generation of Hydraulic Flange Ports™

**Adaconn®** and **INSERTA®** have introduced a unique 4-bolt and 2-bolt flange system based on the Unified Code 61 Flange Port.

Patented one-piece four-bolt flange adapters made to this system utilize the same bolt pattern as SAE J518 Code 61. However, their one-piece construction allows them to be significantly narrower than standard four-bolt SAE Code 61 split flanges. Furthermore, given their one-piece design, Unified Code U61 flange adapters may be qualified in applications at pressures that exceed the Code 61 specification.

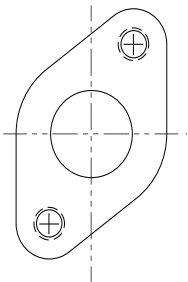
The relative narrowness of the Unified Code U61 flange adapters gives the component and manifold designer the ability to place adjacent four-bolt ports closely together. The potential for higher pressures also can result in an increased “power density” on a component or manifold surface.

The U61 series expands upon the SAE Code 61 series to include the 1/8”, 1/4”, and 3/8” flange port sizes, for a total range of 1/8” to 2”, inclusive.

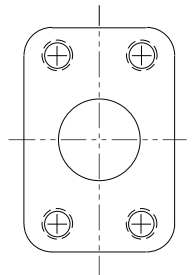
Unified Code 61 2-bolt adapters are also available. The distance between bolt centers of the U61 2-bolt pattern are similar to the diagonal bolt patterns of the SAE Code 61 4-bolt patterns.

The following diagram is a comparison of the relative footprints of comparably sized flange patterns:

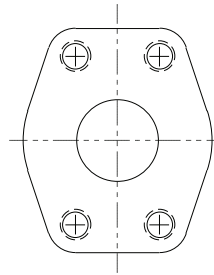
**UNIFIED  
CODE U61 2-BOLT**



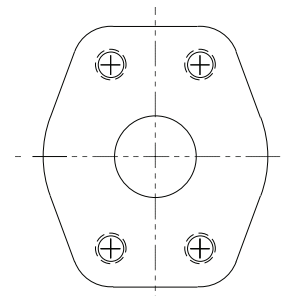
**UNIFIED  
CODE U61 4-BOLT**



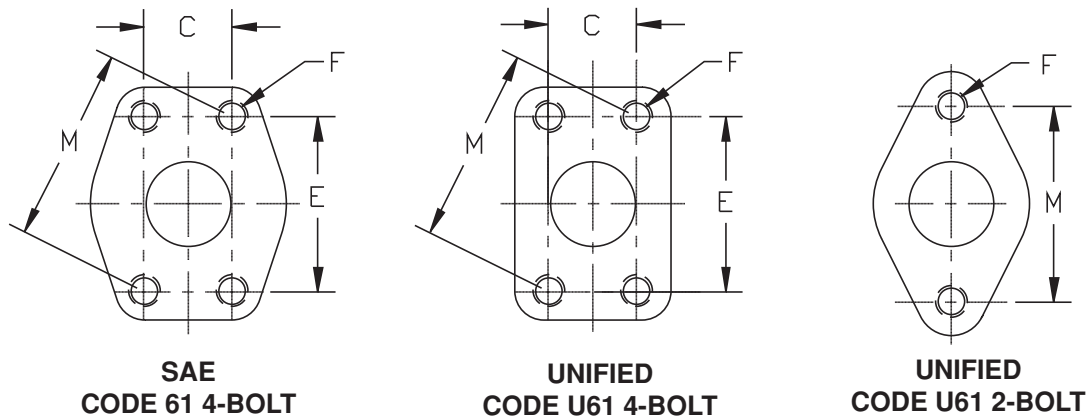
**SAE J518  
CODE 61 4-BOLT**



**SAE J518  
CODE 62 4-BOLT**



The diagram below shows a comparison of the bolt center dimensions of the SAE Code 61 4-bolt pattern with the Unified U61 4-bolt and 2-bolt patterns:



Unified Code U61 2-bolt flange ports may be nested together even more closely than their 4-bolt U61 counterparts. When the U61 2-bolt ports are utilized with **Adaconn®** Unified Code U61 one-piece, two-bolt flange adapters, they may be qualified at working pressures similar to the maximum working pressures of comparably sized SAE Code 61 split flange applications. This gives the designer a means to minimize the size and weight of hydraulic components.

An advantage that Unified Code U61 flange ports offer over comparably sized O-ring threaded ports is that they can generally be used at higher pressures. Unified Code 61 flange ports can be manufactured using simple drill and tap operations with standard tooling, and do not require the use of costly port form tools and large thread taps or thread mills.

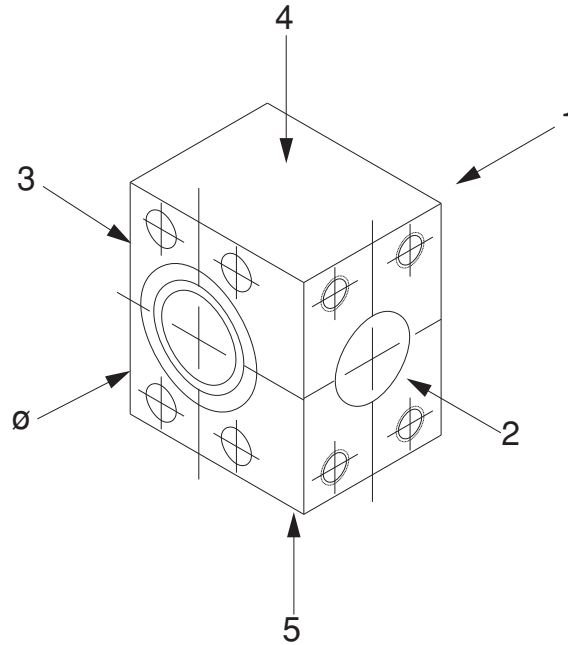
Modular fittings by **INSERTA®** are also offered and are to be used with **Adaconn®** 4-bolt and 2-bolt Unified Code U61 one-piece flange adapters. These unique modular fittings (Elbows, T-runs, Branch Tee's, Crosses, and Port Spacers) are more compact and lighter weight than the standard line of modular fittings made for use with SAE Code 61 split flanges.

**Adaconn®** 4-bolt and 2-bolt Unified Code U61 flange adapters are backward compatible with any existing SAE Code 61 flange port.

# Inserta Products, Inc.

## Viewing INSERTA® Modular Connectors 4-Bolt, Flange type

INSERTA® Modular Connectors 4-Bolt, Flange Type, are six-sided system building blocks that save space, time and money, eliminate piping leaks, and add value and integrity to the system. They are viewed from Face Ø with the 4-Bolt patterns in a specific relationship on Face Ø as illustrated below:



By definition Face Ø is the front face and has the largest or one of the largest size ports on it. This port normally has all the flow going to or from it. If one of the largest ports has a seal, this becomes Face Ø. The 4-Bolt pattern on Face Ø has the bolts' short center distance in the horizontal position and the bolts' long center distance in the vertical position.

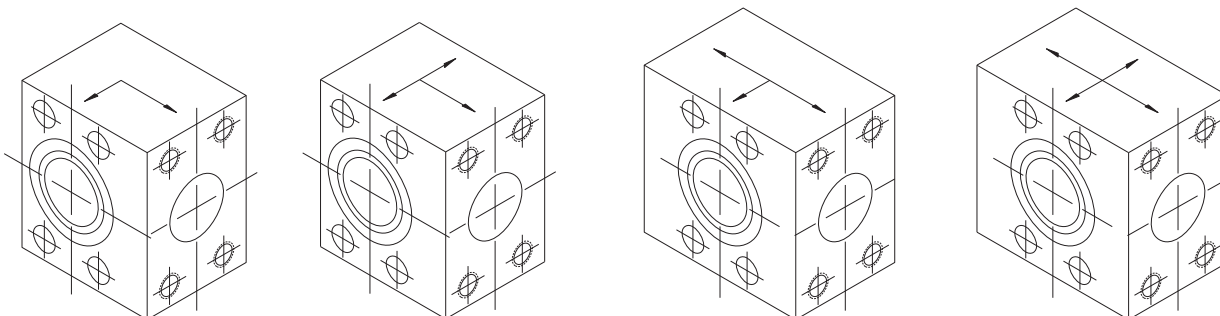
INSERTA® Modular Connectors 4-Bolt, Flange Type, is made in Elbow, Tee Run, Tee Branch and Cross configurations. The Modular Connectors are made in three design configurations A, B, and C. Design-A Modular Connectors have a seal groove with its O-ring on Face Ø and a flat pattern on Face 1 with through holes from Face Ø to Face 1 for through hole bolting. Any 4-Bolt Flange patterns on Face 2 or 3 will have flat Faces with 4 tapped holes for flange mounting. Likewise these 4-Bolt patterns will have the short centers in the horizontal position and the bolts' long center distance in the vertical position.

INSERTA® Modular Connectors 4-Bolt, Flange Type, Design-B are the same as the Design-A but with Face Ø having a flat face (without an O-Ring and its retaining groove).

INSERTA® Modular Connectors 4-Bolt, Flange Type, Design-C is similar to the Design-B in that it has all flat flange faces, but having all 4-Bolt holes tapped for flange mounting.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b> <b>4-BOLT</b> <b>FLANGE TYPE</b></p>	
---	---	--

The following views illustrate the basic **INSERTA® Modular Connectors 4-Bolt**, Flange Type, Design-A with equal size flange connections on appropriate Faces  $\emptyset$ , 1, 2 and 3. They do not have any ports on Faces 4 or 5. A schematic has been drawn on Face 4 to illustrate the flow path between the faces and the O-Ring face seal on Face  $\emptyset$ .



ELBOW

TEE RUN

TEE BRANCH

CROSS

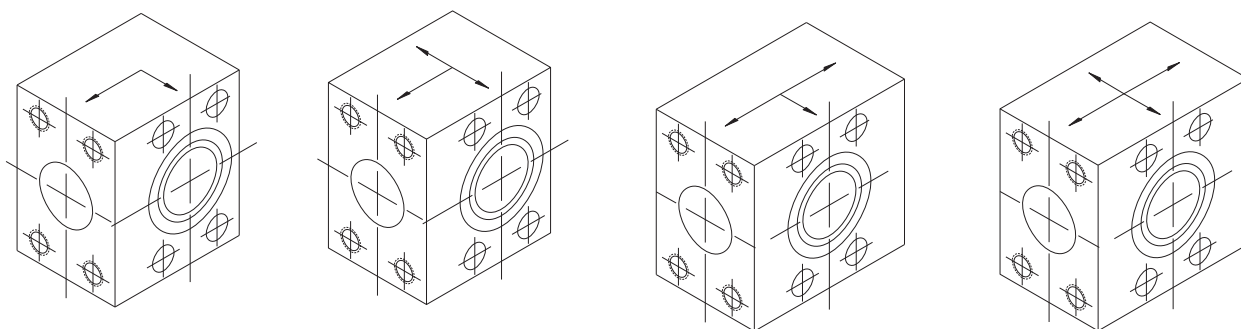
IEL-A-\*\*\*\*  
IEL-B-\*\*\*\*  
IEL-C-\*\*\*\*

ITR-A-\*\*\*\*  
ITR-B-\*\*\*\*  
ITR-C-\*\*\*\*

ITB-A-\*\*\*\*  
ITB-B-\*\*\*\*  
ITB-C-\*\*\*\*

ICX-A-\*\*\*\*  
ICX-B-\*\*\*\*  
ICX-C-\*\*\*\*

\*\*\*\* Denotes the Code and Size of the 4-Bolt Flange pattern on Face  $\emptyset$ , i.e. IEL-A-6124 denotes an **INSERTA®** Elbow Code 61 Size 24 4-Bolt Flange Pattern on Face  $\emptyset$ . On the Standard Modular Connectors the same size flange pattern is on all appropriate faces, i.e. on Faces 1, 2, and/or 3. Note that when there are no ports being specified on Faces 4 or 5 the Standard Modular Connector can be used to reverse port locations 2 and 3 as illustrated in the corresponding schematics.



ELBOW

TEE RUN

TEE BRANCH

CROSS

By viewing **INSERTA® Modular Connectors 4-Bolt** in the manner as described above one can now locate and call out the proper position and part number for gauge and test ports on Faces 4 and/or 5 as specified in the catalog under ordering information for standard outlets.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b> 4-BOLT FLANGE TYPE</p>	
---	---	--

# Inserta Products, Inc.

## MODULAR CONNECTORS CODE 61 & 62 4-BOLT SPLIT FLANGE TYPE

The INSERTA® CODE 61 and CODE 62 4-Bolt, Split Flange Type, Modular Connectors, are used in integrated hydraulic systems in place of welded and threaded pipe fittings. These are the original INSERTA® Modular Connectors whose port face widths are made to accommodate the width of the SAE CODE 61 and CODE 62 Split clamp flanges.

Design A and B Modular elbows, run tees, branch tees, and crosses are held in place by bolts that extend from Face 1 to Face Ø in the 4-bolt flange pattern.

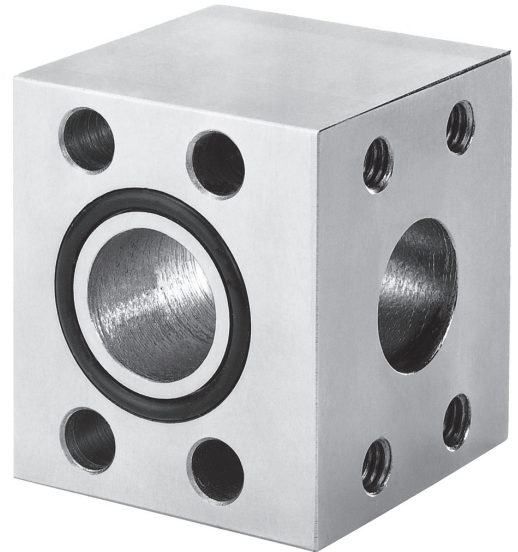
Design-A incorporates the 4-Bolt clamp face groove and sealing O-ring on Face Ø and a plain face on Face 1. This design permits stacking various INSERTA® flange type modules together with a minimum of O-ring seals to virtually eliminate leaks associated with pipe threads. The task is further enhanced because using large wrenches with high torque normally needed to install pipe fittings are no longer required since the INSERTA® Modular Connectors bolt together.

Design-B eliminates the 4-Bolt clamp face groove and O-ring on Face Ø for those applications that require this geometry.

Design-C has port faces on all designated port faces, and therefore are not held together by thru bolts (as in Designs A & B), but are port faces that other flange type components are fastened.

INSERTA® Modular Connectors have inch fastener clearance holes and threads as standard. Thread depths may not be as specified in the latest revisions of SAE J518-1 and SAE J518-2. Thread engagements were designed to provide equal chance of failure in the female thread of the Modular Connector, or a Grade 5 fastener allowable in earlier J518 standards. SAE J518-1 and SAE J518-2 now indicate that metric fasteners are to be used in all new designs, and SAE J429 Grade 8 Hexagon Head screws or ASME 18.3 SHCS of ASTM A574 material are specified when inch fasteners are used.

Standard CODE 61 and CODE 62 Modular Connectors, have all flange ports of the same size, and are made of steel. These are designed for use with inch fasteners. Contact the factory for metric fastener options.



### ORDERING INFORMATION

#### STANDARD OUTLETS

INSERTA® ICX — A — 61 24 — \* — G\* — T\*  
**MODULAR CONNECTORS**

- CX = CROSS
- EL = ELBOW
- TR = TEE, RUN
- TB = TEE, BRANCH
- PS = PORT SPACER (A&B DESIGN)

#### MOUNTING DESIGN CODE

- A = SEAL GROOVE & O-RING ON FACE Ø WITH 4-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø
- B = PLAIN FACE Ø WITH 4-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø
- C = 4-BOLT FLANGE PORTS ON ALL DESIGNATED FACES

#### MOUNTING PATTERN

- 61 = CODE 61
- 62 = CODE 62

#### TEST PORT\*\*

- T = #4 SAE (7/16-20) or P=1/4 NPTF
- \* = 1, 3, 4 and 5 PORT FACE POSITIONS

#### GAUGE PORT\*\*

- G = #6 SAE (9/16-18)
- \* = 1, 3, 4 and 5 PORT FACE POSITIONS

#### SEAL COMPOUND

- (OMIT FOR DESIGNS B & C)
- N = BUNA N-70 Duro (STANDARD)
- M = BUNA N-90 Duro (Upon Request)
- V = VITON

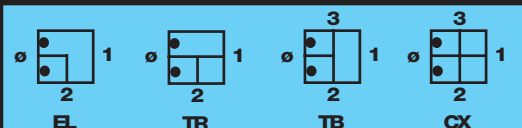
#### NOMINAL SIZE

- |            |            |
|------------|------------|
| 08 = 1/2   | 32 = 2     |
| 12 = 3/4   | 40 = 2 1/2 |
| 16 = 1     | 48 = 3     |
| 20 = 1 1/4 | 56 = 3 1/2 |
| 24 = 1 1/2 | 64 = 4     |

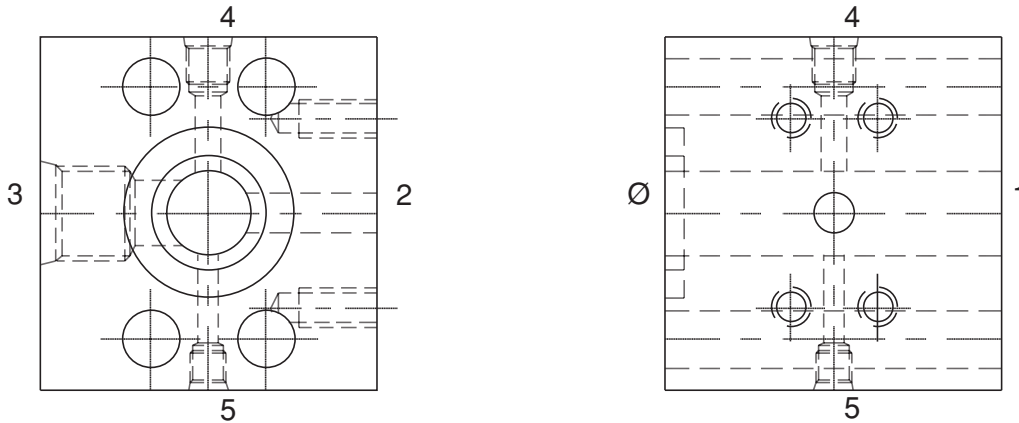
\*\*Gauge & Test Port Guidelines (Refer to Page 15).

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**MODULAR CONNECTORS  
CODE 61 AND CODE 62  
4-BOLT SPLIT FLANGE TYPE**



# CODE 61 AND CODE 62 MODULAR CONNECTORS WITH OPTIONAL OUTLETS.

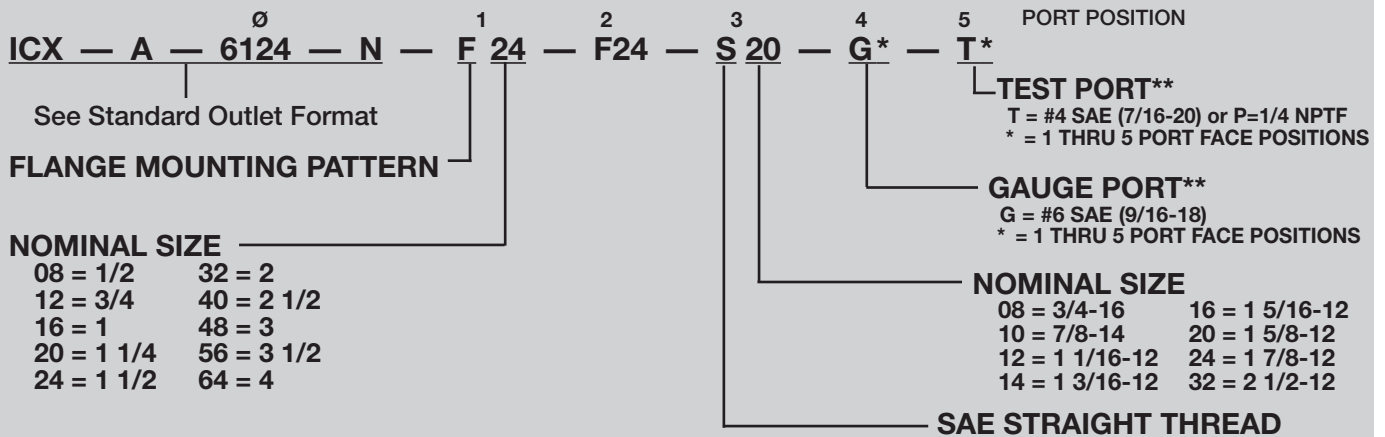


**INSERTA® Modular Connectors** with optional outlets add flexibility to piping systems by allowing size reductions. Although the **ADAFLANGE™\*** adapters have all but eliminated the need for threaded ports in the **INSERTA® Modular Connectors**, they are still offered for those who want them. Side outlets are available in the same size as the flange pattern on face Ø or any smaller size. Flange patterns will always be the same SAE code as the one on face Ø. To order, select the product type and specify each port. If no outlet port is required, put an O in that position. The actual optional **INSERTA® Modular Connector** size may be smaller than the standard outlet models as this is determined by the actual outlet sizes selected.

\***ADAFLANGE™** is a trademark of **ADACONN®**

## ORDERING INFORMATION

FOR OPTIONAL OUTLETS



**EXAMPLE 1:**

INSERTA® cross, 1 1/2" Code 61 with 1 1/4" Code 61 flange side outlet, #20 SAE straight thread side outlet, gauge port, and test port.

ICX - A - 6124 - N - F24 - F24 - S20 - G4 - T5

**EXAMPLE 2:**

INSERTA® branch tee, 1 1/2" Code 61 with a gauge port at position 1 and 2-1" flange side outlets.

ITB - A - 6124 - N - G1 - F20 - F20

**EXAMPLE 3:**

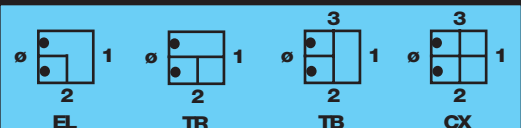
INSERTA® elbow, 1 1/4" Code 62 with #20 SAE straight thread outlet, gauge port at position 3 and a test port at position 5.

IEL - A - 6220 - N - O - S20 - G3 - O - T5

\*\*Gauge & Test Port Guidelines (Refer to Page 15).

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**MODULAR CONNECTORS**  
CODE 61 AND CODE 62  
4-BOLT SPLIT FLANGE TYPE

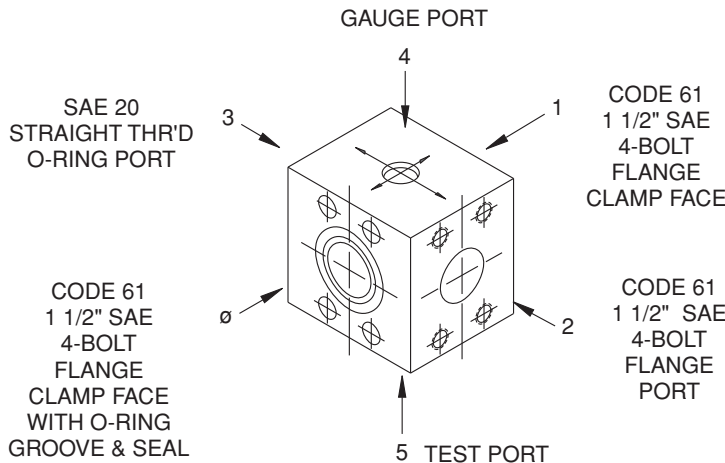


# VIEWING CODE 61 AND CODE 62 MODULAR CONNECTORS WITH OPTIONAL OUTLETS

**INSERTA® CODE 61 AND CODE 62 4-Bolt Split Flange Type Modular Connectors** with other optional porting arrangements are available and can be specified by using the ordering information in the catalog for optional outlets. The following isometric drawings will help one to visualize the three examples that are given in the catalog.

**Example 1:**

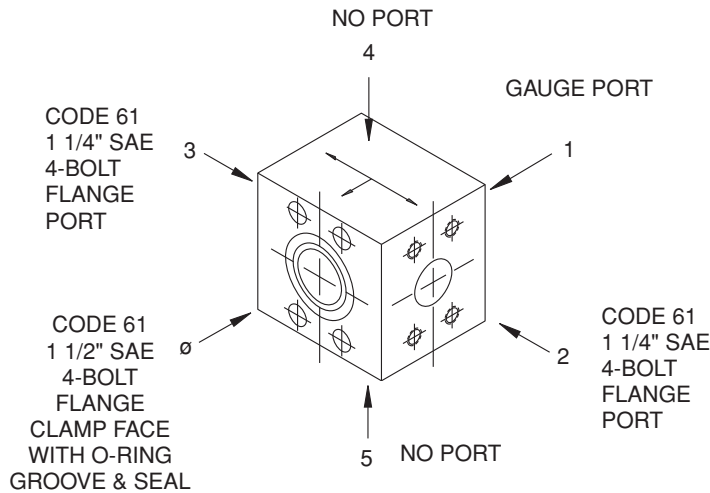
**INSERTA® Design A Cross, Code 61 with 1/2" Code 61 flange side outlet, #12 SAE straight thread side outlet, gauge port on Face 4 and Test Port on Face 5.**



**INSERTA® Part No. ICX-A-6124-N-F24-F24-S20-G4-T5**

**Example 2:**

**INSERTA® Branch tee, 1 1/2" Code 61 with 2-1" Code 61, flange side outlet and a gauge port at position 1.**



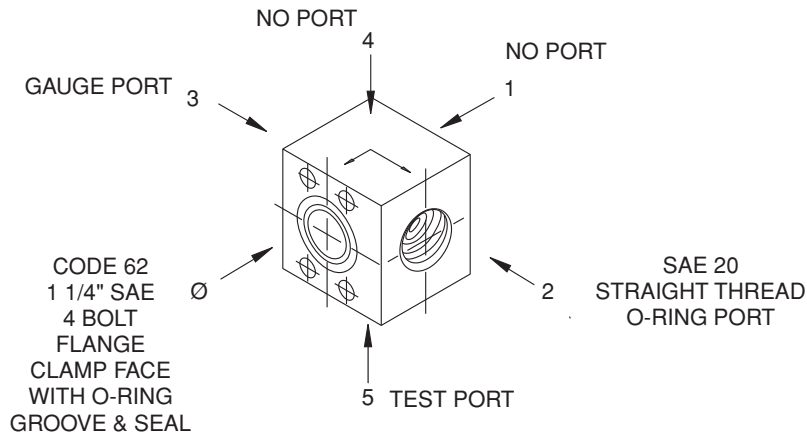
**INSERTA® Part No. ITB-A-6124-N-G1-F20-F20**

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS CODE 61 AND CODE 62 4-BOLT SPLIT FLANGE TYPE</b></p>	
---	---	--



**Example 3:**

**INSERTA®** Elbow, 3/4" Code 62 with #12 SAE straight thread outlet, gauge port at position 3 and a test port at position 5.



**INSERTA®** Part No. **IEL-A-6220-N-O-S20-G3-O-T5**

Note that in the above part number an O is placed on each face that doesn't have a port between two specified ports to confirm that a port is omitted. However, an O or a series of O's are not employed if they are at the end of the part number and not between specified ports. Example 2 is such a case when the need for additional O's is superfluous and therefore is not used. It should also be noted that the orientation of all 4-Bolt flanges are the same as for standard outlets.

Contact the factory for special outlet Modular Connectors such as when one requires both Code 61 and Code 62 flanges or other flange standards mixed on the same connector. This would also be the case for Modular Connectors where one may want special rotational relationships to exist between the various flange ports.

**GAUGE and TEST PORT GUIDELINES**

By definition an **INSERTA®** Gauge Port is a #6 SAE (9/16-18) Port, and an **INSERTA®** Test Port is either a #4 SAE (7/16-20) or 1/4" NPTF Port. If these port sizes are used for functions other than Gauge or Test Ports, they are still to be specified as G, T or P ports respectively in an **INSERTA®** Modular Connector Part Number.

**MODULAR CONNECTORS:**

The Modular Connector Smart Part Number with standard outlets describes in sequence: the connector's product type, the Face Ø mounting design, the mounting pattern and nominal size, and the seal material if one is required on Face Ø. All other ports are defined for modular connectors and have the same flange size as Face Ø and are oriented in the same manner. A Gauge or Test Port can be placed in any available unused face by adding the respective G, T or P and its face position to the port number in port face position sequence. The example shows T5 test port and G4 gauge port correctly added to a modular connector part number as underlined, i.e. ICX-A-6124-N-G4-T5.

**MODULAR CONNECTORS WITH OPTIONAL OUTLETS:**

The Modular Connector Smart Part Number with optional outlets describes in sequence: the connector's product type, the Face Ø mounting design, the mounting pattern and nominal size, and the seal material if one is required on Face Ø. To order, specify what ports are required in positions 1 thru 3 in port face sequence. A zero should be placed on any face that does not have a port. A Gauge or Test Port can be placed in any available port face by adding a G, T, or P and its face position in port face position sequence. Example 1 shows the modular connector with optional ports and gauge and test ports, as underlined, i.e. ICX-A-6124-N-F24-F24-S20-G4-T5.

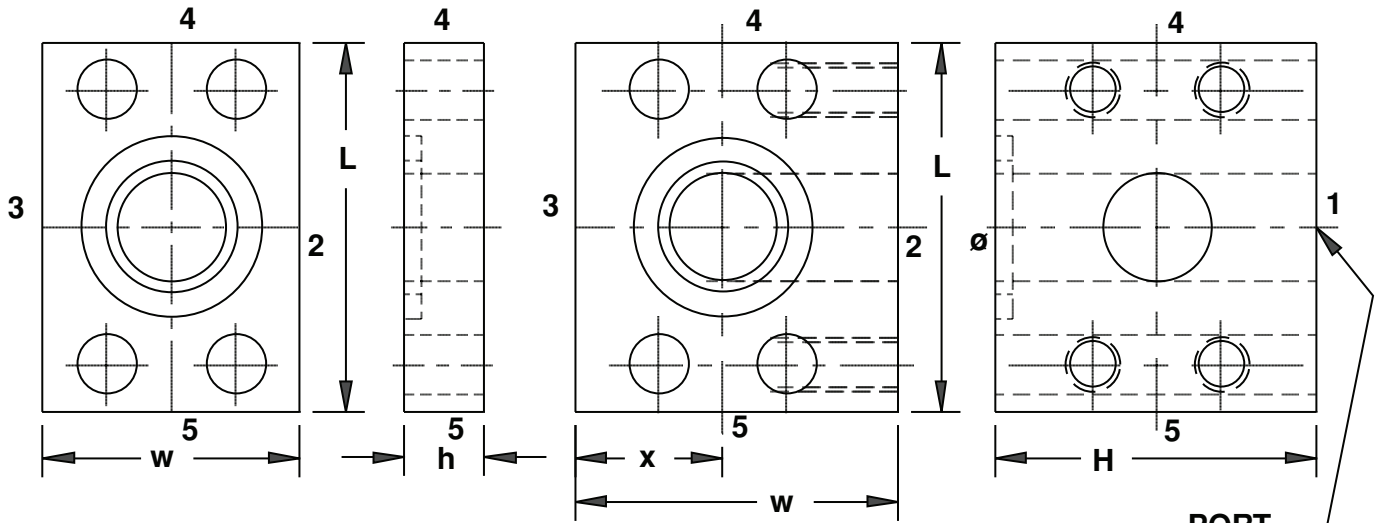
**INSERTA®** Modular connector Smart Part Numbers give you the tool to specify what you need for your integrated hydraulic system.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b> <b>CODE 61 AND CODE 62</b> <b>4-BOLT SPLIT FLANGE TYPE</b></p>	
---	---	--

**CODE 61 PORT SPACER**

**Ø FACE VIEW**

**ELBOW/TEE, RUN**



DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face Ø.  
 DESIGN C = 4-Bolt flange ports on all designated faces.

**PORT  
TEE RUN  
ONLY**

**CODE 61**

NOMINAL SIZE	H	L	W	X	PORT SPACER		O-RING SIZE NO.
					h	w	
6108	1.97	2.12	1.97	0.99	1.00	1.31	210
6112	2.22	2.56	2.28	1.14	1.00	1.63	214
6116	2.72	2.75	2.72	1.24	1.00	1.88	219
6120	2.97	3.12	2.97	1.48	1.00	2.12	222
6124	3.27	3.69	3.46	1.75	1.00	2.50	225
6132	3.96	4.00	3.96	2.00	1.00	3.00	228
6140	4.47	4.50	4.47	2.25	—	—	232
6148	5.20	5.31	5.20	2.60	—	—	237
6156	5.46	6.00	5.46	2.75	—	—	241
6164	5.96	6.38	5.96	3.00	—	—	245

**CODE 62**

6208	1.97	2.22	1.97	0.99	1.00	1.50	210
6212	2.47	2.82	2.47	1.23	1.00	1.88	214
6216	2.97	3.19	2.97	1.50	1.00	2.12	219
6220	3.27	3.75	3.46	1.75	1.00	2.38	222
6224	3.77	4.44	3.96	2.00	1.00	2.75	225
6232	4.47	5.25	4.96	2.50	1.00	3.38	228
6240	5.96	6.87	5.96	3.00	—	—	232
6248	8.46	8.50	8.46	3.50	—	—	237

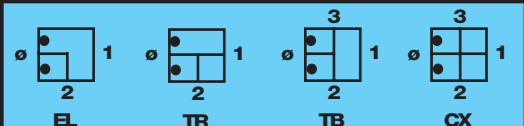
Fastener mounting patterns and O-ring sizes conform to SAE Standard J518 parts 1 & 2. Note that fastener clearance holes and threads are made for use with UN inch fasteners, while the current SAE standard indicates that metric threads are to be used for new designs. Consult factory for modular connectors intended for use with metric fasteners.

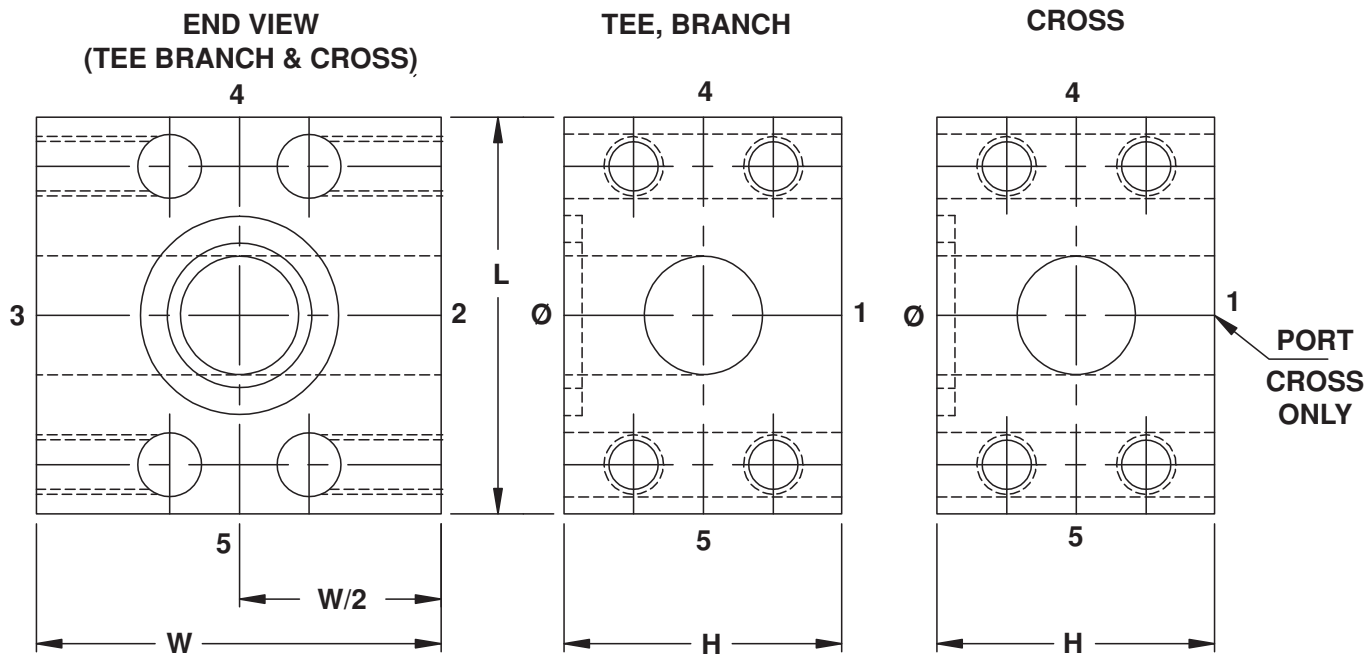
Thread depths may not be as specified in the latest revisions of SAE J518-1 and SAE J518-2. The thread depths furnished were designed to prevent the stripping of internal threads when torqued to the limits specified in SAE J518 Jun93.

The total depth of thread was made to accept the use of fasteners to attach standard SAE flanges to the Inserta® modular fittings without bottoming. Minimum thread depths were determined using the formulas in ASNI B1.1 that considered the yield strengths of both the modular fitting and the fasteners. Thread shear stresses were also limited to 70% of the internal thread material.

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**MODULAR CONNECTORS  
CODE 61 AND CODE 62  
4-BOLT SPLIT FLANGE TYPE**





DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face Ø.  
 DESIGN C = 4-Bolt flange ports on all designated faces.

**CODE 61**

NOMINAL SIZE	H	L	W	O-RING SIZE NO.
6108	2.00	2.12	2.00	210
6112	2.25	2.56	2.50	214
6116	2.72	2.75	2.72	219
6120	2.97	3.12	2.97	222
6124	3.25	3.69	3.50	225
6132	4.00	4.00	4.00	228
6140	4.50	4.50	4.50	232
6148	5.25	5.31	5.20	237
6156	5.50	6.00	5.50	241
6164	6.00	6.38	6.00	245

**CODE 62**

6208	2.00	2.20	2.00	210
6212	2.50	2.82	2.50	214
6216	3.00	3.20	3.00	219
6220	3.25	3.80	3.50	222
6224	3.75	4.50	4.00	225
6232	4.50	5.25	5.00	228
6240	6.00	6.88	6.00	232
6248	8.46	8.50	8.46	237

**GAUGE PORTS, #6 SAE (9/16-18)** are available on elbows and branch tees at position 1, on elbows and run tees at position 3, and on all modular connectors size 24 and larger at positions 4 and 5.

**TEST PORTS** are available on elbows and branch tees at position 1, on elbows and run tees at position 3 and on all modular connectors size 20 and larger at positions 4 and 5.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b> CODE 61 AND CODE 62 4-BOLT SPLIT FLANGE TYPE</p>	
---	---	--

# Inserta Products, Inc.

## MODULAR CONNECTORS UNIFIED CODE U61 4-BOLT FLANGE TYPE

The INSERTA® UNIFIED CODE U61 4-Bolt Modular Connectors, are used in integrated hydraulic systems in place of welded and threaded pipe fittings. The UNIFIED CODE U61 4-Bolt pattern is the same as the CODE 61 but their ports and connecting flange footprints are significantly smaller. Socket Head Cap Screw Fasteners are used with the INSERTA® UNIFIED CODE U61 4-Bolt Modular Connectors and the ADAFLANGE® UNIFIED CODE U61 4-Bolt 4-Bolt Adapters. The INSERTA® UNIFIED CODE U61 4-Bolt Modular Connector, should be considered whenever the features of the larger CODE 61 and CODE 62 Modular Connectors are not required.

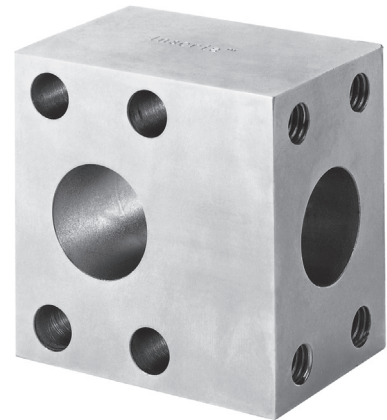
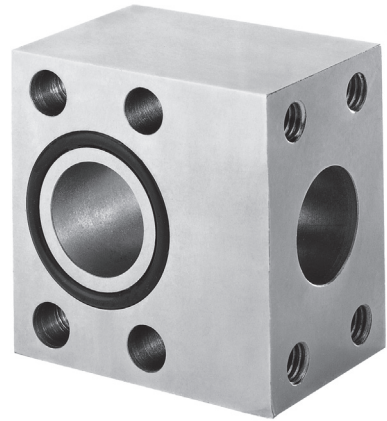
Design-A and Design-B Modular Connector elbows, run tees, branch tees, crosses, and port spacers are held in place by bolts (Socket Head Cap Screws) that extend from Face 1 to Face Ø in the 4-Bolt flange pattern.

Design-A incorporates the 4-Bolt clamp face groove and sealing O-ring on Face Ø and a plain face on Face 1. This design permits the stacking of various INSERTA® flange type modules together with a minimum of O-ring seals to virtually eliminate leaks associated with pipe threads. The task is further enhanced because using large wrenches with high torque normally needed to install pipe fittings is no longer required since INSERTA® Modular Connectors bolt together.

Design-B eliminates the 4-Bolt clamp face groove and O-ring on Face Ø for those applications that required this geometry.

Design-C has port faces on all designated faces, and therefore are not held together by thru bolts (as in Designs A & B), but are port faces that other flange type components are fastened.

Standard INSERTA® UNIFIED CODE U61 4-Bolt Modular Connectors, have all flange ports of the same size, and are made of steel.



### ORDERING INFORMATION

**INSERTA®** \_\_\_\_\_  
**MODULAR CONNECTORS**  
**U61 4-BOLT TYPE**  
CX = CROSS  
EL = ELBOW  
TR = TEE, RUN  
TB = TEE, BRANCH  
PS = PORT SPACER (A & B DESIGN)  
PN = PORT CONNECTOR (C DESIGN)

**MOUNTING DESIGN CODE** \_\_\_\_\_  
A = SEAL GROOVE & O-RING ON FACE Ø WITH 4-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø  
B = PLAIN FACE Ø WITH 4-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø  
C = 4-BOLT FLANGE PORTS ON ALL DESIGNATED FACES

**MOUNTING PATTERN** \_\_\_\_\_  
U461 = UNIFIED CODE U61 4-BOLT

**ICX - A - U461 24\* - N - G\* - T\* - ZN**

**SURFACE FINISH**  
ZN = ZINC NICKEL  
OMIT = UNPLATED

**TEST PORT**  
T = #4 SAE (7/16-20) or P = 1/4 NPTF  
\* = 1, 3, 4 and 5 PORT FACE POSITIONS  
(See Page 20 for Selection Availability)

**GAUGE PORT**  
G = #6 SAE (9/16-18)  
\* = 1, 3, 4 and 5 PORT FACE POSITIONS  
(See Page 20 for Selection Availability)

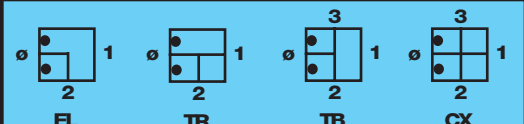
**SEAL COMPOUND**  
(OMIT FOR B & C DESIGNS)  
N = BUNA N (STANDARD)  
V = VITON

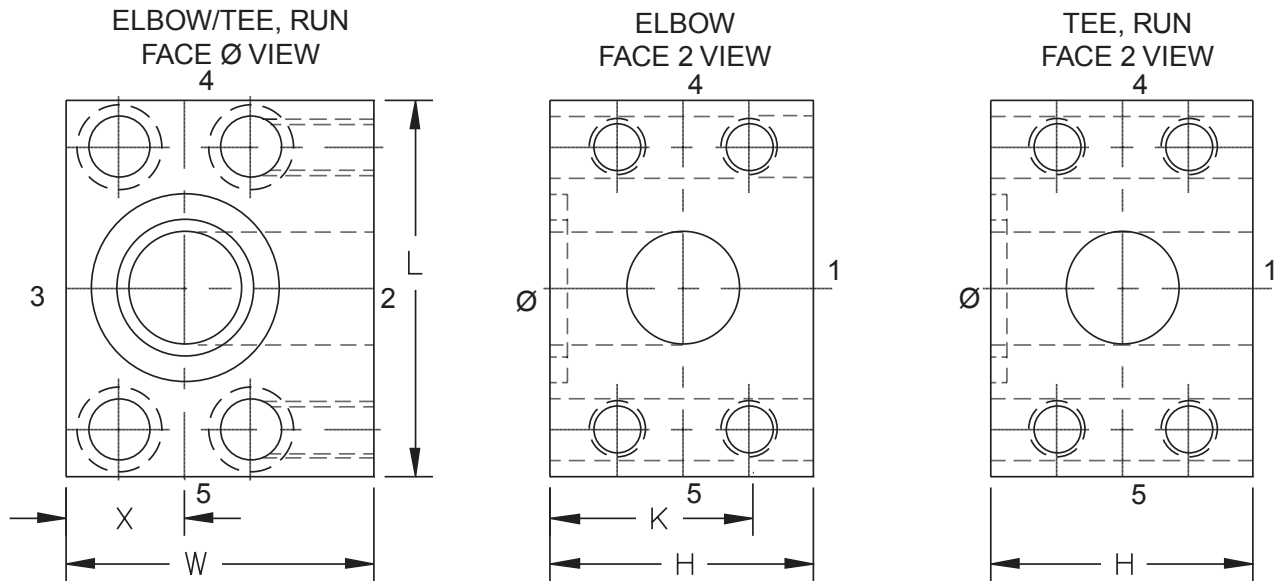
**PORT SPACER/CONNECTOR**  
'h1' DIMENSION (1/4 INCREMENTS)  
1 = 1/4 THICK  
2 = 1/2 THICK  
OMIT = FOR NON 1/4 INCREMENT h1 SIZES, THAT IS THE PS = .12 AND THE PN = .62

**NOMINAL SIZE**  
02 = 1/8      16 = 1  
04 = 1/4      20 = 1 1/4  
06 = 3/8      24 = 1 1/2  
08 = 1/2      32 = 2  
12 = 3/4

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

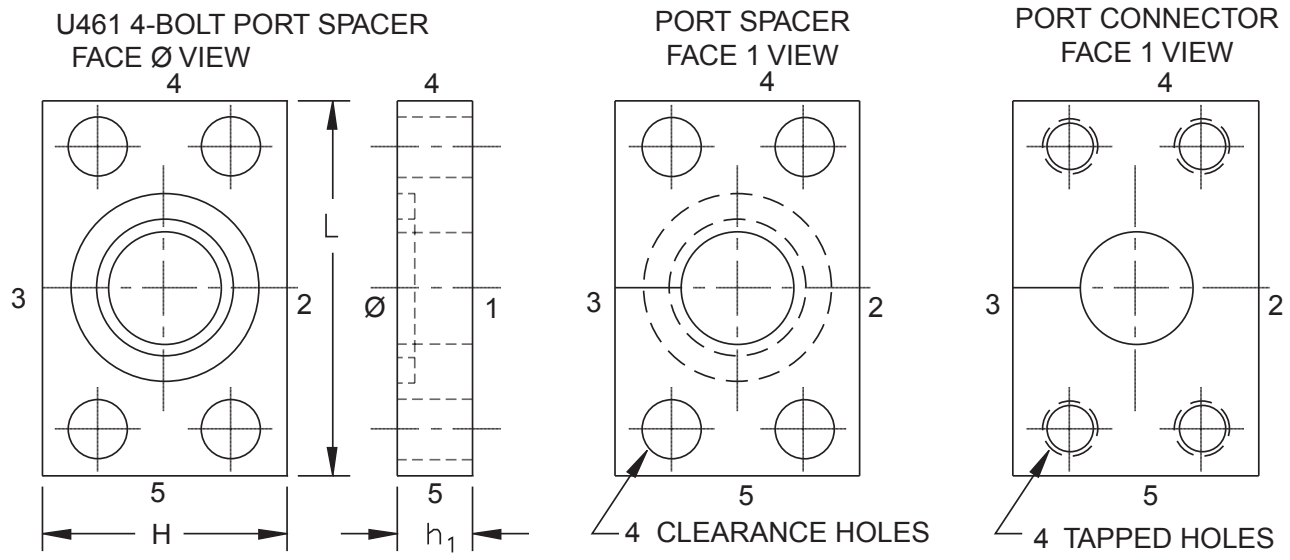
**MODULAR CONNECTORS  
CODE U61 4-BOLT  
FLANGE TYPE**



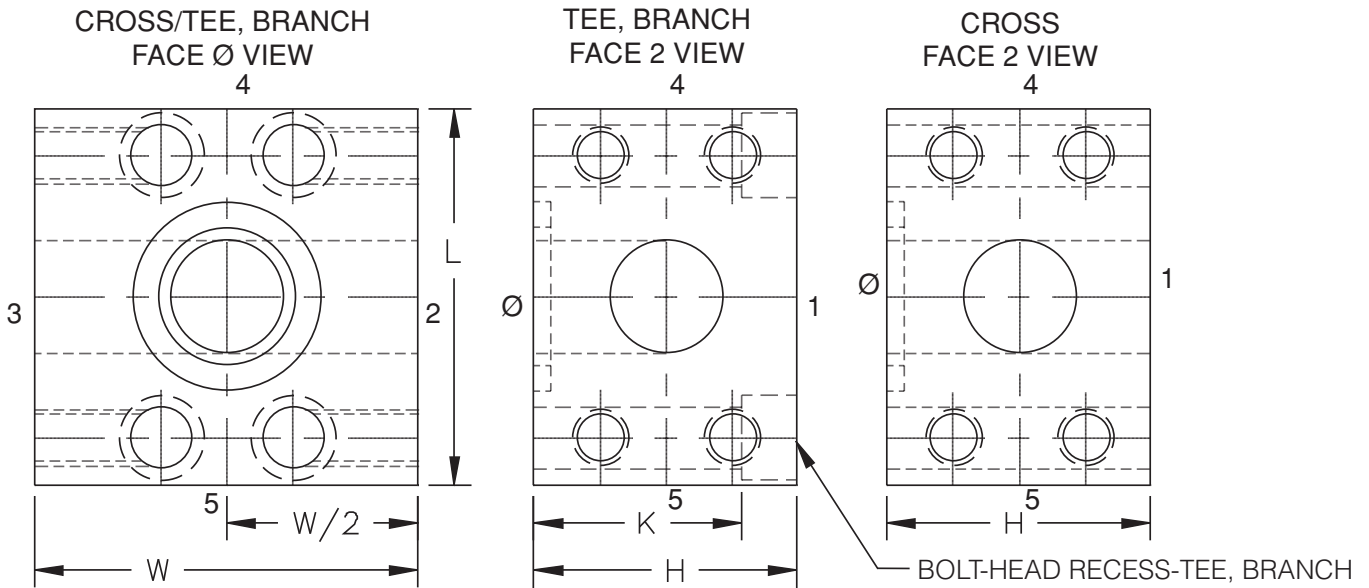


DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face-Ø.  
 DESIGN C = UNIFIED CODE U61 4-Bolt Pattern on all designated faces. Tapped holes without O-Ring groove.  
 NOTE: Port Spacers have clearance holes thru. Port Connector has tapped holes thru.

NOMINAL PATTERN SIZE	H	L	W	X	K	h <sub>1</sub>		O-RING SIZE NO.
						PS	PN	
U46102	.62	1.00	1.00	.31	.37	.12/.25	.62	010
U46104	.75	1.25	1.12	.38	.50	.12/.25	.75	011
U46106	.87	1.50	1.38	.44	.62	.12/.25	1.00	014
U46108	1.31	2.12	2.00	.66	1.00	1.00	1.25	210
U46112	1.62	2.56	2.38	.81	1.12	1.00	1.50	214
U46116	1.87	2.75	2.50	.94	1.38	1.00	1.50	219
U46120	2.12	3.12	2.88	1.06	1.66	1.00	1.75	222
U46124	2.50	3.69	3.38	1.25	1.94	1.00	2.00	225
U46132	3.00	4.00	3.75	1.50	2.44	1.00	2.00	228



<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b> CODE U61 4-BOLT FLANGE TYPE</p>	
---	--	--



DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face-Ø.  
 DESIGN C = UNIFIED CODE U61 4-Bolt Pattern on all designated faces. Tapped holes without O-Ring groove.  
 NOTE: Tee Branch has Bolt-Head recesses on Face 1.

NOMINAL PATTERN SIZE	H	L	W	W/2	K	O-RING SIZE NO.	TEE, BRANCH CLAMP FACE BOLT KITS (4 BOLTS)
U46102	.62	1.00	1.25	.62	.37	010	IBK-SH4008-32x0.62
U46104	.75	1.25	1.50	.75	.50	011	IBK-SH4010-24x0.87
U46106	.87	1.50	2.00	1.00	.62	014	IBK-SH4025-20x1.00
U46108	1.31	2.12	2.50	1.25	1.00	210	IBK-SH4031-18x1.50
U46112	1.62	2.56	3.00	1.50	1.12	214	IBK-SH4038-16x1.75
U46116	1.87	2.75	3.12	1.56	1.38	219	IBK-SH4038-16x2.00
U46120	2.12	3.12	3.50	1.75	1.66	222	IBK-SH4044-14x2.50
U46124	2.50	3.69	4.00	2.00	1.94	225	IBK-SH4050-13x2.75
U46132	3.00	4.00	4.37	2.18	2.44	228	IBK-SH4050-13x3.25

**GAUGE and TEST PORT AVAILABILITY**

The following optional Gauge and Test Ports can be included in the standard Code U61-4 Bolt Modular Connectors.

Gauge Ports, #6 SAE (9/16-18) are available on elbows and branch tees at position 1, on elbows and run tees at position 3, and on all modular connectors size 24 and larger at port face positions 4 and 5.

Test Ports, #4 SAE (7/16-20) and 1/4 NPTF are available on elbows and branch tees at position 1, on elbows and run tees at position 3 and on all modular connectors size 20 and larger at port face positions 4 and 5.

Note: Each port face is limited to one port, i.e. either a Test or Gauge Port.

<b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422	<b>MODULAR CONNECTORS</b> <b>CODE U61 4-BOLT</b> <b>FLANGE TYPE</b>				
		EL	TR	TB	CX

# Inserta Products, Inc.

## MODULAR CONNECTORS UNIFIED CODE U61 2-BOLT FLANGE TYPE

INSERTA® UNIFIED CODE U61 2-Bolt Modular Connectors are used in integrated hydraulic systems in place of welded and threaded pipe fittings. These 2-Bolt Modular Connectors offer great flexibility and additional options for making compact integrated hydraulic system. The 2-Bolt Modular Connectors should be used whenever the features of the 4-Bolt design are not required.

INSERTA® UNIFIED CODE U61 2-Bolt Modular Connectors use the upper right and lower left threaded holes of the INSERTA® UNIFIED CODE U61 4-Bolt port pattern for the 2-Bolt connections.

Design-A and Design-B Modular Connector elbows, run tees, branch tees, crosses, and port spacers are held in place by bolts (Socket Head Cap Screws) that extend from Face 1 to Face Ø in the 2-bolt flange pattern.

Design-A incorporates the 2-bolt clamp face groove and sealing O-ring on Face Ø and a plain face on Face 1. This design permits the stacking of various INSERTA® inline modules together with a minimum of O-ring seals to virtually eliminate leaks associated with pipe threads. The task is further enhanced because large wrenches with high torque normally needed to install pipe fittings are no longer necessary since the components bolt together.

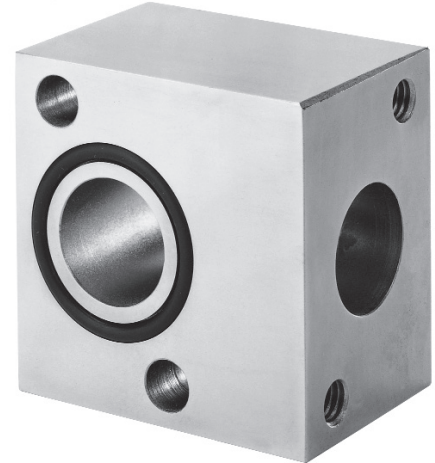
Design-B eliminates the 2-bolt clamp face groove and O-ring on Face Ø for those applications that require this geometry.

Design-C eliminates the Face 1 to Ø thru hole characteristics of Designs A & B. Design-C has port faces on all designated faces, and therefore are not held together by thru bolts, but are port faces that other flange type components are fastened. The nesting of the 2-bolt mounting holes on adjacent port faces makes these Design-C 2-Bolt Modular Connectors more compact than the Design C 4-Bolt Modular Connectors.

INSERTA® UNIFIED CODE U61 2-Bolt Port Spacers should also be used between CODE 61 and CODE U61 4-Bolt Ports and the connected ADAFLANGE™ UNIFIED CODE U61 2-BOLT Adapters to cover and protect the two unused mounting holes.

The INSERTA® UNIFIED CODE U61 2-Bolt Retainer Connector uses the same two threaded holes to retain either 2 or 4-Bolt Flange Type modules, and has the bolt holes counter-bored to recess the heads of the Socket Head Cap Screws. These Retainer Connectors have the other two diagonal holes of the 4-Bolt Port pattern threaded for fastening an ADAFLANGE™ UNIFIED CODE U61 2-Bolt Adapter. This Retainer Connector feature is also available as a built in option in the INSERTA® ICX and ITR Modular Connectors.

Standard INSERTA® Unified CODE U61 2-Bolt Modular Connectors have all flange ports of the same size, and are made of steel.



### ORDERING INFORMATION

UNIFIED WITH SAME SIZE OUTLETS

INSERTA® **ICX** — **A** — **U261 24 \*** — **N** — **G\*** — **T\***

**MODULAR CONNECTORS U61 2-BOLT TYPE**

- CX = CROSS
- EL = ELBOW
- RC = RETAINING CROSS
- RT = RETAINING TEE RUN
- TR = TEE, RUN
- TB = TEE, BRANCH
- PS = PORT SPACER (A & B DESIGN)
- PN = PORT CONNECTOR (C DESIGN)
- PR = PORT RETAINER (A & B DESIGN)

**MOUNTING DESIGN CODE**

- A = SEAL GROOVE & O-RING ON FACE Ø WITH 2-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø
- B = PLAIN FACE Ø WITH 2-BOLT PATTERN THRU HOLES FROM FACE 1 TO FACE Ø
- C = 2-BOLT FLANGE PORTS ON ALL DESIGNATED FACES

**MOUNTING PATTERN**

U 261 = UNIFIED CODE U61 2-BOLT

**TEST PORT**  
T = #4 SAE (7/16-20) or P=1/4 NPTF  
\* = 1, 3, 4 and 5 PORT FACE POSITIONS (See Page 20 for Selection Availability)

**GAUGE PORT**  
G = #6 SAE (9/16-18)  
\* = 1, 3, 4 and 5 PORT FACE POSITIONS (See Page 20 for Selection Availability)

**SEAL COMPOUND**  
(OMIT FOR DESIGNS B & C)  
N = BUNA N (STANDARD)  
V = VITON

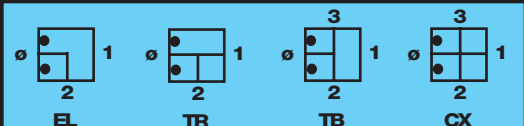
**NOMINAL SIZE**

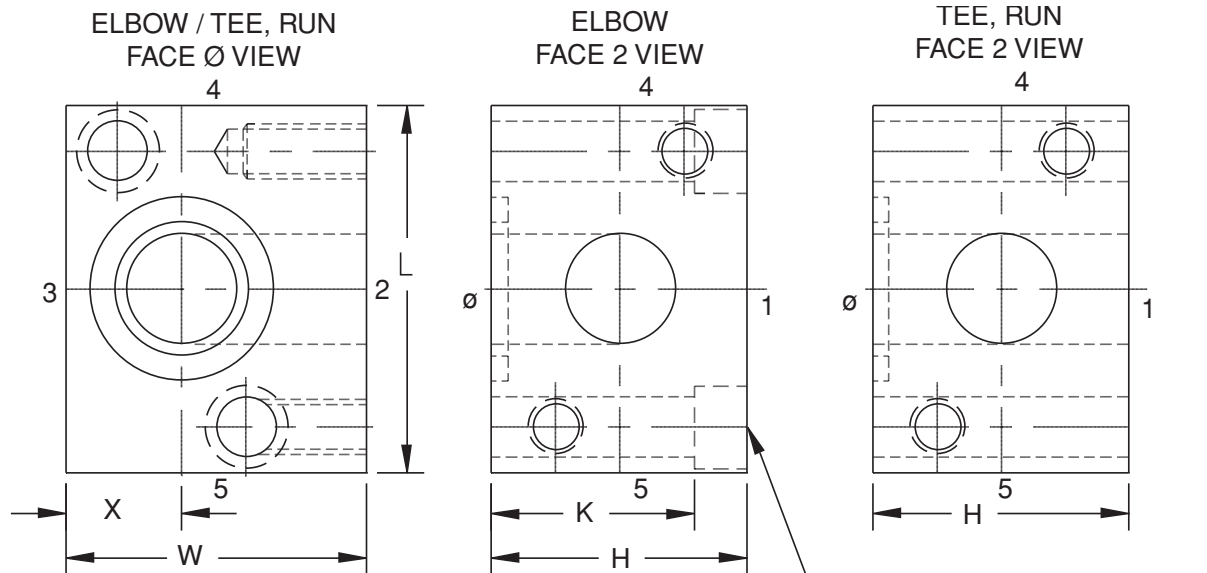
02 = 1/8	16 = 1
04 = 1/4	20 = 1 1/4
06 = 3/8	24 = 1 1/2
08 = 1/2	32 = 2
12 = 3/4	

**PORT SPACER/CONNECTOR**  
h, DIMENSION (1/4 INCREMENTS)  
1 = 1/4 THICK  
2 = 1/2 THICK  
OMIT = The non 1/4 increment standard PS or PC

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**MODULAR CONNECTORS  
UNIFIED CODE U61  
2-BOLT FLANGE TYPE**

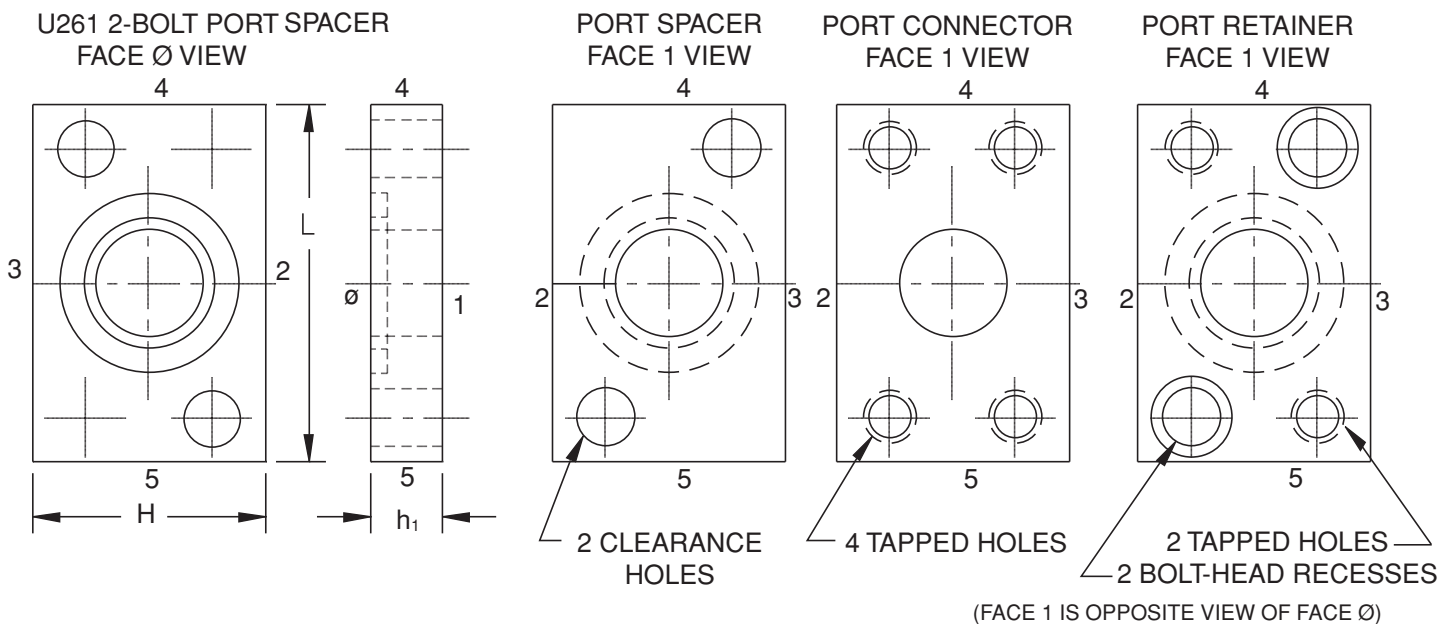




DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face-Ø.  
 \*NOTE: Port Spacer available in 2 standard h<sub>1</sub> sizes.

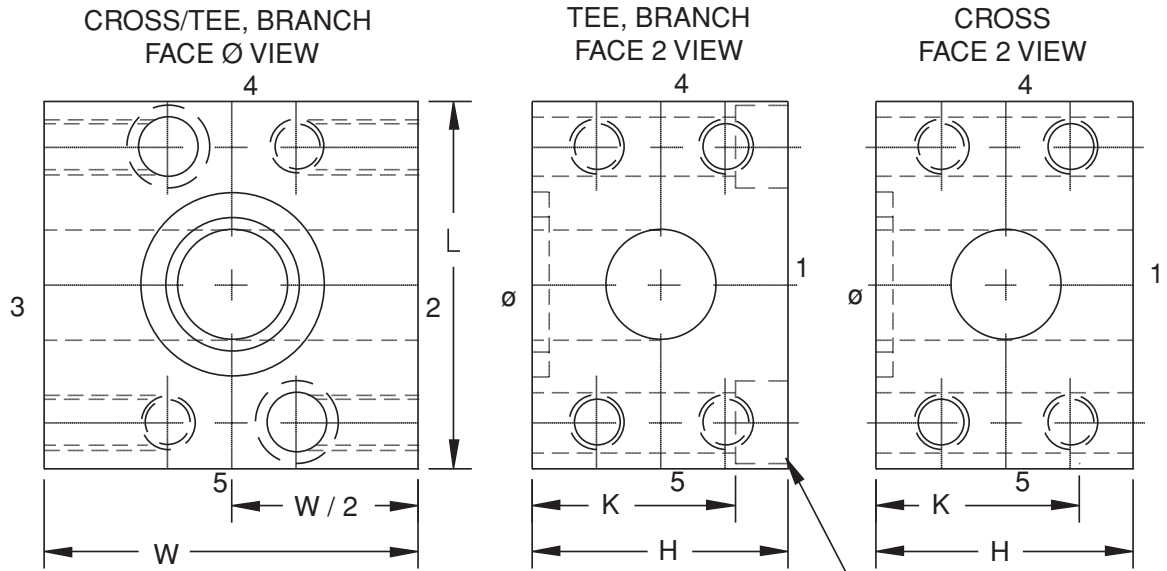
BOLT-HEAD RECESS-ELBOW

NOMINAL PATTERN SIZE	H	L	W	X	K	h <sub>1</sub>			K	O-RING SIZE NO.	ELBOW CLAMP FACE BOLT KITS (2 BOLTS)	PR BOLT LENGTHS
					EL	PS*	PN	PR	PR			
U26102	.62	1.00	1.00	.31	.37	.12/.25	.34	.50	.31	010	IBK-SH2008-32x0.62	0.62
U26104	.75	1.25	1.12	.38	.50	.12/.25	.38	.50	.31	011	IBK-SH2010-24x0.87	0.62
U26106	.87	1.50	1.38	.44	.62	.12/.25	.50	.50	.25	014	IBK-SH2025-20x1.00	0.62
U26108	1.31	2.12	2.00	.66	1.00	.25/.50	.62	1.00	.69	210	IBK-SH2031-18x1.50	1.25
U26112	1.62	2.56	2.38	.81	1.12	.25/.50	.75	1.00	.62	214	IBK-SH2038-16x1.75	1.25
U26116	1.87	2.75	2.50	.94	1.38	.25/.50	.75	1.00	.62	219	IBK-SH2038-16x2.00	1.25
U26120	2.12	3.12	2.88	1.06	1.66	.25/.50	.88	1.00	.56	222	IBK-SH2044-14x2.50	1.25
U26124	2.50	3.69	3.38	1.25	1.94	.25/.50	1.00	1.00	.50	225	IBK-SH2050-13x2.75	1.25
U26132	3.00	4.00	3.75	1.50	2.44	.25/.50	1.00	1.00	.50	228	IBK-SH2050-13x3.25	1.25



<b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422	<b>MODULAR CONNECTORS</b> UNIFIED CODE U61 2-BOLT FLANGE TYPE	 EL	 TR	 TB	 CX
		 EL	 TR	 TB	 CX

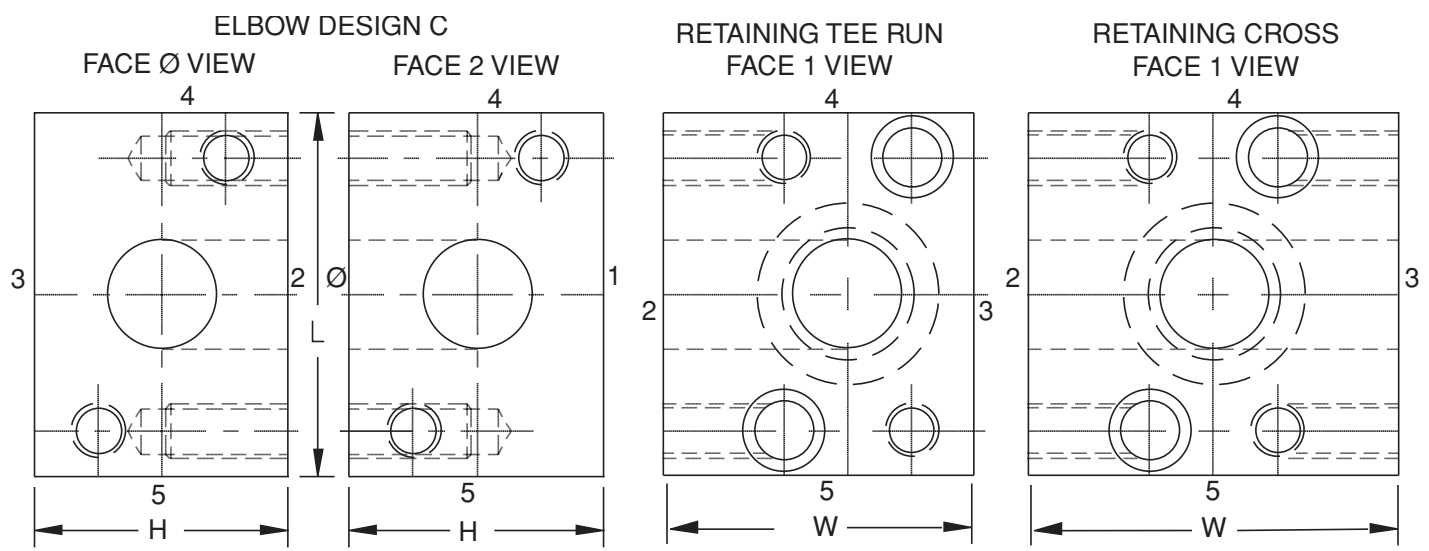




DESIGN A = AS SHOWN on drawings above and the title block schematics below.  
 DESIGN B = Eliminates seal groove and O-Ring from Face-Ø.  
 \*NOTE: Tee Branch has Bolt-Head recesses on Face 1.  
**BOLT-HEAD RECESS-TEE, BRANCH**

NOMINAL PATTERN SIZE	H	L	W	W/2	K TB, RC, RT	O-RING SIZE NO.	TB, RT, RC CLAMP FACE BOLT KITS (2 BOLTS)
U26102	.62	1.00	1.25	.37	.44	010	IBK-SH2008-32x0.62
U26104	.75	1.25	1.50	.50	.56	011	IBK-SH2010-24x0.87
U26106	.87	1.50	2.00	.62	.62	014	IBK-SH2025-20x1.00
U26108	1.31	2.12	2.50	1.00	1.00	210	IBK-SH2031-18x1.50
U26112	1.62	2.56	3.00	1.12	1.25	214	IBK-SH2038-16x1.75
U26116	1.87	2.75	3.12	1.38	1.50	219	IBK-SH2038-16x2.00
U26120	2.12	3.12	3.50	1.66	1.69	222	IBK-SH2044-14x2.50
U26124	2.50	3.69	4.00	1.94	2.00	225	IBK-SH2050-13x2.75
U26132	3.00	4.00	4.37	2.44	2.50	228	IBK-SH2050-13x3.25

DESIGN C  
 U61 2-BOLT FLANGE PORT MOUNTING SURFACE ON ALL FACES SPECIFIED. TAPPED HOLES WITHOUT O-RING GROOVE.



**GAUGE and TEST PORT AVAILABILITY**

AVAILABLE GAUGE and PORT LOCATIONS ARE THE SAME AS THOSE FOR THE CODE U61 4-BOLT MODULAR CONNECTORS (see page 20).

<p><b>Inserta Products, Inc.</b>                  Blue Bell, Pa. 19422</p>	<p><b>MODULAR CONNECTORS</b>                  UNIFIED CODE U61                  2-BOLT FLANGE TYPE</p>	
--	--	--

# Inserta Products, Inc.

## SPECIALTY FLANGE PLATES

INSERTA® has various proprietary Specialty Flange Plates that gives one great flexibility in the assembly of INSERTA® modular valves and connectors. Specialty Flange Plates for use with INSERTA® **Modular Valves and Connectors, 4-Bolt Flange Type** include Seal Plates with seal and optional integrity support ring, Gender Changer plates, Blanking Plates and Blanking Plates with orifice. An example of each of these is shown below:

### Seal Plate with Seal and optional Integrity Support Ring\*

INSERTA® Seal Plates are made to locate and provide the proper squeeze on the O-Ring to facilitate sealing on the two joining surfaces. An optional Integrity Support Ring can be added to provide structural support for the two joining inner surfaces. It's outer diameter is grooved with radial fluid control orifices to center and improve the O-Ring's loading. This support ring should also be used to eliminate seal damage or loss caused by rapid fluid decompression and/or high line flow forces.

### Gender Changer Plate

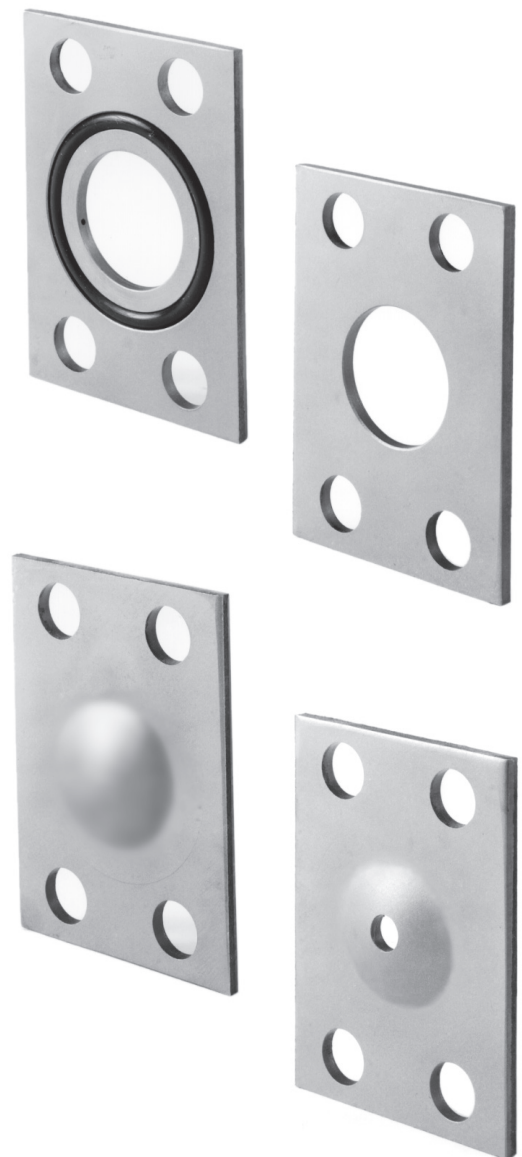
INSERTA® Gender Changer Plates are made with a nominal size center hole. This permits two O-Ring clamp like flange faces to be joined together with their O-Ring's sealing on the opposing Gender Changer plate's surface.

### Blanking Plate\*

INSERTA® Blanking Plates are made with a dome that induces stresses in the plate that are several times greater than any anticipated fluid's maximum opposing pressure stress. The dome is installed facing the fluid side that is to become pressurized.

### Orifice Plate\*

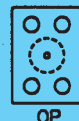
INSERTA® Orifice Plates are Blanking Plates with an orifice in the center of the dome. By facing the dome upstream, this provides a preferred leading center stream sharp edge orifice for fluid flow control.

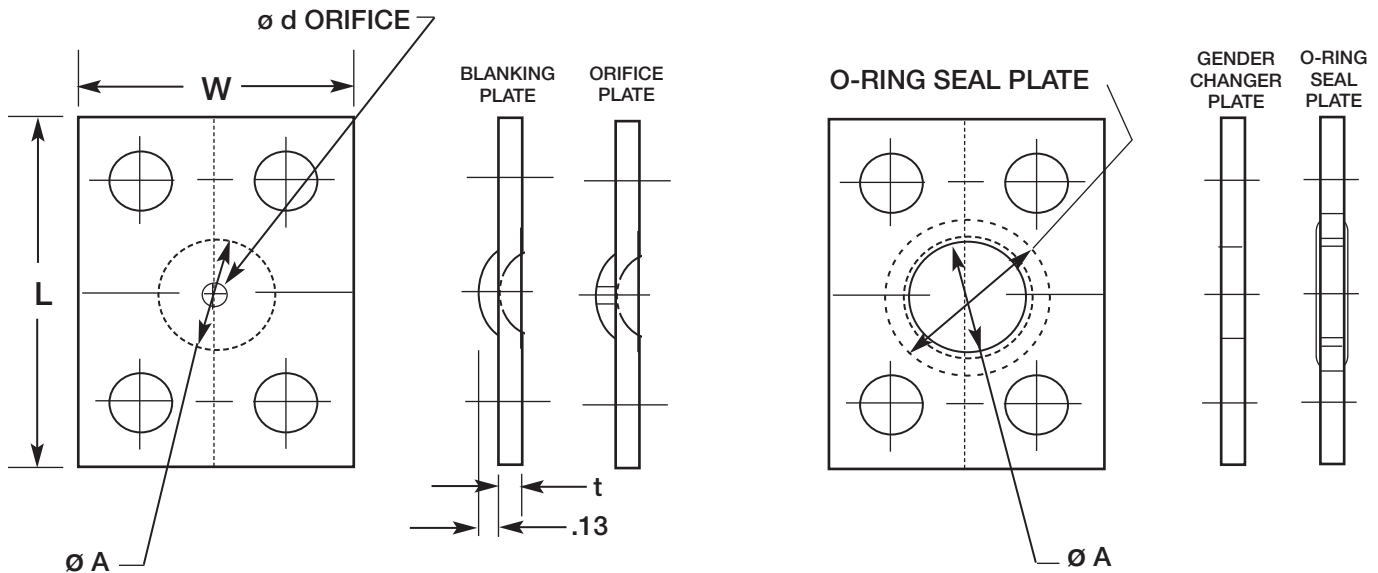


\*Patent Pending

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**SPECIALTY  
FLANGE  
PLATES**



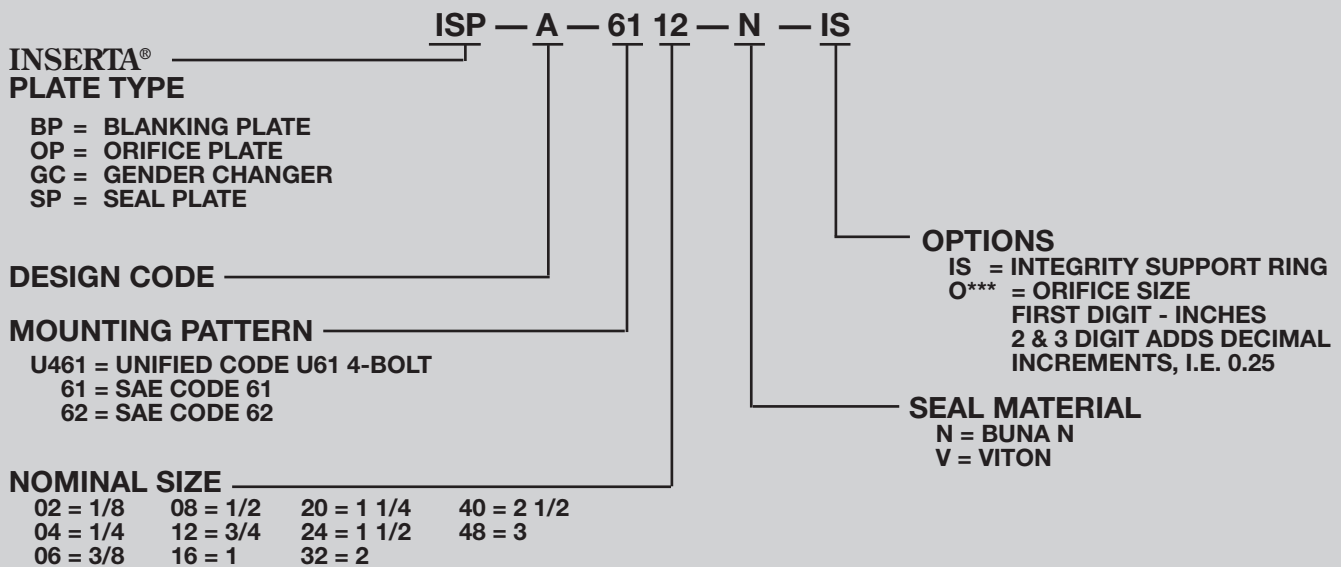


FLANGE PLATES

PATTERN SIZE	A DIA.	L	W	t	d* DIA.	O-RING SIZE NO.	PATTERN SIZE	A DIA.	L	W	t	d* DIA.	O-RING SIZE NO.			
U46102	1/8	1.00	.62	.06	CUSTOMER SPECIFIED	010	6208	1/2	2.25	1.50	.11	CUSTOMER SPECIFIED	210			
U46104	1/4	1.25	.75	.06		011	6212	3/4	2.75	1.88			214			
U46106	3/8	1.50	.88	.06		014	6216	1	3.00	2.25			219			
6108	1/2	2.12	1.38	.11		210	6220	1 1/4	3.25	2.50			222			
6112	3/4	2.50	1.75			214	6224	1 1/2	4.25	3.00			225			
6116	1	2.75	2.00			219	6232(1)	2	5.00	4.00			.24	228		
6120	1 1/4	3.00	2.25			222	6240(2)	2 1/2	6.75	4.25			.11	N/A	232	
6124	1 1/2	3.75	2.75	.24		225	6248(2)	3	8.50	5.25			.11	N/A	237	
6132(1)	2	4.00	3.25			228	*MIN. $\phi$ = .016									
6140(2)	2 1/2	4.50	3.50			.11									N/A	232
6148(2)	3	5.25	4.25	.11	N/A	237										

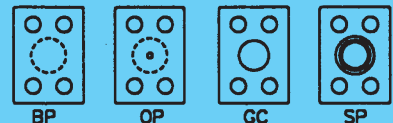
- (1) t = .11 for seal plate and gender changer.
- (2) Sizes 6\*40 & 6\*48 are not available in blanking or orifice plates.

### ORDERING INFORMATION



**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**SPECIALTY  
FLANGE  
PLATES**



# Inserta Products, Inc.

## 90° FLANGE 4-BOLT ROTATIONAL RETAINING ADAPTERS

INSERTA® Valves and Modular Connectors are effectively assembled by bolting these components together on the Code U461, Code 61 and Code 62 4-Bolt patterns. The assembly of these components saves space, time and money, eliminates piping leaks, and adds value and integrity to a system. Connecting a series of INSERTA® Code U461, Code 61 or Code 62 4-Bolt Modular Valves & Connectors together puts the interconnecting flow paths all in one plane, i.e. normally in the horizontal or vertical plane with flow passing between the large bolt spacings in the Code 61 and Code 62 bolt patterns.

The INSERTA® 90° Flange Rotational Retaining Adapters provide the means to rotate the flow plane 90° and thereby permit flow paths in both the horizontal and vertical planes. Design-A provides a clamp flange face seal on Face Ø and counterbored thru holes from Face 1 to Face Ø for use with socket head clamping bolts. The Flange port is rotated 90° on Face 1. The Design-A INSERTA® 90° Flange Rotational Retaining Adapter is also used with longer bolts to fasten together and terminate a series of stacked Code U461, Code 61 or Code 62 INSERTA® Modules. The Design-B adapter has a plain clamp face for those special applications that require this unique geometry. Together, these INSERTA® 90° Flange Rotational Retaining Adapters offer great flexibility in the design and assembly of multiplanar Code U461, Code 61 and Code 62 fluid flow systems.

The INSERTA® 90° Flange Rotational Retaining Adapters are available with the same Code and size ports, or with one reducing port size. They are also available with Code U461, Code 61, or Code 62 ports of the same size. The models with different Codes or port sizes on the adapters are pressure rated based on the lower of the two flange connections. INSERTA® Code U461 Flange Rotational Retainers should be specified to connect two Code U461 4-Bolt flanges when their higher-pressure rating is required. Likewise, specify the Code 62 with the Code U461 4-Bolt ports when it's higher-pressure rating is required. These connector options further enhance the use and flexibility in assembling INSERTA® Modular Valves.

All INSERTA® 90° Flange Rotational Retaining Adapters are made of steel as standard. Custom adapters and adapters made from other materials can be provided whenever a customer's design dictates a specialized requirement.

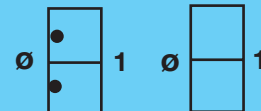


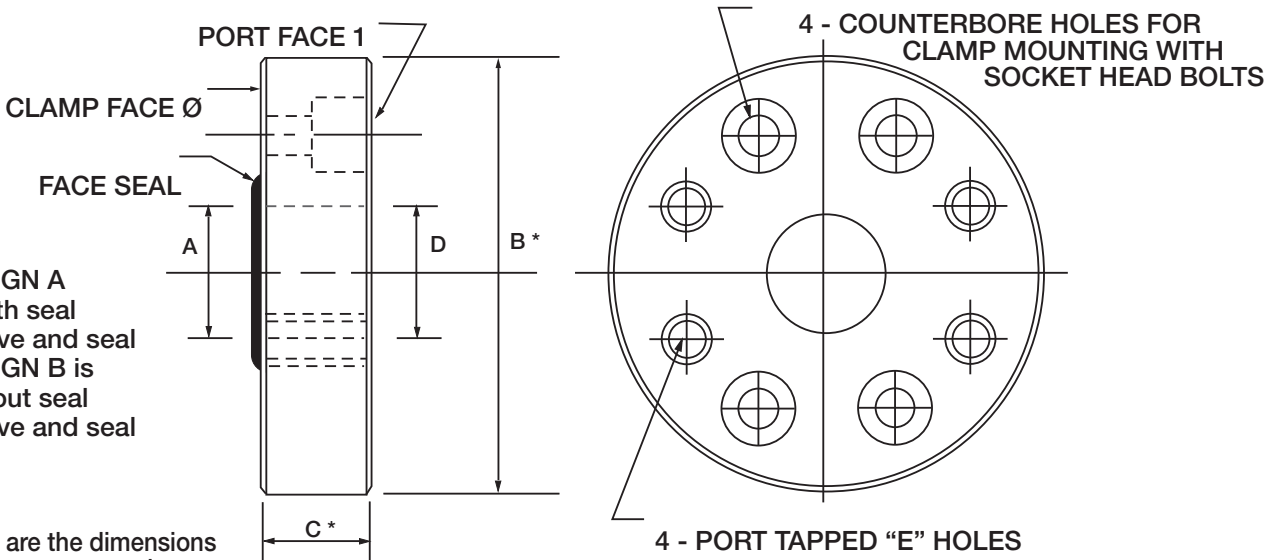
### ORDERING INFORMATION

<p><b>IFRA</b> — <b>A</b> — <b>6116</b> — <b>6116</b> — <b>N</b></p>	<p>INSERTA® 90° FLANGE ROTATIONAL RETAINING ADAPTER</p>	<p>CLAMP FACE Ø</p>	<p>PORT FACE 1</p>	<p>SEAL COMPOUND (OMIT FOR DESIGN B) N = BUNA N (STANDARD) V = VITON</p>																																																				
<p>MOUNTING DESIGN CODE A = 4-BOLT SEAL CLAMP FACE Ø x PORT FACE 1 B = 4-BOLT PLAIN CLAMP FACE Ø x PORT FACE 1</p>	<table border="0"> <thead> <tr> <th colspan="4">CLAMP FACE or PORT FACE PATTERN</th> </tr> <tr> <th>SIZE</th> <th>CODE U461</th> <th>CODE 61</th> <th>CODE 62</th> </tr> </thead> <tbody> <tr> <td>02</td> <td>U46102</td> <td></td> <td></td> </tr> <tr> <td>04</td> <td>U46104</td> <td></td> <td></td> </tr> <tr> <td>06</td> <td>U46106</td> <td></td> <td></td> </tr> <tr> <td>08</td> <td>U46108</td> <td>6108</td> <td>6208</td> </tr> <tr> <td>12</td> <td>U46112</td> <td>6112</td> <td>6212</td> </tr> <tr> <td>16</td> <td>U46116</td> <td>6116</td> <td>6216</td> </tr> <tr> <td>20</td> <td>U46120</td> <td>6120</td> <td>6220</td> </tr> <tr> <td>24</td> <td>U46124</td> <td>6124</td> <td>6224</td> </tr> <tr> <td>32</td> <td>U46132</td> <td>6132</td> <td>6232</td> </tr> <tr> <td>40</td> <td></td> <td>6140</td> <td>6240</td> </tr> <tr> <td>48</td> <td></td> <td>6148</td> <td>6248</td> </tr> </tbody> </table>				CLAMP FACE or PORT FACE PATTERN				SIZE	CODE U461	CODE 61	CODE 62	02	U46102			04	U46104			06	U46106			08	U46108	6108	6208	12	U46112	6112	6212	16	U46116	6116	6216	20	U46120	6120	6220	24	U46124	6124	6224	32	U46132	6132	6232	40		6140	6240	48		6148	6248
CLAMP FACE or PORT FACE PATTERN																																																								
SIZE	CODE U461	CODE 61	CODE 62																																																					
02	U46102																																																							
04	U46104																																																							
06	U46106																																																							
08	U46108	6108	6208																																																					
12	U46112	6112	6212																																																					
16	U46116	6116	6216																																																					
20	U46120	6120	6220																																																					
24	U46124	6124	6224																																																					
32	U46132	6132	6232																																																					
40		6140	6240																																																					
48		6148	6248																																																					

Inserta Products, Inc.  
Blue Bell, Pa. 19422

90° FLANGE 4-BOLT  
ROTATIONAL  
RETAINING ADAPTERS





\* B and C are the dimensions of the larger pattern size

**UNIFIED CODE U461 & CODE 61**

CODE U461 PATTERN SIZE	NOMINAL SIZE	C	CODE 61 PATTERN SIZE	C	ALL FLANGE SIZES				CLAMP FACE BOLT KIT (4-BOLTS)	O-RING SIZE NO.
					A	B	D	E UNC-2B		
U46102	1/8	.50	---	---	.13	1.12	.13	8-32	IBK-SH4008-32x0.62	010
U46104	1/4	.50	---	---	.25	1.38	.25	10-24	IBK-SH4010-24x0.62	011
U46106	3/8	.50	---	---	.38	1.62	.38	1/4-20	IBK-SH4025-20x0.62	014
U46108	1/2	1.00	6108	1.00	.50	2.38	.50	5/16-18	IBK-SH4031-18x1.00	210
U46112	3/4	1.12	6112	1.00	.75	3.00	.75	3/8-16	IBK-SH4038-16x1.00	214
U46116	1	1.12	6116	1.12	1.00	3.00	1.00	3/8-16	IBK-SH4038-16x1.00	219
U46120	1 1/4	1.25	6120	1.12	1.25	3.50	1.25	7/16-14	IBK-SH4044-14x1.25	222
U46124	1 1/2	1.38	6124	1.12	1.50	4.00	1.50	1/2-13	IBK-SH4050-13x1.25	225
U46132	2	1.50	6132	1.12	2.00	4.50	2.00	1/2-13	IBK-SH4050-13x1.25	228
---	2 1/2	---	6140	1.12	2.50	5.00	2.50	1/2-13	IBK0SH4050-13x1.25	232
---	3	---	6148	1.12	3.00	6.00	3.00	5/8-11	IBK-SH4063-11x1.50	237

**SAE CODE 62**

PATTERN SIZE	NOMINAL SIZE	A	B	C	D	E	CLAMP FACE BOLT KIT (4 BOLTS)	O-RING SIZE NO.
6208	1/2	.50	2.38	1.00	.50	5/16-18	IBK-SH4031-18x1.00	210
6212	3/4	.75	3.00	1.12	.75	3/8-16	IBK-SH4038-16x1.00	214
6216	1	1.00	3.50	1.12	1.00	7/16-14	IBK-SH4044-14x1.25	219
6220	1 1/4	1.25	4.00	1.25	1.25	1/2-13	IBK-SH4050-13x1.25	222
6224	1 1/2	1.50	4.50	1.38	1.50	5/8-11	IBK-SH4063-11x1.50	225
6232	2	2.00	5.50	1.50	2.00	3/4-10	IBK-SH4075-10x1.75	228
6240	2 1/2	2.50	7.00	1.50	2.50	7/8-9	IBK-SH4088-9x2.25	232
6248	3	3.00	8.50	1.62	3.00	1 1/8-7	IBK-SH4112-7x2.50	237

- The INSERTA® 90° Flange Rotational Retaining Adapters are available in the following combinations:
- Code 61 to Code 61 in the same size or with Port Face 1 reduced one size.
  - Code 62 to Code 62 in the same size or with Port Face 1 reduced one size.
  - Code 62 clamp Face Ø to the same size Code 61 Port Face 1.
  - Code 62 to Code U461 in the same size or with Port Face 1 reduced one size.
  - Code U461 to Code U461 in the same size or with Port Face 1 reduced one size.

The bolt kits listed are for mounting the adapters directly to the corresponding Port Face. The length of the bolts in the kit is indicated after the x; i.e. 1.00 is 1.00 inches long. The length in these bolt kits are the minimum length to connect to an Inserta™ steel module having an SAE Code 61 or 62 port pattern and provides 1 1/2 times the nominal bolt diameter for thread engagement. Longer lengths need to be considered when other conditions exist such as connecting to lower strength materials. When one wants to use INSERTA® components between the Port Face and these adapters, longer bolts will also be required. Changing the last digits to reflect the length required in inches specify these longer bolt kits. The bolt kits that are available are listed on page 75.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>90° FLANGE 4-BOLT ROTATIONAL RETAINING ADAPTERS</b></p>	
---	---	--

**ADAPTORS & CONNECTORS**

# Inserta Products, Inc.

## 90° FLANGE ROTATIONAL CONNECTORS

The **INSERTA® 90° Flange Rotational Connectors** gives one greater flexibility in assembling **INSERTA® Valves and Modular Connectors** on Code U461, Code 61 and Code 62 4-Bolt patterns. The assembly of these components saves space, time and money, eliminates piping leaks, and adds value and integrity to a system.

An **INSERTA® 90° Flange Rotational Connector** and an **INSERTA® 90° Flange Rotational Retaining Adapter** are used to sandwich **INSERTA® Valves and Modular Connectors** together as inline flange ported assemblies.

An **INSERTA® 90° Rotational Connector** and two **INSERTA® 90° Flange Rotational Retaining Adapters** are used to sandwich **INSERTA® Valves and Modular Connectors** together as inline flange ported assemblies with the inlet and outlet ports rotated 90°.

The **INSERTA® 90° Flange Rotational Connectors** are available with the same Code and size ports, or with one reducing port size. They are available with Code 61, Code U461 or Code 62 ports of the same size. The models with different Codes or sizes of ports on the connector are pressure rated based on the lower of the two pressure rated flange connectors. The **INSERTA® Code 61 Flange Rotational Connectors** are used to connect Code 61 to Code 61 4-Bolt flanges. **Code U461 Flange Rotational Retainers** should be specified to connect two Code U461 4-Bolt flanges when their higher-pressure rating is required. Likewise, specify the Code 62 with the Code U461 4-Bolt ports when its higher-pressure rating is required. These connector options further enhance the use and flexibility in assembling **INSERTA® Modular Valves**.

All **INSERTA® 90° Flange Rotational Connectors** are made of steel as standard. Custom connectors and connectors made from other materials can be provided whenever a customer's design dictates a specialized requirement.



### ORDERING INFORMATION

**IFRC - A - 6116 - 6116 - \***

INSERTA®  
90° FLANGE  
ROTATIONAL CONNECTOR

**SURFACE FINISH**  
EN = ELECTROLESS NICKEL  
OMIT = UNPLATED

PORT FACE 1

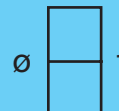
PORT FACE Ø

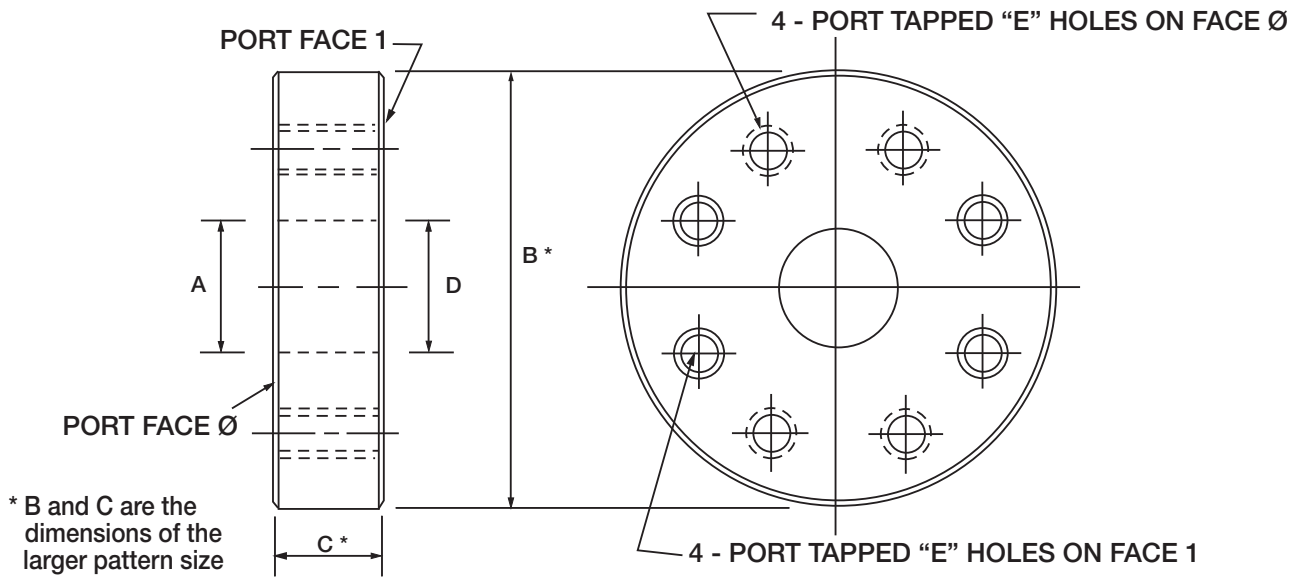
MOUNTING DESIGN CODE

SIZE	CODE U461	CODE 61	CODE 62
02	U46102		
04	U46104		
06	U46106		
08	U46108	6108	6208
12	U46112	6112	6212
16	U46116	6116	6216
20	U46120	6120	6220
24	U46124	6124	6224
32	U46132	6132	6232
40		6140	6240
48		6148	6248

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**90° FLANGE  
ROTATIONAL  
CONNECTORS**





### CODE 61 & UNIFIED CODE U461

CODE U461 PATTERN SIZE	NOMINAL SIZE	C	CODE 61 PATTERN SIZE	C	ALL FLANGE SIZES			
					A	B	D	E UNC-2B
U46102	1/8	.50	—	—	.13	1.12	.13	8-32
U46104	1/4	.50	—	—	.25	1.38	.25	10-24
U46106	3/8	.50	—	—	.38	1.62	.38	1/4-20
U46108	1/2	1.00	6108	1.00	.50	2.38	.50	5/16-18
U46112	3/4	1.12	6112	1.00	.75	3.00	.75	3/8-16
U46116	1	1.12	6116	1.12	1.00	3.00	1.00	3/8-16
U46120	1 1/4	1.25	6120	1.12	1.25	3.50	1.25	7/16-14
U46124	1 1/2	1.38	6124	1.12	1.50	4.00	1.50	1/2-13
U46132	2	1.50	6132	1.12	2.00	4.50	2.00	1/2-13
—	2 1/2	—	6140	1.12	2.50	5.00	2.50	1/2-13
—	3	—	6148	1.12	3.00	6.00	3.00	5/8-11

### CODE 62

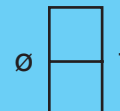
PATTERN SIZE	NOMINAL SIZE	A	B	C	D	E
6208	1/2	.50	2.38	1.00	.50	5/16-18
6212	3/4	.75	3.00	1.12	.75	3/8-16
6216	1	1.00	3.50	1.12	1.00	7/16-14
6220	1 1/4	1.25	4.00	1.25	1.25	1/2-13
6224	1 1/2	1.50	4.50	1.38	1.50	5/8-11
6232	2	2.00	5.50	1.50	2.00	3/4-10
6240	2 1/2	2.50	7.00	1.50	2.50	7/8- 9
6248	3	3.00	8.50	1.62	3.00	1 1/8- 7

The 90° Flange Rotational Connectors are available in the following combinations:

1. Code 61 to Code 61 in the same size or with Port Face 1 reduced one size.
2. Code 62 to Code 62 in the same size or with Port Face 1 reduced one size.
3. Code 62 to Code 61 in the same size or with Port Face 1 reduced one size.
4. Code 62 to Code U461 in the same size or with Port Face 1 reduced one size.
5. Code U461 to Code U461 in the same size or with Port Face 1 reduced one size.

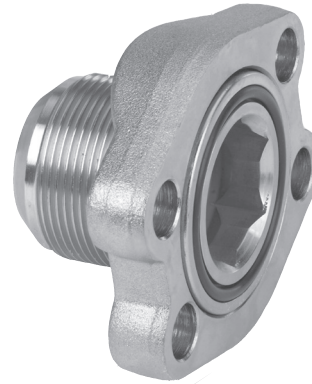
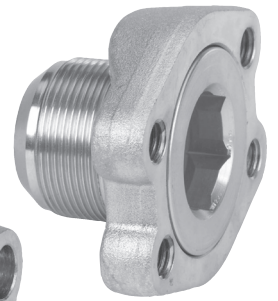
**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**90° FLANGE  
ROTATIONAL  
CONNECTORS**





# ADACONN®



## ADAFLANGE™ SOCKET HEAD FLANGE ADAPTERS

The ADAFLANGE™ SOCKET HEAD FLANGE ADAPTER (AF0), with its face seal, is generally supplied with the clamp type (thru-hole) flange (AS1). This combination adapts a flange port to a threaded connection using a minimum of space and joints.

## ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTERS

The ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTER (AFP), with its plain face, is generally supplied with the threaded type companion flange (BS1). This combination adapts a threaded connection to a flange connection using a minimum of space and joints.

Both the ADAFLANGE™ and the ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTERS can be supplied with either the clamp type or threaded type companion flanges, thereby giving you the greatest amount of flexibility in saving space and reducing joints.

Use of the ADAFLANGE™ and ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTERS together makes a great union.

## ORDERING INFORMATION

**AFO - K 12 - S 12 - 1.75 - S 1 - B - A S 1**

**ADACONN®**  
**ADAPTER TYPE**  
 AFO = ADAFLANGE™  
 AFP = ADAFLANGEPORT™

**FLANGE HEAD DESIGN**  
 K = SAE - J518 (CODE 61)  
 R = SAE - J518 (CODE 62)

**FLANGE HEAD SIZE**  
 08 = 1/2      24 = 1-1/2  
 12 = 3/4      32 = 2  
 16 = 1        40 = 2-1/2  
 20 = 1-1/4    48 = 3

**MALE THREAD TYPE**  
 F = 37° FLARE  
 S = SAE STRAIGHT O-RING STUD ENDS  
 P = PORT PLUG (NO THREAD EXTENSION)  
 O = O-RING FACE SEAL  
 L = TYPE SCHEDULE 40 - ANSI B1.20.3 NPTF  
 T = TYPE SCHEDULE 160 - ANSI B1.20.3 NPTF  
 X = TYPE XXS - ANSI B1.20.3 NPTF

**MALE THREAD SIZE<sup>1</sup>**

F & S TYPE	L,T,X TYPE	O TYPE	F & S TYPE	L,T,X TYPE	O TYPE
08 = 3/4-16	1/2-14	3/4-16	20 = 1 5/8-12	1 1/4-11 1/2	1 5/8-12
10 = 7/8-14			24 = 1 7/8-12	1 1/2-11 1/2	1 7/8-12
12 = 1 1/16-12	3/4-14	1 1/16-12	32 = 2 1/2-12	2-11 1/2	2 1/2-12
14 = 1 3/16-12			40 = 3-12	2 1/2-8	
16 = 1 5/16-12	1-11 1/2	1 5/16-12	48 = 3 1/2-12	3-8	

**SURFACE FINISH**  
 0 = PLAIN (NO FINISH) - STANDARD ON DUCTILE AND MALLEABLE IRON FLANGES  
 1 = ZINC CHROMATE - STANDARD ON STEEL FRAMES

**FLANGE MATERIAL**  
 D = DUCTILE IRON OR MALLEABLE IRON  
 S = STEEL

**FLANGE TYPE**  
 A = SAE - ONE-PIECE CLAMP TYPE  
 B = SAE - ONE-PIECE THREADED COMPANION TYPE

**SEAL MATERIAL**  
 (OMIT ON AFP WITH F or T THREAD)  
 B = BUNA N  
 V = VITON

**ADAPTER FINISH**  
 1 = ZINC CHROMATE  
 Ø = UNPLATED

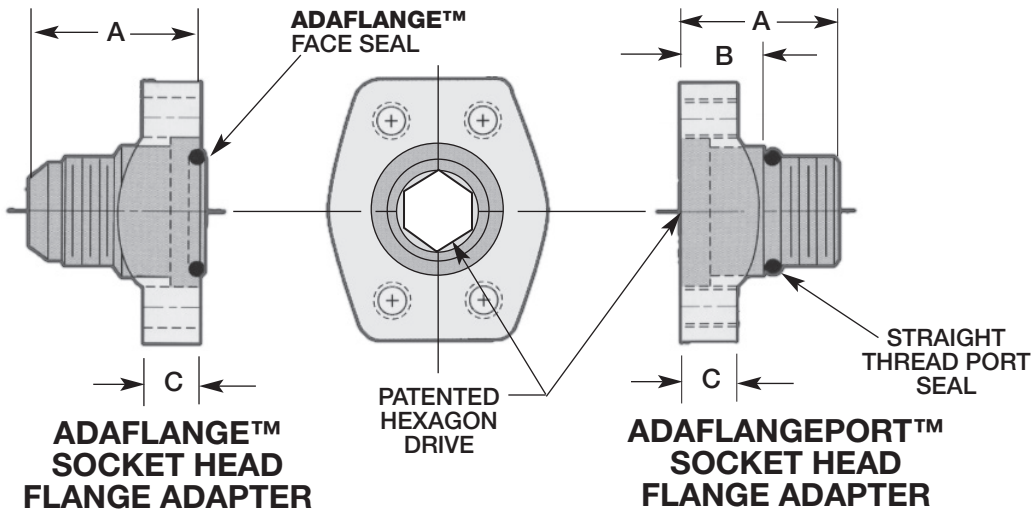
**ADAPTER MATERIAL**  
 S = STEEL  
 X = STAINLESS STEEL

**ADAPTER LENGTH**  
 1.75 = THE ACTUAL "A" LENGTH IN INCHES (OMIT FOR P TYPE)

<sup>1</sup>Male Thread Size Can Not Normally Exceed Flange Head Size with the One-Piece SAE Flange. The Exceptions are the Flange Head Size 08 and 12 may have the F10 and F14 size respectively.

<b>ADACONN®</b> Blue Bell, Pa. 19422	<b>ADAFLANGE™</b> <b>ADAFLANGEPORT™</b> CODE 61 & 62 <b>SOCKET HEAD ADAPTERS</b>	
---	---	--





SEE PAGE 73  
FOR WRENCH TOOL  
INFORMATION

**ADAFLANGE™ and ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTERS** are available with 37° Flare, NPTF threads or SAE straight thread O-Ring stud ends. ISO “M” thread O-Ring stud ends, ORS, O-Ring face seal and British threads are also available.

**ADAFLANGE™ and ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTERS** have hexagon drives in the head end to allow for center drive wrenching.

### SAE CODE 61 FLANGE HEAD - DESIGN K

FLANGE HEAD SIZE	STANDARD COMPACT LENGTH		STANDARD EXTENDED LENGTH		C	HEXAGON BOLT KIT (includes 4 hex bolts with lockwashers)	HEXAGON DRIVE SIZE	BIT or WRENCH NO.	O-RING SIZE NO.	
	A	B	A	B					FACE <sup>2</sup>	PORT <sup>1</sup>
6108	1.50	.94	2.25	1.69	.50	ABK-B4031-18x1.25/1.00*	7/16	AHB-A-7/16	210	908
6112	1.75	1.02	2.38	1.65	.56	ABK-B4038-16x1.25	5/8	AHB-A-5/8	214	912
6116	1.88	1.15	2.50	1.77	.62	ABK-B4038-16x1.25	7/8	AHB-A-7/8	219	916
6120	2.00	1.27	2.88	2.15	.62	ABK-B4044-14x1.50/1.25*	1-1/16	AHW-A-1-1/16	222	920
6124	2.13	1.40	3.00	2.27	.62	ABK-B4050-13x1.50	1-5/16	AHW-A-1-5/16	225	924
6132	2.38	1.65	3.25	2.52	.62	ABK-B4050-13x1.50	1-3/4	AHW-A-1-3/4	228	932
6140	2.75	—	3.75	—	.75	ABK-B4050-13x1.50	2-3/16	AHW-A-2-3/16	232	—
6148	3.00	—	4.00	—	.88	ABK-B4063-11x1.75/2.00*	2-5/8	AHW-A-2-5/8	237	—

### SAE CODE 62 FLANGE HEAD - DESIGN R

FLANGE HEAD SIZE	STANDARD COMPACT LENGTH		STANDARD EXTENDED LENGTH		C	HEXAGON BOLT KIT (includes 4 hex bolts with lockwashers)	HEXAGON DRIVE SIZE	BIT or WRENCH NO.	O-RING SIZE NO.	
	A	B	A	B					FACE <sup>2</sup>	PORT <sup>1</sup>
6208	1.63	1.07	2.25	1.69	.62	ABK-B4031-18x1.25	7/16	AHB-A-7/16	210	908
6212	2.00	1.27	2.75	2.02	.75	ABK-B4038-16x1.50	5/8	AHB-A-5/8	214	912
6216	2.25	1.52	3.13	2.40	.94	ABK-B4044-14x1.75	7/8	AHB-A-7/8	219	916
6220	2.50	1.77	3.25	2.52	1.06	ABK-B4050-13x1.75/2.00*	1-1/16	AHW-A-1-1/16	222	920
6224	2.75	2.02	3.75	3.02	1.19	ABK-B4063-11x2.25	1-5/16	AHW-A-1-5/16	225	924
6232	3.38	2.65	4.63	3.90	1.44	ABK-B4075-10x2.75	1-3/4	AHW-A-1-3/4	228	932
*6240	3.50	—	4.50	—	1.81	ABK-B4088-9x3.25	2-3/16	AHW-A-2-3/16	232	—
*6248	3.75	—	4.75	—	2.19	ABK-B4112-7x4.00	2-5/8	AHW-A-2-5/8	237	—

1. For Male Thread Type S Only  
2. **ADAFLANGE™** Adapters have this seal

\*NOT AN SAE STANDARD—PROVIDES BOLT ENGAGEMENT OF 1 1/2 TIMES NOMINAL BOLT DIAMETER FOR FASTENING TO INSERTA® STEEL MODULAR CONNECTORS.

<p><b>ADACONN®</b> Blue Bell, Pa. 19422</p>	<p><b>ADAFLANGE™</b> <b>ADAFLANGEPORT™</b> CODE 61 &amp; 62 SOCKET HEAD ADAPTERS</p>	
---	--	--



# ADACONN®

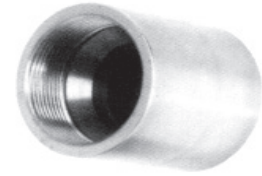
## PORT CONNECTORS

**ADACONN® PORT CONNECTORS** with the **ADAFLANGE™** and/or **ADAFLANGEPORT™** flange adapters are used to improve performance, compactness and flexibility in plumbing 4-Bolt split flange type hydraulic systems. The top photo to the right shows a connector. The center photo shows two **ADAFLANGE™** adapters of the same size fitted to the connector. This permits one to connect two SAE 4-BOLT Flanged Ported Components of the same size together, in a compact and effective manner. These flanges are shown in the same attitude with respect to the longitudinal centerline.

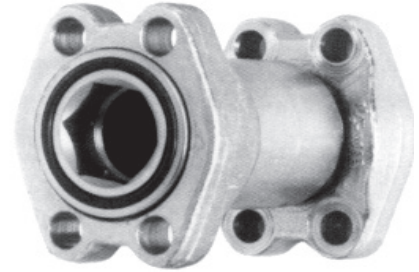
The bottom photo shows an **ADAFLANGE™** adapter being fastened to a smaller size connector and an **ADAFLANGEPORT™** adapter of the same nominal size as the connector. This is used to extend and reduce the **ADAFLANGEPORT™** while still providing the flange type union at the larger 4-Bolt flange port. In this case the **ADAFLANGEPORT™** is shown rotated 90° about its longitudinal axis as referenced from the **ADAFLANGE™** port connection. It should be noted that the one piece 4-Bolt Flanges are kept as captive assemblies that are free to rotate 360° about the longitudinal centerline to facilitate proper alignment and assembly.

The patented **ADACONN® PORT CONNECTOR** adds flexibility with good performance characteristics and cost savings for compact mechanical plumbed hydraulic systems.

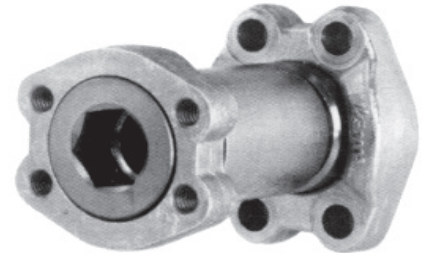
With these connectors the fluid is confined to the inner bore of the connector where the supporting wall thickness is the greatest. These connectors have been proof tested with Code 62 **ADAFLANGE™** and **ADAFLANGEPORT™** adapters to a proof pressure of 18,000 PSI, attesting to the efficacy of these assemblies.



PORT CONNECTOR



PORT CONNECTOR with two **ADAFLANGE™** Adapters



PORT CONNECTOR with **ADAFLANGEPORT™** and **ADAFLANGE™** Adapters  
Patent # 5,848,813

### ORDERING INFORMATION

**A P C - 40 - 1 - LT**

**ADACONN®**  
**PORT CONNECTOR**  
(FOR 37° MALE FLARE FITTING)

**WEIGHT**  
OMIT = STANDARD  
LT = LIGHT FOR 4000 PSI  
MAXIMUM (-40 & -48 SIZES)

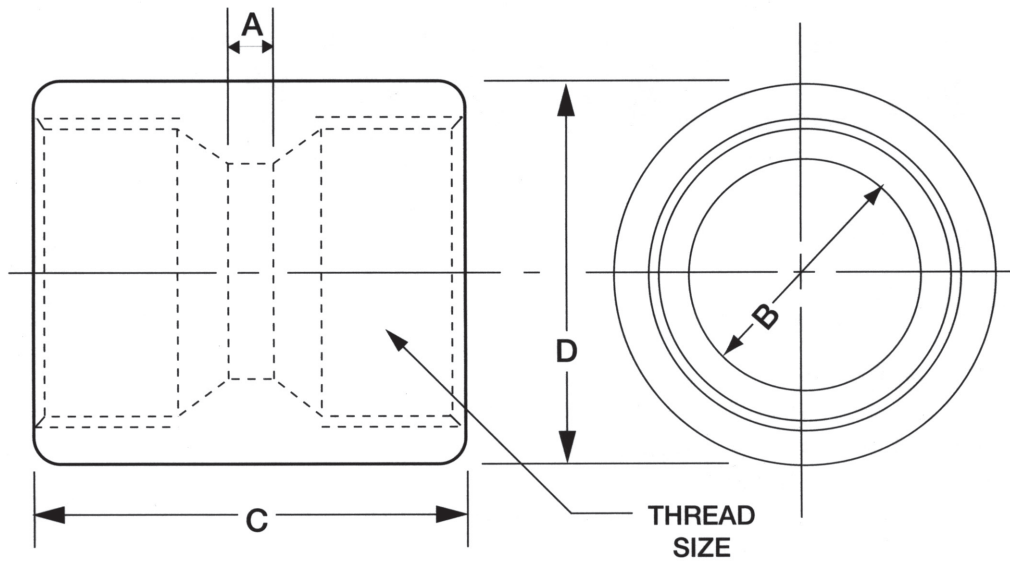
**SURFACE FINISH**  
1 = ZINC CHROMATE

**CONNECTOR SIZE (THREAD SIZE)**

08 = 3/4 - 16	20 = 1 5/8 - 12
10 = 7/8 - 14	24 = 1 7/8 - 12
12 = 1 1/16 - 12	32 = 2 1/2 - 12
14 = 1 3/16 - 12	40 = 3 - 12
16 = 1 5/16 - 12	48 = 3 1/2 - 12

**ADACONN®**  
Blue Bell, Pa. 19422

**PORT  
CONNECTORS**



SIZE	THREAD SIZE	A	B	C	D	TORQUE ft./Lbs.
08	3/4 - 16UN	1/4	.391	1 1/2	15/16	38-42
10	7/8 - 14UN	1/4	.484	1 3/4	1 1/8	57-62
12	1 1/16 - 12UN	1/4	.609	2	1 3/8	79-87
14	1 3/16 - 12UN	1/4	.718	2	1 1/2	94-103
16	1 5/16 - 12UN	1/4	.844	2	1 5/8	108-112
20	1 5/8 - 12UN	3/8	1.078	2 1/4	2	127-140
24	1 7/8 - 12UN	3/8	1.312	2 1/2	2 1/4	158-175
32	2 1/2 - 12UN	3/8	1.781	3	3	245-258
40	3 - 12UN	1/4	2.281	2 1/2	4	312-328
40LT	3 - 12UN	1/4	2.281	2 1/2	3 1/2	312-328
48	3 1/2 - 12UN	3/8	2.781	2 3/4	5	376-392
48LT	3 1/2 - 12UN	3/8	2.781	2 3/4	4	376-392

### SELECTION and ASSEMBLY TIPS

- 1 - Select the connector that matches the 37° flare size of the smaller **ADAFLANGE™** or **ADAFLANGEPORT™** Adapter being connected.
- 2 - Select the same size 37° flare male end on the other **ADAFLANGE™** or **ADAFLANGEPORT™** Adapter.
- 3 - Inspect the 37° male ends and the **ADACONN® Connector** seats to be sure that all are free of contamination or defects.
- 4 - Coat the 37° male ends and the connector seats with a compatible lubricant to prevent any gauling during assembly.
- 5 - Assemble hand tight.
- 6 - Secure one adapter in proper stationary mounted **ADACONN®** wrench.
- 7\*- Use a torque wrench with its proper **ADACONN®** wrench in the other **ADAFLANGE™** or **ADAFLANGEPORT™** Adapter to properly torque the assembly.

\*Before one attempts to torque the assembly, one must be certain that the assembly is properly guided and supported to prevent any loss of applied torque during the torquing process.

<b>ADACONN®</b> Blue Bell, Pa. 19422	<b>PORT CONNECTORS</b>	
---	------------------------	--



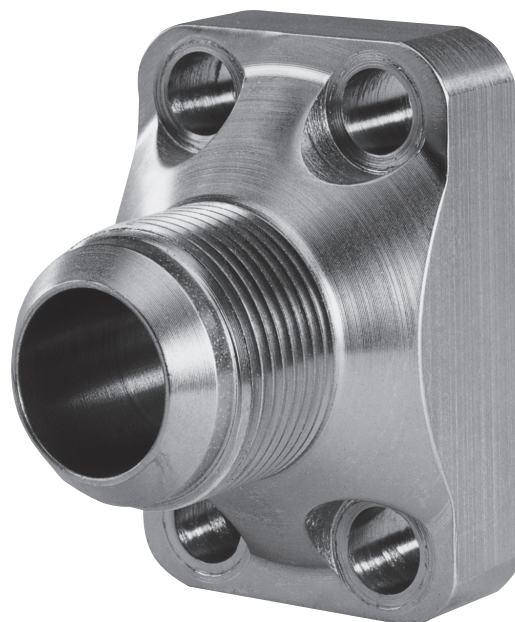
# ADACONN®

## ADAFLANGE™ ADAPTERS UNIFIED CODE U61 4-BOLT FLANGE TYPE

The **ADAFLANGE™ ADAPTERS, UNIFIED CODE U61 4-Bolt** Flange Type, have the same bolt mounting patterns as the Code 61. They provide the means to adapt from the Code 61 flange-mounting pattern to the 37° Male Flare. However, they have smaller flange widths than the Code 61 or Code 62 4-Bolt split flanges. They are assembled using industry standard socket head cap screws that meet or exceed the strength requirements of ASTM Standard A574, i.e. minimum tensile of 180,000 PSI. When these are connected to **INSERTA® Unified Code U61 4-Bolt Modular Connectors**, they offer the opportunity to make smaller assemblies and qualify them in specific higher pressure machine applications.

The flat clamp seal flange faces of these adapters fastened with socket head cap screws (SHCS) also makes them ideal for retaining other **INSERTA® Modules**.

These **ADAFLANGE™ ADAPTERS, UNIFIED CODE U61 4-Bolt**, Flange Type, are also available with end configurations to adapt to other tube, pipe or hose connections for specific customers' production requirements.



Patent #6,715,798

### ORDERING INFORMATION

**AFO – UK4 16 – F 16 – 2.25 – S 1 – B**

**ADACONN®**  
**ADAPTER TYPE**  
AFO = ADAFLANGE™

**DESIGN**  
UK4 = UNIFIED CODE 61  
4-BOLT MOUNTING PATTERN

**FLANGE SIZE**  
02 = 1/8    08 = 1/2    20 = 1-1/4  
04 = 1/4    12 = 3/4    24 = 1-1/2  
06 = 3/8    16 = 1    32 = 2

**MALE THREAD TYPE**  
F = 37° FLARE

**MALE THREAD SIZE**  
02 = 5/16 – 24    06 = 9/16 – 18    14 = 1 3/16 – 12    32 = 2 1/2 – 12  
03 = 3/8 – 24    08 = 3/4 – 16    16 = 1 5/16 – 12  
04 = 7/16 – 20    10 = 7/8 – 14    20 = 1 5/8 – 12  
05 = 1/2 – 20    12 = 1 1/16 – 12    24 = 1 7/8 – 12

**SEAL MATERIAL**  
B = BUNA N  
V = VITON

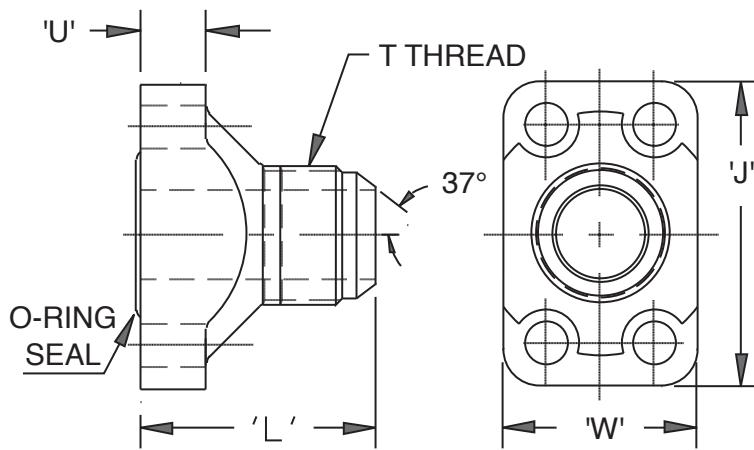
**SURFACE FINISH**  
1 = ZINC CHROMATE

**ADAPTER MATERIAL**  
S = STEEL

**ADAPTER LENGTH**  
2.25 = THE ACTUAL LENGTH IN  
INCHES REF. "L" DIMENSIONS.

**ADACONN®**  
Blue Bell, Pa. 19422

**ADAFLANGE™ ADAPTERS**  
UNIFIED CODE U61 4-BOLT  
FLANGE TYPE



## ADAFLANGE™ ADAPTERS, UNIFIED CODE U61 4-BOLT

FLANGE SIZE	NOMINAL SIZE	J	L	T THREAD	U	W	SOCKET HEAD BOLT KIT (4-BOLTS)	O-RING SIZE NO.	BOLT TORQUE IN LBS.
02	1/8	1.00	1.03	5/16-24	.26	.62	ABK-SH4008-32x0.50	010	40/50
02	1/8	1.00	1.03	3/8-24	.26	.62	ABK-SH4008-32x0.50	010	40/50
04	1/4	1.25	1.19	7/16-20	.33	.75	ABK-SH4010-24x0.63	011	60/75
04	1/4	1.25	1.19	1/2-20	.33	.75	ABK-SH4010-24x0.63	011	60/75
06	3/8	1.50	1.38	9/16-18	.40	.87	ABK-SH4025-20x0.87	014	150/170
06	3/8	1.50	1.38	3/4-16	.40	.87	ABK-SH4025-20x0.87	014	150/170
08	1/2	2.12	1.75	3/4-16	.50	1.31	ABK-SH4031-18x1.00	210	250/300
08	1/2	2.12	1.80	7/8-14	.50	1.31	ABK-SH4031-18x1.00	210	250/300
12	3/4	2.56	2.12	3/4-16	.56	1.62	ABK-SH4038-16x1.25	214	400/550
12	3/4	2.56	2.12	1 1/16-12	.56	1.62	ABK-SH4038-16x1.25	214	400/550
12	3/4	2.56	2.12	1 3/16-12	.56	1.62	ABK-SH4038-16x1.25	214	400/550
12	3/4	2.56	2.12	1 5/16-12	.56	1.62	ABK-SH4038-16x1.25	214	400/550
16	1	2.75	2.25	1 1/16-12	.63	1.87	ABK-SH4038-16x1.25	219	500/600
16	1	2.75	2.25	1 5/16-12	.63	1.87	ABK-SH4038-16x1.25	219	500/600
16	1	2.75	2.25	1 5/8-12	.63	1.87	ABK-SH4038-16x1.25	219	500/600
20	1 1/4	3.12	2.31	1 5/16-12	.66	2.12	ABK-SH4044-14x1.50	222	750/900
20	1 1/4	3.12	2.31	1 5/8-12	.66	2.12	ABK-SH4044-14x1.50	222	750/900
20	1 1/4	3.12	2.31	1 7/8-12	.66	2.12	ABK-SH4044-14x1.50	222	750/900
24	1 1/2	3.69	2.56	1 5/16-12	.66	2.50	ABK-SH4050-13x1.50	225	1400/1600
24	1 1/2	3.69	2.56	1 5/8-12	.66	2.50	ABK-SH4050-13x1.50	225	1400/1600
24	1 1/2	3.69	2.56	1 7/8-12	.66	2.50	ABK-SH4050-13x1.50	225	1400/1600
32	2	4.00	2.68	1 5/8-12	.66	3.00	ABK-SH4050-13x1.50	228	2400/2600
32	2	4.00	2.68	1 7/8-12	.66	3.00	ABK-SH4050-13x1.50	228	2400/2600
32	2	4.00	2.68	2 1/2-12	.66	3.00	ABK-SH4050-13x1.50	228	2400/2600

The Unified Code U61 4 & 2-Bolt Flange Port dimensions are listed on page 76.

The bolt kits listed are for mounting the adapters directly to the corresponding port face. The length of the bolts in the kit are indicated after the x; i.e. 1.25 is 1.25 inches long. The length in these bolt kits is the minimum length required to connect to an **INSERTA**® Unified U461 Series steel module and provides 1 1/2 times the nominal bolt diameter for thread engagement. Longer lengths need to be used when other conditions exist such as connecting to lower strength materials. When one wants to use **INSERTA**® components between the port face and these adapters, longer bolts will also be required. Changing the last digits to reflect the length required in inches specifies these longer bolt kits. Bolt kit ordering information is provided in this catalog on page 75.

These bolt kits include industry standard 1960 series bolts (Socket Head Cap Screws) that meet the strength requirements of ASTM Standard A574, i.e. minimum tensile of 180,000 PSI.

<b>ADACONN®</b> Blue Bell, Pa. 19422	<b>ADAFLANGE™ ADAPTERS</b> <b>UNIFIED CODE U61 4-BOLT</b> <b>FLANGE TYPE</b>
---	--



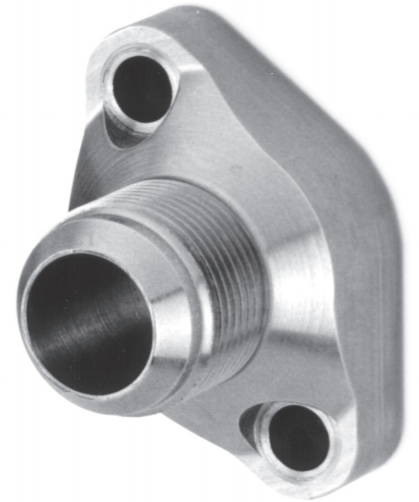
# ADACONN®

## ADAFLANGE™ ADAPTERS UNIFIED CODE U61 2-BOLT FLANGE TYPE

The **ADAFLANGE™ ADAPTERS, UNIFIED CODE U61 2-BOLT FLANGE TYPE** and the corresponding **FLANGE PORTS** should be a first consideration in any new hydraulic component or system design. Made possible through finite element analysis as part of the CAD design process, this design represents a significant improvement to the current technology.

This design utilizes only two bolts to provide a compact and leak resistant flange connection that meets most hydraulic systems connection needs. **UNIFIED Code U61 4 and 2-Bolt Flange Port** data is in the reference section of this catalog.

The small flange footprint permits adjacent ports to be nested together more closely and efficiently. The two bolt flange mounting holes may be oriented 360 degrees about the central fluid flow axis, and provides maximum flexibility in the design of hydraulic components and integrated hydraulic systems. As the flange fastening is outside the wetted flow area, the structure required to support the internal pressure can be minimized to give a more compact, lighter, leak resistant and economical component and system design.



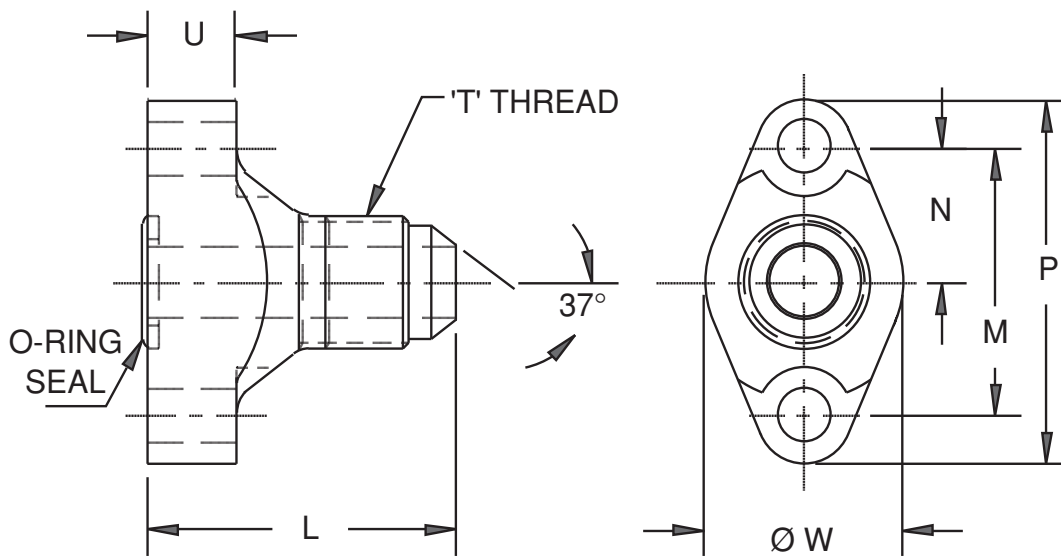
Patent #6,467,820

Industry standard socket head cap screws that meet or exceed the strength requirements of ASTM Standard A574 (minimum tensile strength of 180,000 psi) are used to assemble the **ADAFLANGE™ ADAPTERS**. The data sheet specifies the bolt kits that are recommended with this design. When these adapters are connected to **INSERTA® U61 4 and 2-Bolt Modular Connectors** they offer one the opportunity to make smaller assemblies. This adapter will mate with either of the two diagonal tapped mounting holes of the same nominal size **CODE 61 4-BOLT** flange port.

### ORDERING INFORMATION

<b>ADACONN®</b>				<b>AFO - UK2 16 - F 16 - 2.25 - S 1 - B</b>	
<b>ADAPTER TYPE</b> AFO = ADAFLANGE™				<b>SEAL MATERIAL</b> B = BUNA N V = VITON	
<b>DESIGN</b> UK2 = UNIFIED CODE U61 2 BOLT MOUNTING PATTERN				<b>SURFACE FINISH</b> 1 = ZINC CHROMATE	
<b>FLANGE SIZE</b> 02 = 1/8    08 = 1/2    20 = 1-1/4 04 = 1/4    12 = 3/4    24 = 1-1/2 06 = 3/8    16 = 1        32 = 2				<b>ADAPTER MATERIAL</b> S = STEEL	
<b>MALE THREAD TYPE</b> F = 37° FLARE				<b>ADAPTER LENGTH</b> 2.25 = THE ACTUAL LENGTH IN INCHES. REF "L" DIMENSION	
<b>MALE THREAD SIZE</b> 02 = 5/16 - 24    06 = 9/16 - 18    14 = 1 3/16 - 12    32 = 2 1/2 - 12 03 = 3/8 - 24    08 = 3/4 - 16    16 = 1 5/16 - 12 04 = 7/16 - 20    10 = 7/8 - 14    20 = 1 5/8 - 12 05 = 1/2 - 20    12 = 1 1/16 - 12    24 = 1 7/8 - 12					

<b>ADACONN®</b> Blue Bell, Pa. 19422	<b>ADAFLANGE™ ADAPTERS</b> UNIFIED CODE U61 2-BOLT FLANGE TYPE		
---	--	--	--



## ADAFLANGE™ ADAPTERS UNIFIED CODE U61 2-BOLT

FLANGE SIZE	NOMINAL SIZE	L	M	N	P	T THREAD (UNJF-2A)	U	Ø W	SOCKET HEAD BOLT KIT (2 BOLTS)	O-RING SIZE NO.	Bolt Torque IN-LBS
02	1/8	1.03	.75	.38	1.07	5/16 - 24	.26	.62	ABK-SH2008-32x0.50	010	40/50
02	1/8	1.03	.75	.38	1.07	3/8 - 24	.26	.62	ABK-SH2008-32x0.50	010	40/50
04	1/4	1.19	.88	.44	1.26	7/16 - 20	.33	.75	ABK-SH2010-24x0.63	011	60/75
04	1/4	1.19	.88	.44	1.26	1/2 - 20	.33	.75	ABK-SH2010-24x0.63	011	60/75
06	3/8	1.38	1.12	.56	1.54	9/16 - 18	.40	.87	ABK-SH2025-20x0.87	014	150/170
06	3/8	1.38	1.12	.56	1.54	3/4 - 16	.40	.87	ABK-SH2025-20x0.87	014	150/170
08	1/2	1.75	1.65	.82	2.25	3/4 - 16	.50	1.31	ABK-SH2031-18x1.00	210	250/300
08	1/2	1.80	1.65	.82	2.25	7/8 - 14	.50	1.31	ABK-SH2031-18x1.00	210	250/300
12	3/4	2.12	2.07	1.03	2.73	1 1/16 - 12	.56	1.62	ABK-SH2038-16x1.25	214	400/550
12	3/4	2.12	2.07	1.03	2.73	1 3/16 - 12	.56	1.62	ABK-SH2038-16x1.25	214	400/550
16	1	2.25	2.30	1.15	2.97	1 5/16 - 12	.63	1.87	ABK-SH2038-16x1.25	219	400/550
20	1 1/4	2.31	2.60	1.30	3.36	1 5/8 - 12	.66	2.12	ABK-SH2044-14x1.50	222	750/900
24	1 1/2	2.56	3.09	1.54	3.97	1 7/8 - 12	.66	2.50	ABK-SH2050-13x1.50	225	1400/1600
32	2	2.68	3.49	1.74	4.38	2 1/2 - 12	.66	3.00	ABK-SH2050-13x1.50	228	1400/1600

The Unified Code U61 4 & 2-Bolt Flange Port dimensions are listed on page 76.

These **ADAFLANGE™ Flange Adapters** are also available with end configurations to adapt to other tube, pipe and hose connections as well as in other materials and finishes for customers' quantity requirements.

The bolt kits listed are for fastening the adapters directly to a **UNIFIED Code U61 2-Bolt** flange port. The length of the bolts in the kit are indicated after the x; i.e. 1.25 is 1.25 inches long. These provide a minimum of 1 1/2 times the nominal bolt diameter for thread engagement. Longer lengths need to be considered when other conditions exist such as fastening to lower strength materials. When **INSERTA® MODULES** are stacked between the Flange Port and the **ADAFLANGE™ Flange Adapter**, longer bolts will be required. Changing the last digits of the Bolt Kit part number is required to specify the longer length. Bolt Kit ordering information is provided in this catalog on page 75.

These bolt kits include industry standard 1960 series bolts (Socket Head Cap Screws) that meet the strength requirements of ASTM Standard A574, i.e. minimum tensile of 180,000 PSI.

<b>ADACONN®</b> Blue Bell, Pa. 19422	<b>ADAFLANGE™ ADAPTERS</b> <b>UNIFIED CODE U61</b> <b>2-BOLT FLANGE TYPE</b>		
---	--	--	--

# Inserta Products, Inc.

## BALL VALVES FLANGE TYPE 2 PORT

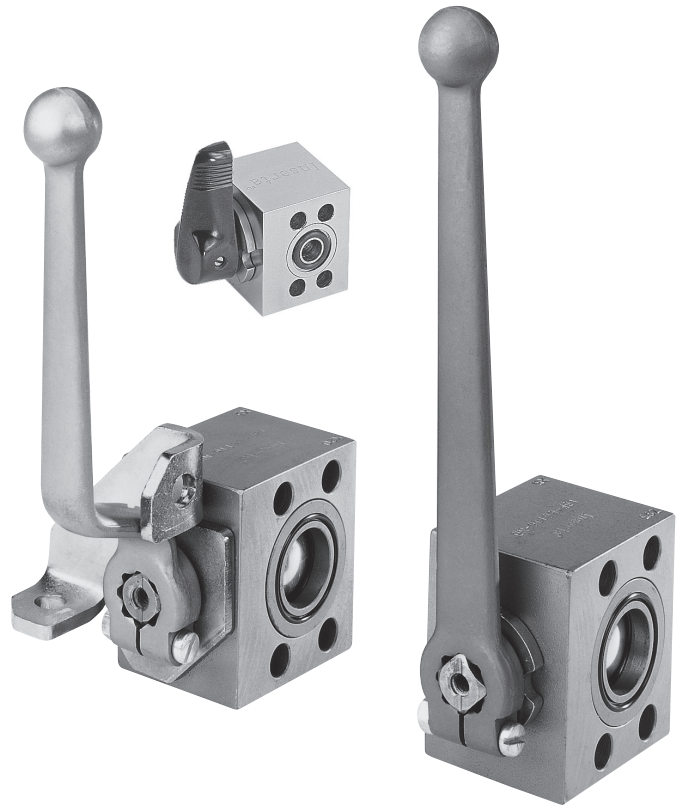
INSERTA® Flange type, 2 port, Ball Valves, provide a simple means to install a ball valve in a circuit that uses any of the offered 4-Bolt flange mounting patterns. These ball valves and other products can be installed on or between other components such as pumps, motors, actuators, filters, valves and manifolds by simply and effectively bolting them together. These assemblies eliminate threaded pipe connections, and the adjoining components are face sealed with the preferred leak resistant O-ring.

INSERTA® Flange type, 2 port, Ball Valves, have two ball seals, one for each port, i.e. ports 0 and 1. The top of the stem has a slot that indicates the direction of the hole that goes through the two port ball valve element. When the slot is in line with ports 0 and 1 the valve is open and permits flow between these two ports. When the stem is turned 90° the slot indicates that these two ports do not communicate and the valve is closed. When the valve is in the closed position the port that sees the higher pressure pushes the ball against the ball seal of the opposing port side. In each case it is the seal on the side of the lower pressure port that creates the ball's directional control valve seal.

An offset steel handle is standard, while offset aluminum and straight aluminum handles are available as options. An offset handle is required for use with a lockable stop plate. A universal lockable stop plate is indicated if a flange or rotational adapter is to be mounted directly to Face 1 of the ball valve. Valve handles are packaged separately for mounting by customer. Standard ball valve handle mounting is with port 0 open to port 1 when the handle is turned counterclockwise and the ports are closed when the handle is turned clockwise.

The CODE 61 4-Bolt Valves can be mounted and retained in systems that employ UNIFIED CODE U61 4 or 2-Bolt Flange Ports and/or Flange Retainers. When used with 2-Bolt systems either of the 2 diagonal bolt holes can be used for mounting and retaining the valve.

These ball valves are of steel construction with a hard chrome plated ball.



Patent No. 5,139,041

### ORDERING INFORMATION

**IBF - B - 6116 - N - D - \* - \* - \***

INSERTA®  
BALL VALVE  
FLANGE TYPE 2-PORT

DESIGN CODE  
C = FOR NOMINAL SIZES 08 & 12

MOUNTING PATTERN  
U461 = UNIFIED CODE U61 4-BOLT  
61 = CODE 61  
61 = CODE 62

NOMINAL SIZE

02 = 1/8	12 = 3/4	32 = 2
04 = 1/4	16 = 1	40 = 2 1/2
06 = 3/8	20 = 1 1/4	48 = 3
08 = 1/2	24 = 1 1/2	

HANDLE OPTION  
OS = OFFSET STEEL HANDLE (STANDARD)  
SS = STRAIGHT STEEL HANDLE  
SA = STRAIGHT ALUMINUM HANDLE  
OA = OFFSET ALUMINUM HANDLE

SURFACE FINISH  
EN = ELECTROLESS NICKEL  
SX = STAINLESS STEEL (316)  
BX = BLACK OXIDE  
OMIT = UNPLATED

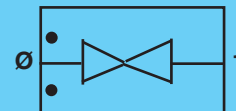
STOP PLATE OPTION  
\* = STANDARD STOP PLATE  
L = LOCKABLE STOP PLATE  
U = UNIVERSAL LOCKABLE STOP PLATE (SIZES 12-48)

SEAL COMPOUND (BALL)  
D = DELRIN (STANDARD)

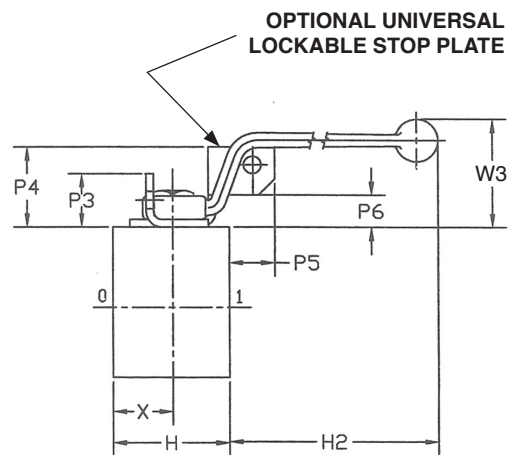
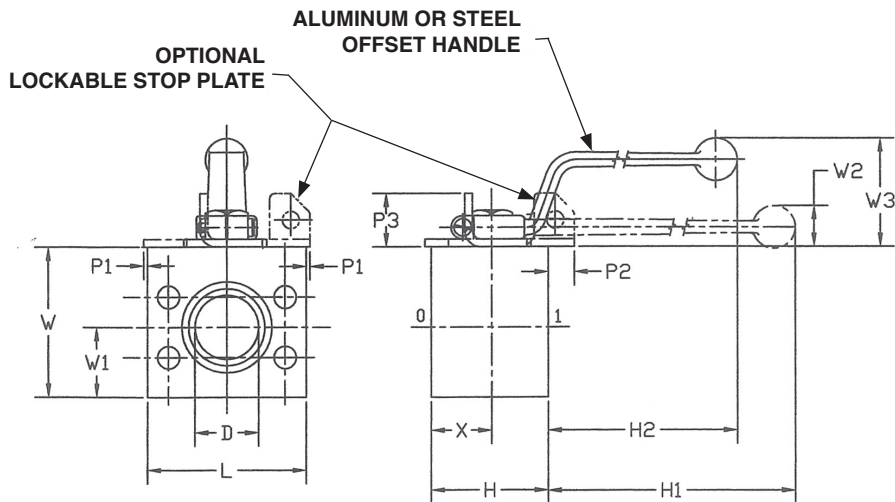
SEAL COMPOUND (STEM & FACE SEAL)  
N = BUNA N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

BALL VALVE  
FLANGE TYPE  
2 PORT







### CODE 61 AND UNIFIED CODE U61 4 BOLT—2-PORT

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	H2	W2	W3	P1	P2	P3	P4	P5	P6
U46102	1/8	.13	1.00	.86	.88	.50	.34	*.88	--	*.63	--	--	--	--	--	--	--
U46104	1/4	.25	1.25	1.10	1.13	.62	.50	*.75	--	*.69	--	--	--	--	--	--	--
U46106	3/8	.38	1.50	1.22	1.25	.70	.50	*.70	--	*.69	--	--	--	--	--	--	--
6108	1/2	.50	2.12	2.00	1.50	.80	1.00	5.22	4.43	.73	1.97	.69	1.05	1.12	--	--	--
6112	3/4	.75	2.50	2.25	2.00	.94	1.00	6.83	5.77	.92	2.50	.75	.94	1.25	1.82	0.97	0.75
6116	1	1.00	2.75	2.50	2.00	1.01	1.10	6.90	5.84	.92	2.50	.63	1.01	1.25	1.82	1.04	0.75
6120	1 1/4	1.00	3.00	2.75	2.25	1.13	1.35	6.77	5.71	.92	2.50	.50	.88	1.25	1.82	0.91	0.75
6124	1 1/2	1.25	3.75	3.50	2.75	1.42	1.63	8.17	7.31	.98	2.52	.13	.67	1.25	1.88	1.06	0.75
6132	2	1.50	4.00	4.00	3.50	1.75	1.88	7.76	6.90	.98	2.52	--	.25	1.25	1.88	0.64	0.75
6140	2 1/2	2.00	4.50	4.50	4.00	2.06	2.12	7.56	6.71	.98	2.52	--	.06	1.25	1.88	0.45	0.75
6148	3	2.25	5.25	5.00	4.50	2.17	2.44	7.18	6.32	.98	2.52	--	--	1.25	1.88	0.06	0.75

\*Handle is phenolic and without ball end. Lockable stop plate option not available in these sizes.

### CODE 62—2-PORT

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	H2	W2	W3	P1	P2	P3	P4	P5	P6
6208	1/2	.50	2.25	2.00	1.50	.80	1.00	5.22	4.43	.73	1.97	.63	1.05	1.12	--	--	--
6212	3/4	.75	2.75	2.50	2.00	.94	1.24	6.83	5.77	.92	2.50	.63	.94	1.25	1.82	0.97	0.75
6216	1	1.00	3.00	2.75	2.00	1.03	1.35	6.90	5.84	.92	2.50	.50	1.03	1.25	1.82	1.06	0.75
6220	1 1/4	1.00	3.50	2.75	2.25	1.13	1.35	6.77	5.71	.92	2.50	.25	.88	1.25	1.82	0.91	0.75
6224	1 1/2	1.25	4.25	3.75	2.75	1.42	1.88	8.17	7.31	.98	2.52	--	.67	1.25	1.88	1.06	0.75
6232	2	1.50	5.00	4.38	3.50	1.75	2.25	7.76	6.90	.98	2.52	--	.25	1.25	1.88	0.64	0.75
6240	2 1/2	2.00	6.00	4.75	4.00	2.06	2.38	7.56	6.71	.98	2.52	--	.06	1.25	1.88	0.45	0.75
6248	3	2.25	8.00	5.25	4.50	2.17	2.68	7.18	6.32	.98	2.52	--	--	1.25	1.88	0.06	0.75

Bolt Mounting Patterns conform to the **UNIFIED CODE U61 4-Bolt** standard and/or the **SAE Code 61 and Code 62 4-Bolt** standard J518 JUN93.

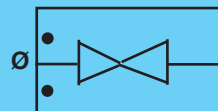
Temperature range is -22°F (-30°C) to 175°F (80°C).  
Operating medium is hydraulic fluid.

FACE Ø O-RING SIZES are:

02 = 206-006	08 = 018	20 = 125	40 = 232
04 = 011	12 = 022	24 = 131	48 = 237
06 = 014	16 = 026	32 = 228	

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**BALL VALVE  
FLANGE TYPE  
2 PORT**



BALL VALVES

# Inserta Products, Inc.

## BALL VALVES FLANGE TYPE 2-PORT STAINLESS STEEL

INSERTA® Flange type, 2-Port, Ball Valves, Stainless Steel, can be installed on or between other components such as pumps, motors, actuators, filters, valves, and manifolds using an SAE 4-Bolt flange or other clamping device. Consider the use of an INSERTA® IFRA Rotational Retainer in order to make a captive assembly.

The metallic elements of the valve are primarily made from 2205 Duplex Stainless Steel and 316 Stainless Steel\* for high pressure service in corrosive environments, or with fluid media that would typically be incompatible with the standard materials of the INSERTA® IBF Flange Type 2-Port Ball Valves.

INSERTA® Flange Type, 2-Port Ball Valves, Stainless Steel, have two ball seals, one for each port (i.e. for ports 0 and 1). When the valve is in the closed position the port that is subject to the higher pressure urges the ball against the ball seal on the opposing port side. In each case it is the seal on the side of the lower pressure port that creates the ball's directional control valve seal.

Each valve is provided with an offset stainless steel handle. A universal lockable stop plate is available as an option.

Screw clearance holes are compatible with either metric or UN fasteners.

Maximum working pressures indicated are for a 4:1 safety factor to burst.

\*Valve handle mounting screw and washer (for valve handle) and stop pin (for stop plate/lock plate) are made from 18-8 stainless steel.



## ORDERING INFORMATION

**IBF - D - 6116 - N - D - \* - SS - \***

INSERTA®  
BALL VALVE  
FLANGE TYPE 2-PORT  
STAINLESS STEEL

DESIGN CODE

MOUNTING PATTERN

61 = CODE 61  
62 = CODE 62

NOMINAL SIZE

16 = 1  
20 = 1 1/4  
24 = 1 1/2  
32 = 2

HANDLE OPTION  
OS = OFFSET STAINLESS  
STEEL HANDLE  
(STANDARD)

BODY MATERIAL  
SS = STAINLESS STEEL

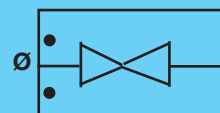
STOP PLATE OPTION  
\* = STANDARD STOP PLATE  
U = UNIVERSAL LOCKABLE  
STOP PLATE (Sizes 12-32)

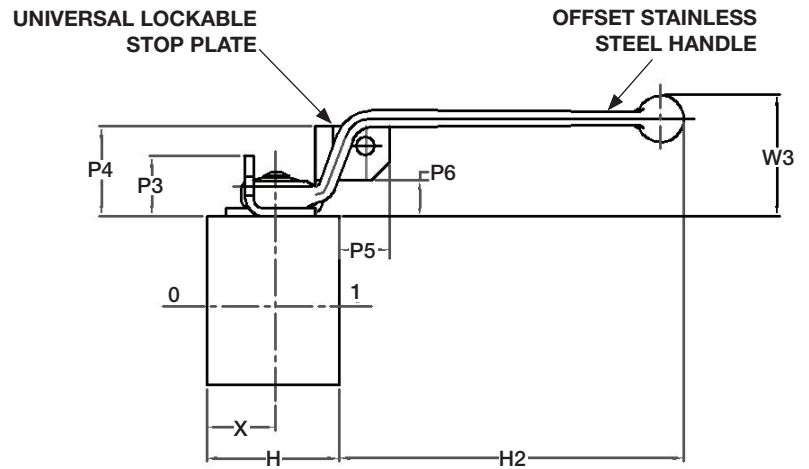
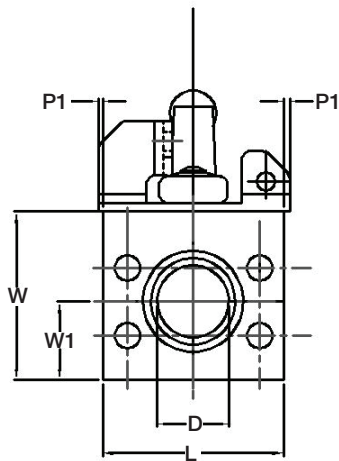
SEAL COMPOUND (BALL)  
D = DELRIN (STANDARD)

SEAL COMPOUND  
(STEM & FACE SEAL)  
N = BUNA N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

BALL VALVE  
FLANGE TYPE  
2-PORT  
STAINLESS STEEL





### CODE 61 – 2-PORT

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H2	W3	P1	P2	P3	P4	P5	P6	MAXIMUM WORKING PRESSURE (PSI)
6116	1	1.00	2.75	2.50	2.00	1.01	1.10	5.84	2.50	.63	1.01	1.25	1.82	1.04	0.75	4600
6120	1 1/4	1.00	3.00	2.75	2.25	1.13	1.35	5.71	2.50	.50	.88	1.25	1.82	0.91	0.75	4000
6124	1 1/2	1.25	3.75	3.50	2.75	1.42	1.63	7.31	2.52	.13	.67	1.25	1.88	1.06	0.75	3000
6132	2	1.50	4.00	4.00	3.50	1.75	1.88	6.90	2.52	--	.25	1.25	1.88	.064	0.75	3000

### CODE 62 – 2-PORT

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H2	W3	P1	P2	P3	P4	P5	P6	MAXIMUM WORKING PRESSURE (PSI)
6216	1	1.00	3.00	2.75	2.00	1.03	1.35	5.84	2.50	.50	1.03	1.25	1.82	1.06	0.75	5000
6220	1 1/4	1.00	3.50	2.75	2.25	1.13	1.35	5.71	2.50	.25	.88	1.25	1.82	.091	0.75	5000
6224	1 1/2	1.25	4.25	3.75	2.75	1.42	1.88	7.31	2.52	--	.67	1.25	1.88	1.06	0.75	5000
6232	2	1.50	5.00	4.38	3.50	1.75	2.25	6.90	2.52	--	.25	1.25	1.88	.064	0.75	5000

Fastener Mounting Patterns conform to the SAE Standard J518 Parts 1 and 2.

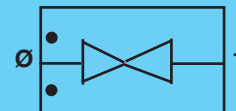
Temperature range is -22°F (-30°C) to 175°F (80°C).  
Operating medium is hydraulic fluid.

FACE Ø O-RING SIZES are:

16 = 026    24 = 131  
20 = 125    32 = 228

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**BALL VALVE  
FLANGE TYPE  
2 PORT**



# Inserta Products, Inc.

## BALL VALVES FLANGE TYPE 3 PORT DIVERTER

**INSERTA® Flange type, 3 Port Diverter Ball Valves**, provide a simple means to install a diverter ball valve in a circuit that uses any of the offered 4-Bolt flange mounting patterns. These ball valves and other **INSERTA®** products can be installed on or between other components such as pumps, motors, actuators, filters, valves, and manifolds by simply and effectively bolting them together. These assemblies eliminate threaded pipe connections, and the adjoining components are face sealed with the preferred leak resistant O-ring.

The **INSERTA® Flange type, 3 Port Diverter Ball Valves**, have two ball seals similar to the 2 port directional control ball valves, one for each port, i.e. ports Ø and 1. The sealing characteristics of these three port valves are similar to the two port valves. The top of the stem has an "L" slot that indicates the direction of the hole that goes through the three port diverter ball valve element that is used to divert flow from port 2 to ports Ø or 1. The ball has a hole on the bottom that is not sealed that accepts flow from port 2 and communicates it with the "L" hole in the ball. When the handle is turned counter clockwise (CCW) the slot should be in line with port Ø indicating that the flow from port 2 is diverted to port Ø and as long as the pressure in ports 2 and Ø is higher than port 1, port 1 is blocked (and sealed). As the handle is turned clockwise the slot should be in line with port 1 indicating that the flow from port 2 is diverted to port 1 and as long as the pressure in ports 2 and 1 is higher than port Ø, port Ø is blocked (and sealed). As the handle is turned between its two normal 90° end positions both ports Ø and 1 have restricted inter-flow from port 2.

With a total understanding of how these diverter valves function one can consider them for use as a 3 Port Selector valve. This could be possible when selecting flow from either Ø or 1 and directing it to port 2 when the pressure is always lower on the blocked port than is on the flow ports. With this understanding one may find further use for these diverter valves in applications that currently employ 3 way valves.

An offset steel handle is standard, while offset aluminum and straight aluminum handles are available as options. An offset handle is required for use with a lockable stop plate. A universal lockable stop plate is indicated if a flange is to be mounted directly to Face 1 of the ball valve. Ball valve handles are packaged separately for mounting by customer. Standard ball valve handle mounting is with port 2 open to port Ø and port 1 closed when the handle is turned counterclockwise, and port 2 is open to port 1 with port Ø closed when the handle is turned clockwise.

The **CODE 61 4-Bolt Valves** can be mounted and retained in systems that employ **UNIFIED CODE U61 4 or 2-Bolt Flange Ports and/or Flange Retainers**. When used with 2-Bolt systems either of the 2 diagonal bolt holes can be used for mounting and retaining the valve.

These ball valves are of steel construction with a hard chrome plated ball.



Patent No. 5,139,041

## ORDERING INFORMATION

**IBF3D - A - 6116 - N - D - \* - \* - \***

INSERTA®  
BALL VALVE FLANGE TYPE  
3 PORT DIVERTER

DESIGN CODE

MOUNTING PATTERN  
U461 = UNIFIED CODE U61 4-BOLT  
61 = CODE 61  
62 = CODE 62

NOMINAL SIZE  
02 = 1/8      12 = 3/4      32 = 2  
04 = 1/4      16 = 1          40 = 2 1/2  
06 = 3/8      20 = 1 1/4      48 = 3  
08 = 1/2      24 = 1 1/2

HANDLE OPTION  
OS = OFFSET STEEL HANDLE (STANDARD)  
SS = STRAIGHT STEEL HANDLE  
SA = STRAIGHT ALUMINUM HANDLE  
OA = OFFSET ALUMINUM HANDLE

SURFACE FINISH  
EN = ELECTROLESS NICKEL  
SX = STAINLESS STEEL (316)  
BX = BLACK OXIDE  
OMIT = UNPLATED

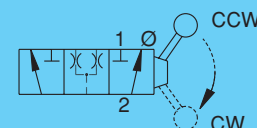
STOP PLATE OPTION  
\* = STANDARD STOP PLATE  
L = LOCKABLE STOP PLATE  
U = UNIVERSAL LOCKABLE STOP PLATE (SIZES 12-48)

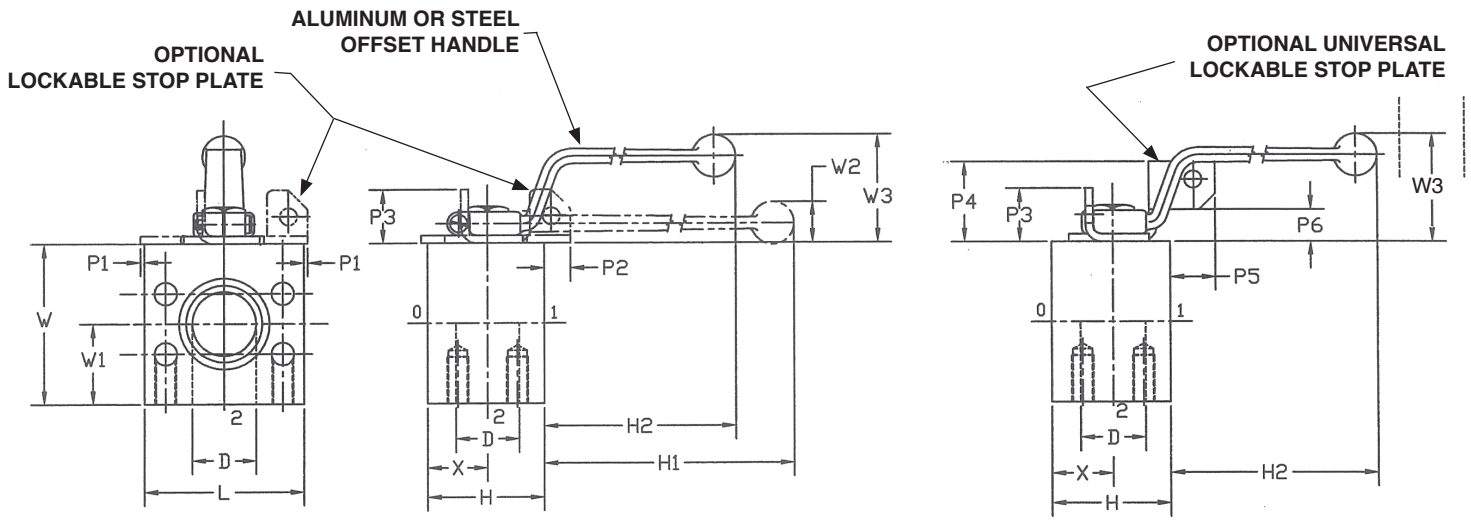
SEAL COMPOUND (BALL)  
D = DELRIN (STANDARD)

SEAL COMPOUND (STEM & FACE SEAL)  
N = BUNA N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

BALL VALVES  
FLANGE TYPE  
3 PORT DIVERTER





### CODE 61 AND UNIFIED CODE U61 4-BOLT—3 PORT DIVERTER

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	H2	W2	W3	P1	P2	P3	P4	P5	P6
U46102	1/8	.13	1.00	1.08	.88	.50	.56	*.88	--	*.63	--	--	--	--	--	--	--
U46104	1/4	.25	1.25	1.25	1.13	.62	.64	*.75	--	*.69	--	--	--	--	--	--	--
U46106	3/8	.38	1.50	1.59	1.25	.70	.86	*.70	--	*.69	--	--	--	--	--	--	--
6108	1/2	.50	2.12	2.25	1.50	.80	1.25	5.22	4.43	.73	1.97	.69	1.05	1.12	--	--	--
6112	3/4	.75	2.50	2.75	2.00	.94	1.50	6.83	5.77	.92	2.50	.75	.94	1.25	1.82	0.97	0.75
6116	1	1.00	2.75	2.88	2.00	1.01	1.48	6.90	5.84	.92	2.50	.63	1.01	1.25	1.82	1.04	0.75
6120	1 1/4	1.00	3.00	3.00	2.25	1.13	1.60	6.77	5.71	.92	2.50	.50	.88	1.25	1.82	0.91	0.75
6124	1 1/2	1.25	3.75	3.75	2.75	1.42	1.88	8.17	7.31	.98	2.52	.13	.67	1.25	1.88	1.06	0.75
6132	2	1.50	4.00	4.25	3.50	1.75	2.12	7.76	6.90	.98	2.52	--	.25	1.25	1.88	0.64	0.75
6140	2 1/2	2.00	4.50	4.75	4.00	2.06	2.38	7.56	6.71	.98	2.52	--	.06	1.25	1.88	0.45	0.75
6148	3	2.25	5.25	5.47	4.50	2.17	2.91	7.18	6.32	.98	2.52	--	--	1.25	1.88	0.06	0.75

\*Handle is phenolic and without ball end. Lockable stop plate option not available in these sizes.

### CODE 62—3 PORT DIVERTER

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	H2	W2	W3	P1	P2	P3	P4	P5	P6
6208	1/2	.50	2.25	2.25	1.50	.80	1.25	5.22	4.43	.73	1.97	.63	1.05	1.12	--	--	--
6212	3/4	.75	2.75	2.75	2.00	.94	1.50	6.83	5.77	.92	2.50	.63	.94	1.25	1.82	0.97	0.75
6216	1	1.00	3.00	3.00	2.00	1.03	1.60	6.90	5.84	.92	2.50	.50	1.03	1.25	1.82	1.06	0.75
6220	1 1/4	1.00	3.50	3.25	2.25	1.13	1.85	6.77	5.71	.92	2.50	.25	.88	1.25	1.82	0.91	0.75
6224	1 1/2	1.25	4.25	4.00	2.75	1.42	2.13	8.17	7.31	.98	2.52	--	.67	1.25	1.88	1.06	0.75
6232	2	1.50	5.00	4.75	3.50	1.75	2.63	7.76	6.90	.98	2.52	--	.25	1.25	1.88	0.64	0.75
6240	2 1/2	2.00	6.25	5.94	4.00	2.06	3.56	7.56	6.71	.98	2.52	--	.06	1.25	1.88	0.45	0.75
6248	3	2.25	8.00	6.88	4.50	2.17	4.31	7.18	6.32	.98	2.52	--	--	1.25	1.88	0.06	0.75

Fastener Mounting Patterns conform to the UNIFIED CODE U61 4-Bolt standard and/or the SAE Standard J518 Parts 1 and 2.

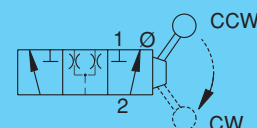
Temperature range is -22°F (-30°C) to 175°F (80°C).  
Operating medium is hydraulic fluid.

FACE Ø O-RING SIZES are:

02 = 206-006	08 = 018	20 = 125	40 = 232
04 = 011	12 = 022	24 = 131	48 = 237
06 = 014	16 = 026	32 = 228	

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**BALL VALVES  
FLANGE TYPE  
3 PORT DIVERTER**



BALL VALVES

# Inserta Products, Inc.

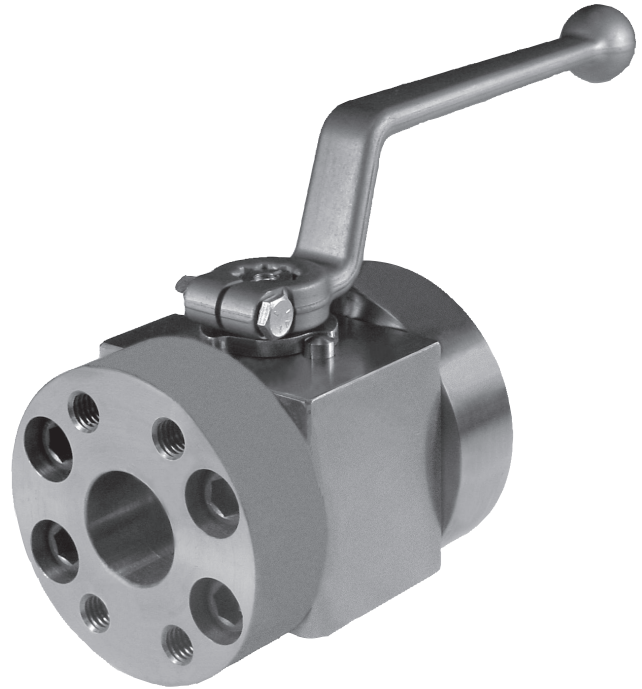
## BALL VALVES FLANGE PORTED 2 PORT

INSERTA® Flange Ported Ball Valves provide a simple means to install a ball valve in-line between two SAE flanges. Additional INSERTA® components can be “sandwiched” between these ball valves and an SAE flange.

INSERTA® Flange Ported 2-port Ball Valves have two ball seals, one for each port, 0 and 1. The top of the stem has a slot that indicates the direction of the hole through the two-port valve element. When the slot is in line with ports 0 and 1, the valve is open and permits flow between these two ports. When the stem is turned 90 degrees, the slot indicates that these two ports do not communicate and the valve is closed. When the valve is in the closed position the port that sees the higher pressure pushes the ball against the ball seal of the opposing port side. In each case it is the seal on the side of the lower pressure port that creates the ball’s directional control valve seal.

The valve is supplied with a forged offset steel handle. Valve handle kits are packaged separately for mounting by the customer. Standard ball valve handle mounting is with port 0 open to port 1 when the handle is turned counterclockwise. The ports are closed when the handle is subsequently turned clock-wise.

These valves can be used in conjunction with ADAFLANGE™ adapters to provide a variety of in-line male porting options, such as JIC 37-degree male and SAE straight thread connections.



### ORDERING INFORMATION

**IBFP - A - 6116 - N - D - \* - \* - \***

INSERTA®  
BALL VALVE  
FLANGE PORTED

#### DESIGN CODE

- A = NOMINAL PORTING\*
- B = FULL PORTING - CODE 62
- C = FULL PORTING - CODE 61

#### MOUNTING PATTERN

- 61 = SAE CODE 61
- 62 = SAE CODE 62

#### NOMINAL SIZE

- 08 = 1/2
- 12 = 3/4
- 16 = 1
- 20 = 1 1/4
- 24 = 1 1/2
- 32 = 2

**SURFACE FINISH**  
EN = ELECTROLESS NICKEL  
OMIT = UNPLATED

#### HANDLE OPTION

- OS = OFFSET STEEL  
HANDLE (STANDARD)

#### STOP PLATE OPTION

- \* = STANDARD STOP PLATE
- U = UNIVERSAL LOCKABLE  
STOP PLATE

#### SEAL COMPOUND (BALL)

- D = DELRIN (STANDARD)

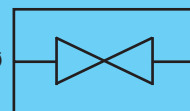
#### SEAL COMPOUND

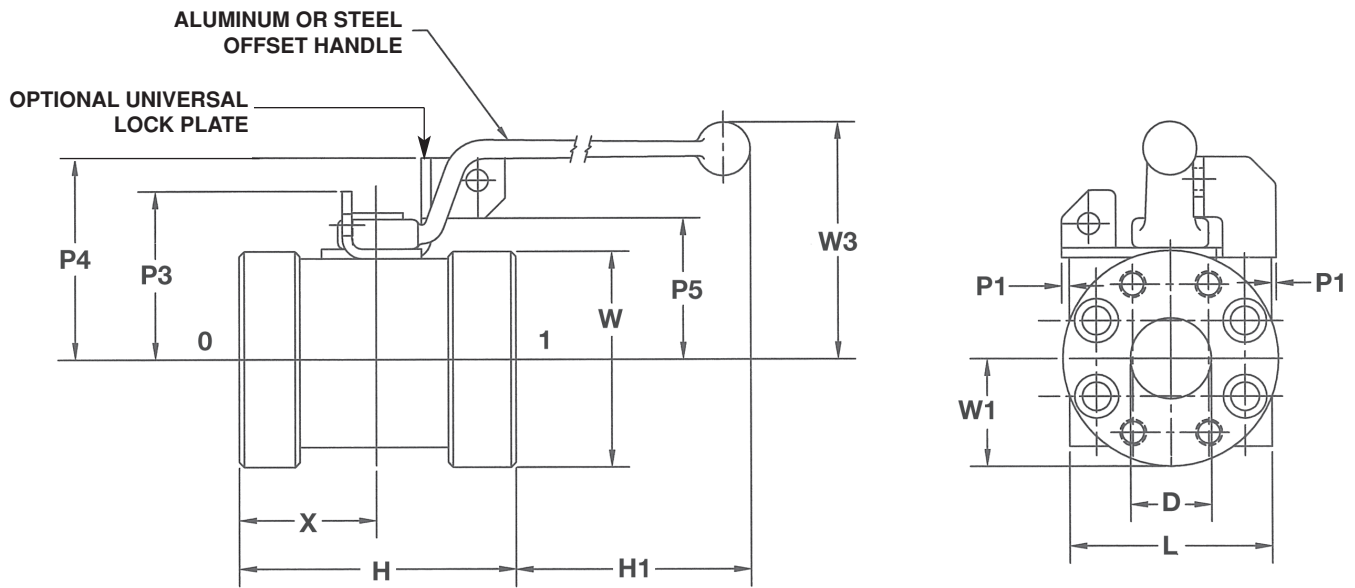
- N = BUNA-N (STANDARD)
- V = VITON

\* 6\*08 thru 6\*16 are Full ported in Design Series A.

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**BALL VALVES  
FLANGE PORTED  
2 PORT**





**IBFP-A CODE 61 AND CODE 62 NOMINAL\* BALL VALVE DIMENSIONS**

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	W3	P1	P3	P4	P5
6108	1/2	0.50	2.12	2.37	3.50	1.80	1.19	3.43	2.98	--	--	--	--
6112	3/4	0.75	2.50	3.00	4.00	1.94	1.50	4.77	3.95	0.75	2.50	3.07	2.02
6116	1	1.00	2.75	3.00	4.25	2.14	1.50	4.71	3.90	0.63	2.65	3.22	2.15
6120	1 1/4	1.00	3.00	3.50	4.50	2.25	1.75	4.58	3.90	0.50	2.65	3.22	2.15
6124	1 1/2	1.25	3.75	4.00	5.00	2.55	2.00	6.18	4.39	0.13	3.12	3.75	2.62
6132	2	1.50	4.00	4.50	5.75	2.88	2.25	5.77	4.64	--	3.38	4.01	2.88
6208	1/2	0.50	2.25	2.37	3.50	1.80	1.19	3.43	2.98	--	--	--	--
6212	3/4	0.75	2.75	3.00	4.25	2.07	1.40	4.64	3.76	0.63	2.50	3.07	2.02
6216	1	1.00	3.00	3.00	4.25	2.16	1.50	4.71	3.90	0.50	2.65	3.22	2.15
6220	1 1/4	1.00	3.50	4.00	4.75	2.38	2.00	4.46	3.90	0.25	2.65	3.22	2.15
6224	1 1/2	1.25	4.25	4.50	5.40	2.80	2.25	5.93	4.39	--	3.12	3.75	2.62
6232	2	1.50	5.00	5.50	6.50	3.25	2.50	5.40	4.65	--	3.37	4.00	2.88

\* 6\*08 thru 6\*16 are Full ported in Design Series A.

**IBFP-C CODE 61 AND IBFP-B CODE 62 FULL PORTED BALL VALVE DIMENSIONS**

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	W3	P1	P3	P4	P5
6120	1 1/4	1.25	4.25	4.50	5.50	2.80	2.25	5.93	4.41	0.13	3.12	3.75	2.62
6124	1 1/2	1.50	5.00	5.50	6.50	3.25	2.75	5.40	4.65	--	3.37	4.00	2.88
6132	2	2.00	6.00	7.00	7.00	3.55	3.50	5.21	4.92	--	3.62	4.25	3.13
6220	1 1/4	1.25	4.25	4.50	5.50	2.80	2.25	5.93	4.41	--	3.12	3.75	2.62
6224	1 1/2	1.50	5.00	5.50	6.50	3.25	2.75	5.40	4.65	--	3.37	4.00	2.88
6232	2	2.00	6.00	7.00	7.00	3.55	3.50	5.21	4.92	--	3.62	4.25	3.13

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>BALL VALVES FLANGE PORTED 2 PORT</b></p>	
---	--	--

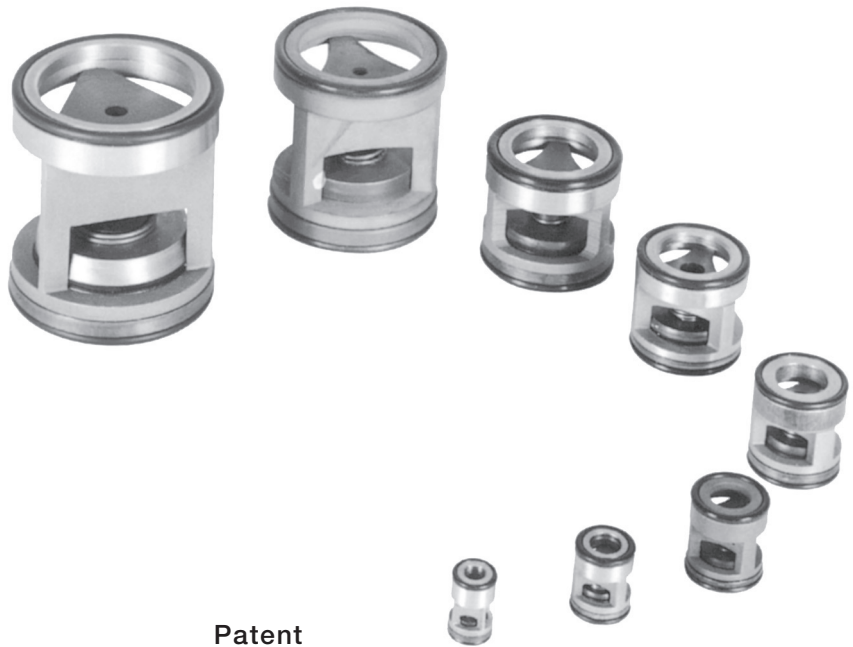
# Inserta Products, Inc.

## CHECK VALVES SLIP-IN TYPE

INSERTA® ICS Check Valves, Slip-In Type, can be inserted in manifolds, subplates, flanges or integrated valve systems. This compact design eliminates external leak points associated with line mounted check valves. These check valves can control flow in or out depending on how they are inserted into the machined cavity.

These disc check valves are also available with a fixed orifice for customers' specific quantity requirement.

INSERTA® ICS Check Valves, Slip-In Type, are all steel construction with hardened, lapped discs and seats providing positive fluid shut off. They come complete with O-rings.



Patent  
5,010,916

### ORDERING INFORMATION

INSERTA®  
CHECK VALVES  
SLIP-IN TYPE

#### DESIGN CODE

B = FOR NOMINAL SIZE 02  
C = FOR NOMINAL SIZE 04,06,12  
D = FOR NOMINAL SIZE 08,16,20,24,32,40,48

#### NOMINAL SIZE

02 = 1/8	20 = 1 1/4
04 = 1/4	24 = 1 1/2
06 = 3/8	32 = 2
08 = 1/2	40 = 2 1/2
12 = 3/4	48 = 3
16 = 1	

ICS-D-24-N015-RØ

#### FLOW CONTROL OPTION

R = FIXED RESTRICTIVE ORIFICE  
Ø = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER.  
SEE "RØ" ON DATA SHEET FOR MAX. ORIFICE DATA. (MIN. Ø = .016)  
(OMIT FOR STANDARD CHECK VALVE)

#### CRACKING PRESSURE

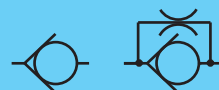
003 = 3 PSI	} Optional Longer Check Valve
007 = 7 PSI	
015 = 15 PSI (STANDARD)	
030 = 30 PSI	
060 = 60 PSI	
090 = 90 PSI	

#### SEAL COMPOUND

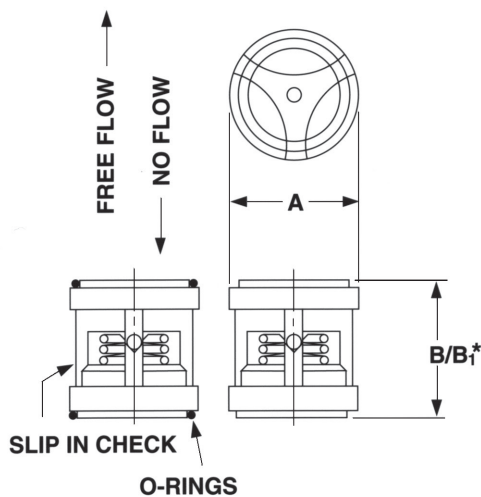
N = BUNA-N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
SLIP-IN TYPE





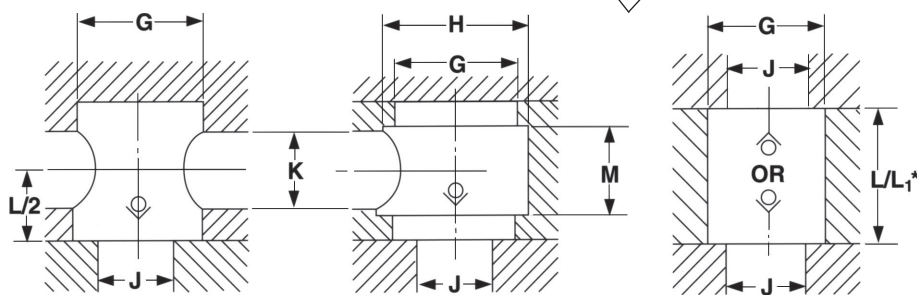


VALVE SIZE	NOMINAL FLOW (GPM)	A -.002	B -.002	B1* -.002	RØ MAX	O-RING SIZE NO. (MM) DESIGN CODE C	O-RING SIZE NO. (MM) DESIGN CODE D
02	2	.333	.531	.728	.024	(6.2 X 1.0)	N/A
04	5	.451	.571	.846	.039	(8.5 X 1.5)	(8.0 X 1.8)
06	10	.589	.669	.866	.078	(12.0 X 1.5)	(11.2 X 1.8)
08	18	.746	.787	.945	.078	(16.0 X 1.5)	016
12	24	.963	.906	1.220	.140	116	N/A
16	45	1.199	1.102	2.434	.218	213	213
20	75	1.553	1.653	2.500	.275	219	218
24	110	1.770	2.007	2.500	.394	222	222
32	200	2.391	2.858	3.582	.394	227	227
40	300	2.883	3.407	3.532	.394	231	230
48	400	3.385	3.507	4.119	.394	235	234

NOTE: MINIMUM ORIFICE=.016 DIAMETER

In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required.

**MACHINED CAVITY DIMENSIONS**  
SURFACE FINISH TO BE 63



TEE BRANCH      RIGHT ANGLE      STRAIGHT THRU  
(COMBINATIONS OF THESE CAVITIES CAN BE USED)

**NOMINAL FLOW RATES**  
ARE WITH A ΔP OF  
20 TO 40 PSI

**CAUTION**  
Care must be exercised when installing check valve to insure the free flow path of the slip-in check valve is correct for the system in which it is installed.

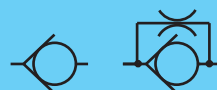
VALVE SIZE	G	H MAX.	J MAX.	K MAX.	L +.002 -.000	L1* +.002 -.000	M MAX.
02	.3346 / .3360	.433	.157	.197	.531	.728	.220
04	.4428 / .4545	.551	.236	.236	.571	.846	.256
06	.5906 / .5923	.709	.315	.354	.669	.866	.374
08	.7480 / .7500	.866	.433	.433	.787	.945	.453
12	.9646 / .9666	1.102	.551	.551	.906	1.220	.571
16	1.2008 / 1.2032	1.378	.787	.787	1.102	1.535	.787
20	1.5551 / 1.5575	1.811	1.102	1.102	1.653	2.434	1.102
24	1.7717 / 1.7741	2.204	1.250	1.250	2.007	2.500	1.375
32	2.3927 / 2.3960	2.968	1.750	1.750	2.858	3.582	1.875
40	2.884 / 2.887	3.546	2.062	2.062	3.407	3.532	1.750
48	3.386 / 3.389	4.205	2.500	2.500	3.507	4.119	2.000

**MOUNTING POSITION:**  
OPTIONAL  
**MAXIMUM OPERATING PRESSURE:**  
5000 PSI (Contact the Factory for pressures up to 7250 PSI)  
**TEMPERATURE RANGE:**  
-22°F (-30°C) TO 175°F (80°C)  
**OPERATING MEDIUM:** HYDRAULIC FLUID

**VISCOSITY RANGE:**  
50 SSU TO 2000 SSU  
**CRACKING PRESSURE:**  
3 PSI, 7 PSI, 15 PSI (STANDARD)  
OR 30 PSI.  
\* 60 PSI & 90 PSI, OPTIONAL WITH LONGER CHECK VALVE.

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**CHECK VALVES**  
SLIP-IN TYPE



# Inserta Products, Inc.

## CHECK VALVES GUIDED DISC SLIP-IN

INSERTA® **GS (Steel) Check Valves Guided Disc**, Slip-In type, may be considered as an alternative to standard **ICS** Slip-In Type valves for more demanding applications.

The Guided Disc design (patent pending) affords improved longevity in applications prone to turbulence, high flow rate transients, higher cycling, and applications with right angle flow.

Pressure drops across the valve in right angle flow applications are typically significantly lower than similarly sized thread-in type cartridge valves, resulting in increased system efficiency, and decreased heat generation.

The IGS guided disc check valves are compatible with INSERTA® ICS standard disc valve cavities, and may be interchanged in INSERTA® ICF and INSERTA® ICFS flanged valve bodies.

The valve components are steel. The valve discs and seats are hardened and flat lapped for positive fluid shut off.

The valve disc may be provided with a customer specified orifice to provide fixed orifice flow control function in the checked direction.



**Patent Pending**

### ORDERING INFORMATION

**IGS-A-24-N015-RØ**

INSERTA®  
CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE

DESIGN CODE

NOMINAL SIZE

- 16 = 1
- 20 = 1 1/4
- 24 = 1 1/2
- 32 = 2
- 40 = 2 1/2
- 48 = 3

**FLOW CONTROL OPTION**

R = FIXED RESTRICTIVE ORIFICE  
Ø = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER  
SEE "RØ" ON DATA SHEET FOR MAX. ORIFICE DATA. (MIN. 0 = 0.16)  
(OMIT FOR STANDARD CHECK VALVE)

**CRACKING PRESSURE**

- 003 = 3 PSI
- 007 = 7 PSI
- 015 = 15 PSI (STANDARD)

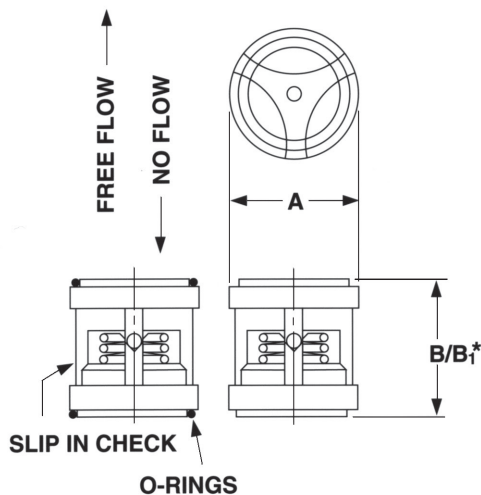
**SEAL COMPOUND**

- N = BUNA-N (STANDARD)
- V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE



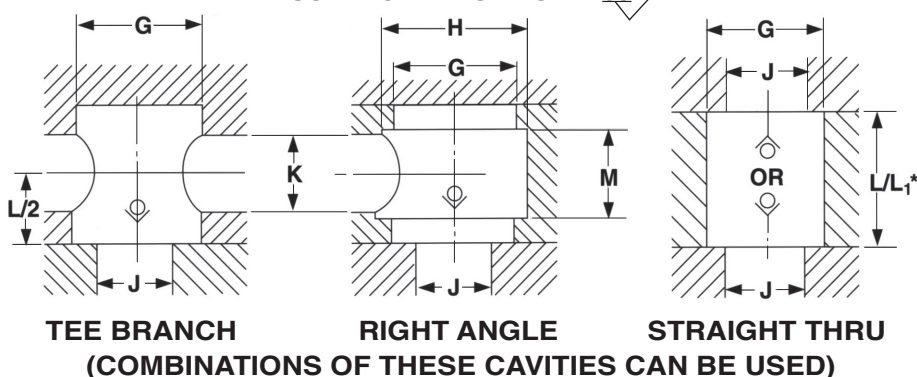


VALVE SIZE	NOMINAL FLOW (GPM)	A -.002	B -.002	B1* -.002	RØ MAX	O-RING SIZE NO. (MM)
16	45	1.199	1.102	1.535	0.120	213
20	75	1.553	1.653	2.434	0.177	218
24	110	1.770	2.007	2.500	0.265	222
32	200	2.391	2.858	3.582	0.265	227
40	300	2.883	3.407	3.532	0.445	230
48	400	3.385	3.507	4.119	0.394	234

**NOTE: MINIMUM ORIFICE=.016 DIAMETER**

In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required.

**MACHINED CAVITY DIMENSIONS  
SURFACE FINISH TO BE 63**



**NOMINAL FLOW RATES  
ARE WITH A ΔP OF  
20 TO 40 PSI**

**CAUTION**  
Care must be exercised when installing check valve to insure the free flow path of the slip-in check valve is correct for the system in which it is installed.

VALVE SIZE	G	H MAX.	J MAX.	K MAX.	L +.002 -.000	L1* +.002 -.000	M MAX.
16	1.2008 / 1.2032	1.378	.787	.787	1.102	1.535	.787
20	1.551 / 1.5575	1.811	1.031	1.102	1.653	2.434	1.102
24	1.7717 / 1.7741	2.204	1.250	1.250	2.007	2.500	1.375
32	2.3927 / 2.3960	2.968	1.750	1.750	2.858	3.582	1.875
40	2.884 / 2.887	3.546	2.062	2.062	3.407	3.532	1.750
48	3.386 / 3.389	4.205	2.500	2.500	3.507	4.119	2.000

**MOUNTING POSITION:  
OPTIONAL**

**MAXIMUM OPERATING PRESSURE:  
6000 PSI (Contact the Factory for  
pressures up to 7250 PSI)**

**TEMPERATURE RANGE:  
-22°F (-30°C) TO 175°F (80°C)**

**OPERATING MEDIUM: HYDRAULIC FLUID**

**VISCOSITY RANGE:**

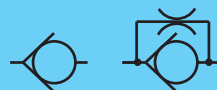
**50 SSU TO 2000 SSU**

**CRACKING PRESSURE:**

**3 PSI, 7 PSI, 15 PSI (STANDARD)**

**Inserta Products, Inc.  
Blue Bell, Pa. 19422**

**CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE**



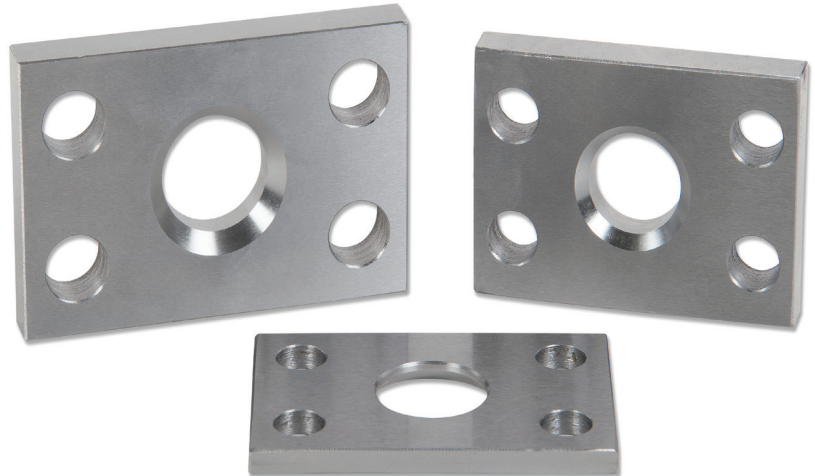
# Inserta Products, Inc.

## CHECK VALVES RETAINER SLIP-IN TYPE

INSERTA® ICVR Check Valves Retainer, Slip-In type, Code 61 and Code 62 is used with an SAE J518 flange assembly to retain an INSERTA® ICS Check Valve, Slip-in type in axial flow applications. The retainer provides a flow transition between the valve and the flange.

These may be used with ADACONN® ADAFLANGE™ ADAPTERS, UNIFIED CODE U61 4-Bolt, in order to provide a minimum distance to adjacent surface components.

The INSERTA® ICVR Check Valve Retainers, Slip-In type, are steel construction, and plated for corrosion resistance.



### ORDERING INFORMATION

**ICVR - B - 6116 - \***

INSERTA®  
CHECK VALVES  
RETAINER  
SLIP-IN TYPE

DESIGN CODE

MOUNTING PATTERN

61 = SAE CODE 61  
62 = SAE CODE 62

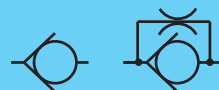
SURFACE FINISH  
EN = ELECTROLESS NICKEL  
OMIT = UNPLATED

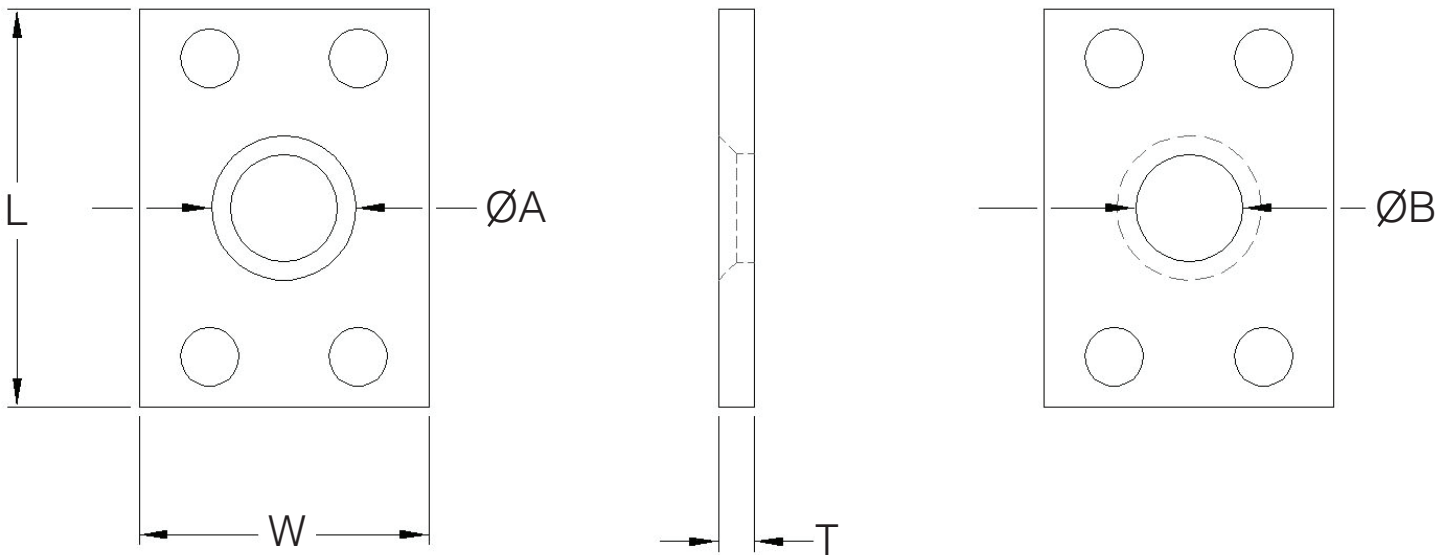
NOMINAL SIZE

12 = 3/4	32 = 2
16 = 1	40 = 2 1/2
20 = 1 1/4	48 = 3
24 = 1 1/2	

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE



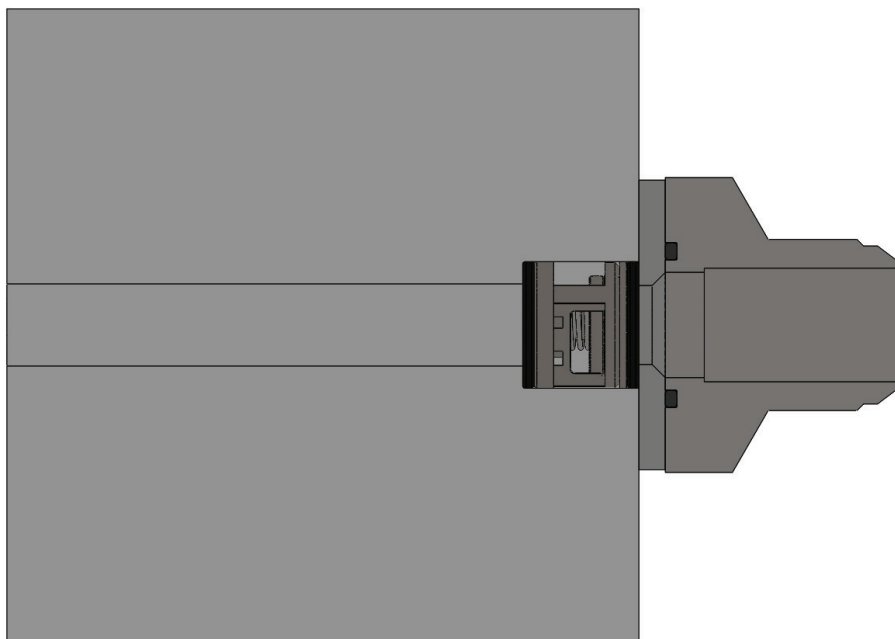


**CODE 61**

PATTERN SIZE	A DIA.	B DIA.	L	W	T
6112	0.75	0.56	2.50	1.64	0.25
6116	1.00	0.75	2.75	2.00	0.25
6120	1.25	1.00	3.00	2.14	0.25
6124	1.50	1.16	3.75	2.50	0.25
6132	2.00	1.69	4.00	3.00	0.25

**CODE 62**

PATTERN SIZE	A DIA.	B DIA.	L	W	T
6220	1.25	1.00	3.50	2.50	0.50
6224	1.50	1.16	4.25	2.77	0.50
6232	2.00	1.69	5.00	3.50	0.75
6240	2.50	2.00	6.00	4.25	0.75
6248	3.00	2.44	8.00	5.00	0.87



**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE**

# Inserta Products, Inc.

## SLIP-IN CHECK VALVE RETAINING PLUG FLANGE TYPE

INSERTA® IGS Slip-in Check Valve Retaining Plug, Flange Type, provides an effective means to retain an INSERTA® IGS Slip-In Check Valve in a cavity for use with a right angle flow path (axial fluid flow at the valve inlet, radial fluid flow at the valve outlet). The INSERTA® IGS Slip-In Check Valve is preferred (in nominal sizes-16 and above) over the INSERTA® ICS Slip-In Check Valve for the right angle flow path typical of hydraulic cartridge check valves.

INSERTA® IGS Slip-in Check Valves can offer significantly lower pressure drops over typical hydraulic cartridge check valves, resulting in lower operating costs and less waste heat generation.

The INSERTA® IGS Slip-In Check Valve cavity does not require dedicated cavity form tools. A four bolt flange pattern (long axis perpendicular to the valve outlet radial flow direction) consistent with SAE J518 is used at the surface of the cavity. The retaining plug is inserted in the cavity after placement of the Slip-In check valve, and the valve and retaining plug are then held in place by an SAE J518 flange, using fasteners to engage the four-bolt flange pattern at the cavity surface. The retaining plug offsets the check valve from the cavity surface to allow for a flange or threaded port to be placed at the valve outlet, should this be desired.

The INSERTA® IGS Slip-In Check Valve is installed using both of its O-rings. The O-ring at the valve inlet provides sealing with the valve operating in the checked direction. The opposite O-ring does not contribute to sealing when the valve is used with a right angle flow path, however it does contribute to a frictional interface between the valve and retaining plug that opposes fluid forces tending to rotate the valve in the cavity during operation.

The Retaining Plug is all steel construction, and is supplied with a standard J518 flange and SHCS fasteners.



### ORDERING INFORMATION IGSP – A – 61 24 – N – 1

INSERTA®  
SLIP-IN CHECK VALVE  
RETAINING PLUG  
FLANGE TYPE

DESIGN CODE

MOUNTING PATTERN  
61 = SAE J518-1: CODE 61  
62 = SAE J518-2: CODE 62

NOMINAL SIZE  
16 = 1  
20 = 1 1/4  
24 = 1 1/2  
32 = 2

SURFACE FINISH  
1 = ZINC CHROMATE

SEAL COMPOUND  
N = BUNA-N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

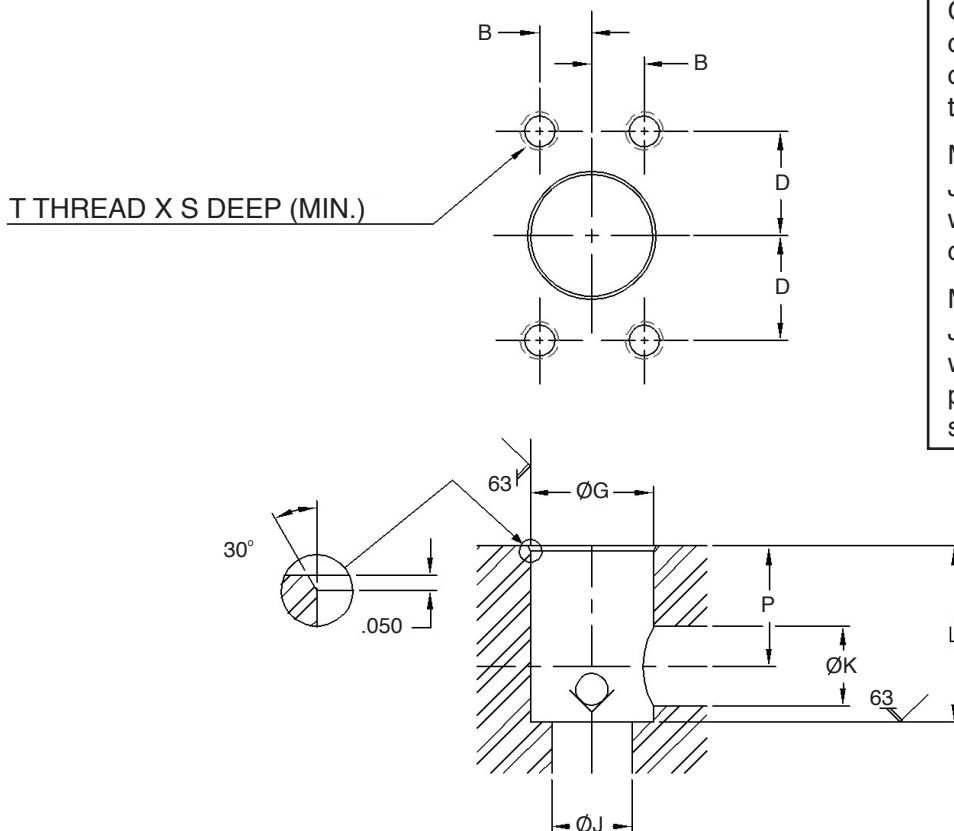
CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE

**CAUTION**

Care must be exercised when installing check valve to insure the free flow path of the slip-in check valve is correct for the system in which it is installed.

Maximum Working Pressure per SAE J518, or 6000 psi, whichever is lower, when using an IGS Check Valve in steel or ductile iron cavities.

Maximum working pressure per SAE J518, or 5000 psi, whichever is lower, when using an ICS Check Valve (not preferred for 90° flow applications) in steel or ductile iron cavities.

**CODE 61**

VALVE SIZE	B	D	G	J MAX	K MAX	L +.002/-0.000	P	T	S(MIN)
6116	0.515	1.031	1.2008 / 1.2032	0.787	0.787	1.735	1.184	3/8-16UN-2B	0.87
6120	0.594	1.156	1.5551 / 1.5575	1.031	1.102	2.296	1.470	7/16-14UN-2B	0.98
6124	0.703	1.375	1.7717 / 1.7741	1.250	1.250	2.640	1.637	1/2-13UN-2B	1.06
6132	0.844	1.531	2.3927 / 2.3960	1.750	1.750	3.363	1.934	1/2-13UN-2B	1.06

**CODE 62**

VALVE SIZE	B	D	G	J MAX	K MAX	L +.002/-0.000	P	T	S(MIN)
6216	0.547	1.125	1.2008 / 1.2032	0.787	0.787	1.955	1.404	7/16-14UN-2B	1.06
6220	0.625	1.312	1.5551 / 1.5575	1.031	1.102	2.386	1.560	1/2-13UN-2B	0.98
6224	0.719	1.562	1.7717 / 1.7741	1.250	1.250	2.908	1.905	5/8-11UN-2B	1.38
6232	0.875	1.906	2.3927 / 2.3960	1.750	1.750	3.708	2.279	3/4-10UN-2B	1.50

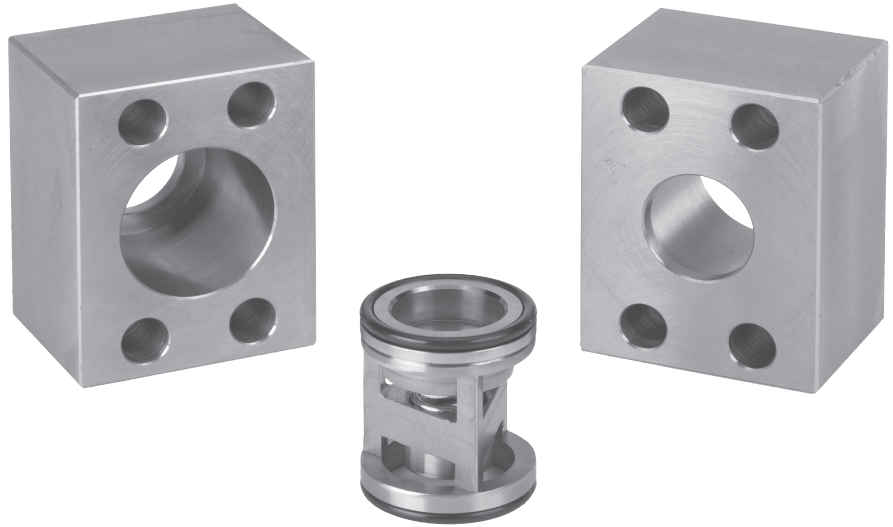
**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**SLIP-IN CHECK VALVE  
RETAINING PLUG  
FLANGE TYPE**

# Inserta Products, Inc.

## CHECK VALVE BODIES FLANGE TYPE

**INSERTA® ICF Check Valve Bodies**, Flange type, provide a simple means to install a Check Valve or a Fixed Orifice Flow Control Valve, etc., in a piping system that uses SAE 4-Bolt flanges. These bodies accept the **INSERTA® ICS Slip-In Type Check Valves**, which should be ordered separately. These valve assemblies can be installed between pumps, valves, or manifolds and flange retainers in an effective manner with threaded fasteners. Pipe connections are eliminated and the joints are O-ring sealed. The slip-in valves can be installed with the free flow in either direction.



**INSERTA® ICF Check Valve Bodies**, Flange Type, are all steel construction.

### ORDERING INFORMATION

**ICF - B - 61 12 - L - \***

**INSERTA®**  
**CHECK VALVE BODY,**  
**FLANGE TYPE**

**DESIGN CODE**  
BODIES ARE DESIGN B EXCEPT  
THE LONG BODIES IN -16, -20  
AND -24 SIZES WHICH ARE  
DESIGN C

**MOUNTING PATTERN**  
U461 = UNIFIED CODE U61 4-BOLT  
61 = SAE CODE 61  
62 = SAE CODE 62

**SURFACE FINISH**  
EN = ELECTROLESS NICKEL  
OMIT = UNPLATED

**OPTIONAL LONG BODY**  
**REQUIRED FOR 60 & 90 PSI**  
(OMIT FOR STANDARD BODY)

**NOMINAL SIZE**

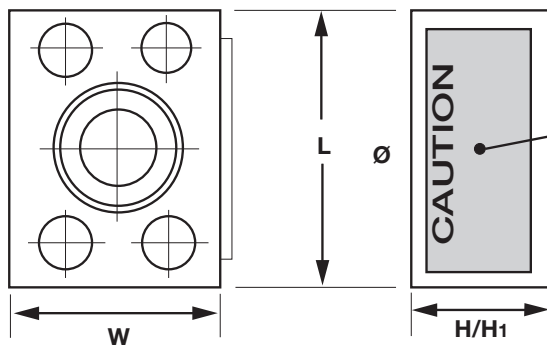
02 = 1/8	08 = 1/2	20 = 1 1/4
04 = 1/4	12 = 3/4	24 = 1 1/2
06 = 3/8	16 = 1	

**Inserta Products, Inc.**  
**Blue Bell, Pa. 19422**

**CHECK VALVE BODIES**  
**FLANGE TYPE**







**CAUTION**

Care must be exercised when installing check valve to insure the free flow path of the slip-in check valve is correct for the system in which it is installed.

**CODE 61 AND CODE U61**

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H <sub>1</sub> *	L	SLIP-IN CHECK VALVE PART NO.
U46102	1/8	2	.62	.69	.88	1.00	ICS-*-02-***
U46104	1/4	5	.75	.75	1.00	1.25	ICS-*-04-***
U46106	3/8	10	.88	.88	1.00	1.50	ICS-*-06-***
6108	1/2	24	1.50	1.00	1.50	2.12	ICS-*-12-***
6112	3/4	45	1.87	1.25	1.75	2.50	ICS-*-16-***
6116	1	75	2.25	2.00	2.75	2.75	ICS-*-20-***
6120	1 1/4	110	2.50	2.25	2.75	3.00	ICS-*-24-***
6124	1 1/2	200	3.50	3.25	4.00	4.00	ICS-*-32-***

**CODE 62**

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H <sub>1</sub> *	L	SLIP-IN CHECK VALVE PART NO.
6208	1/2	24	1.50	1.25	1.50	2.25	ICS-*-12-***
6212	3/4	45	2.00	1.50	1.75	2.75	ICS-*-16-***
6216	1	75	2.50	2.00	2.75	3.00	ICS-*-20-***
6220	1 1/4	110	2.75	2.25	2.75	3.50	ICS-*-24-***
6224	1 1/2	200	4.00	3.25	4.00	4.50	ICS-*-32-***

NOMINAL FLOW RATINGS SHOWN ARE WITH A Δ P OF 20 TO 40 PSI WITH ICS CHECK VALVE INSTALLED. In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required. THE PRESSURE RATING OF THESE VALVE ASSEMBLIES MAY BE LIMITED BY THE ICS CHECK INSERT. REFER TO THE ICS DATA SHEET.

OPERATING MEDIUM:  
HYDRAULIC FLUID  
VISCOSITY RANGE:  
50 SSU TO 2000 SSU  
CRACKING PRESSURE:  
3 PSI, 7 PSI, 15 PSI (STANDARD) OR 30 PSI.  
\* 60 PSI & 90 PSI, OPTIONAL WITH LONGER BODY.  
TEMPERATURE RANGE:  
-22° F (-30° C) TO 175° F (80° C)

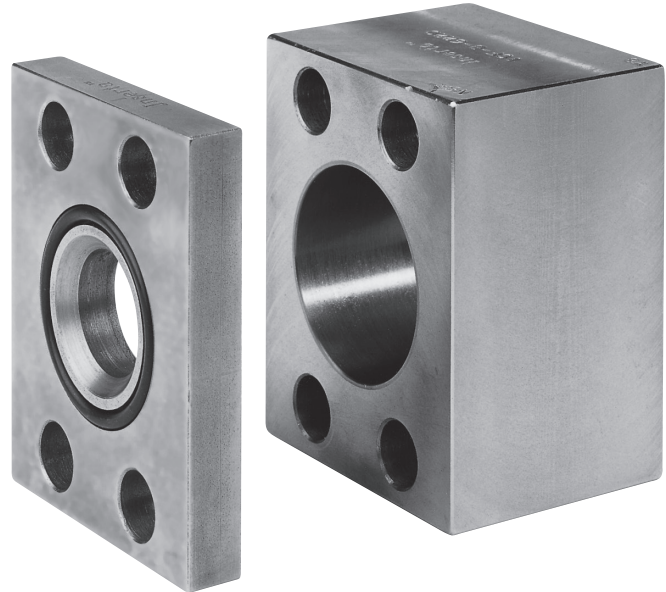
<b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422	<b>CHECK VALVE BODIES FLANGE TYPE</b>	
---	---------------------------------------	--

# Inserta Products, Inc.

## CHECK VALVE BODIES WITH SUPPORT MEMBER FLANGE TYPE

INSERTA® ICFS Check Valve Bodies, Flange Type, with their Support Members provide a simple way to install the same nominal size Check Valve or Fixed Orifice Flow Control Valve in a piping system that uses SAE 4-Bolt flange patterns. These bodies accept the INSERTA® ICS Slip-In Type Check Valves, which should be ordered separately. The support member retains the slip-in check valve in the flange body together with the required sealing O-rings. These valve assemblies can be installed on pumps, valves, manifolds and other components that have SAE 4-Bolt ports. The leak resistant O-ring face sealed joint eliminates less desirable pipe connections. The INSERTA® ICS Check Valves, Slip-In Type, can be installed with free flow in either direction.

INSERTA® ICFS Check Valve Bodies, Flange type, with their Support Members are all steel construction.



Patent #6,776,439

### ORDERING INFORMATION

**ICFS - B - 61 24 - N - L - \***

INSERTA®  
CHECK VALVE BODY,  
FLANGE TYPE WITH  
SUPPORT MEMBER

DESIGN CODE

MOUNTING PATTERN

61 = SAE CODE 61  
62 = SAE CODE 62

**SURFACE FINISH**  
EN = ELECTROLESS NICKEL  
OMIT = UNPLATED

**OPTIONAL LONG BODY  
REQUIRED FOR 60 & 90 PSI  
CHECK VALVES**  
(OMIT FOR STANDARD BODY)

**SEAL MATERIAL**  
N = BUNA N  
V = VITON

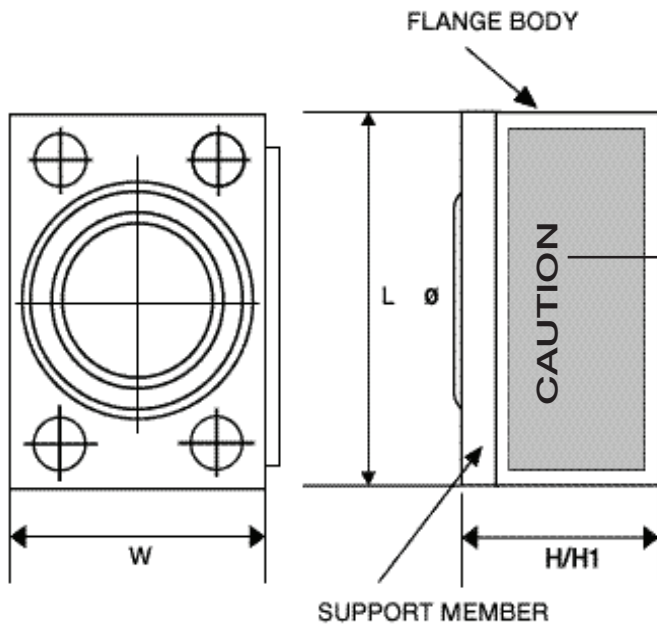
**NOMINAL SIZE**

20 = 1 1/4    40 = 2 1/2  
24 = 1 1/2    48 = 3  
32 = 2

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVE BODIES  
WITH  
SUPPORT MEMBER  
FLANGE TYPE





**CAUTION**  
 Care must be exercised when installing check valve to insure the free flow path of the slip-in check valve is correct for the system in which it is installed.

**SAE CODE 61**

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H <sub>1</sub> *	L	SLIP-IN CHECK VALVE PART NO.	O-RING SIZE NO.
6120	1 1/4	75	2.25	2.25	3.00	3.00	ICS*-20-***	222
6124	1 1/2	110	2.50	2.75	3.25	3.75	ICS*-24-***	225
6132	2	200	3.25	3.50	4.25	4.00	ICS*-32-***	228
6140	2 1/2	300	3.50	4.25	4.50	4.50	ICS*-40-***	232
6148	3	400	4.00	4.25	5.00	5.00	ICS*-48-***	237

**SAE CODE 62**

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H <sub>1</sub> *	L	SLIP-IN CHECK VALVE PART NO.	O-RING SIZE NO.
6220	1 1/4	75	2.50	2.50	3.25	3.50	ICS*-20-***	222
6224	1 1/2	110	3.00	2.75	3.25	4.25	ICS*-24-***	225
6232	2	200	3.50	3.75	4.50	5.00	ICS*-32-***	228
6240	2 1/2	300	4.25	4.25	4.50	6.00	ICS*-40-***	232
6248	3	400	5.00	4.25	5.00	8.00	ICS*-48-***	237

NOMINAL FLOW RATINGS SHOWN ARE WITH A Δ P OF 20 TO 40 PSI WITH ICS CHECK VALVE INSTALLED. In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required. THE PRESSURE RATING OF THESE VALVE ASSEMBLIES MAY BE LIMITED BY THE ICS CHECK INSERT. REFER TO THE ICS DATA SHEET.

OPERATING MEDIUM:  
 HYDRAULIC FLUID  
 VISCOSITY RANGE:  
 50 SSU TO 2000 SSU  
 CRACKING PRESSURE:  
 3 PSI, 7 PSI, 15 PSI (STANDARD) OR 30 PSI.  
 \* 60 PSI & 90 PSI, OPTIONAL WITH LONGER BODY.  
 TEMPERATURE RANGE:  
 -22° F (-30° C) TO 175° F (80° C)

<p><b>Inserta Products, Inc.</b>                  Blue Bell, Pa. 19422</p>	<p><b>CHECK VALVE BODIES WITH SUPPORT MEMBER FLANGE TYPE</b></p>	
--	--	--

# Inserta Products, Inc.

## CHECK CARRIER THREAD-IN TYPE

INSERTA® ICC Check Valve Carriers, Thread-in Type, provide a convenient and effective way to install an INSERTA® ICS Slip-In Type Check Valves, in a hydraulic system that uses SAE threaded ports.

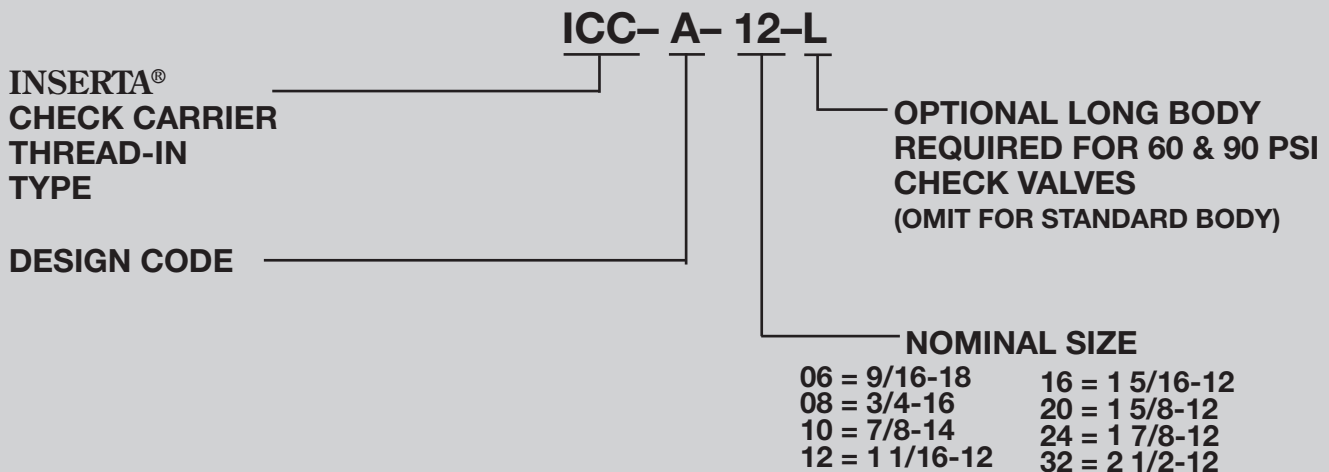
The INSERTA® ICS Check Valve, Slip-In Type should be ordered separately. These Check Valves are also available with a fixed restrictive orifice for Flow Control Options.

The INSERTA® ICS Check Valves, Slip-In Type can be installed in the INSERTA® Check Valve Carrier with the free flow in either direction.

INSERTA® ICC Check Valve Carriers are all steel construction.



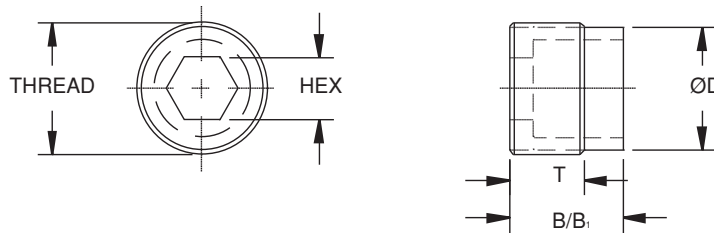
### ORDERING INFORMATION



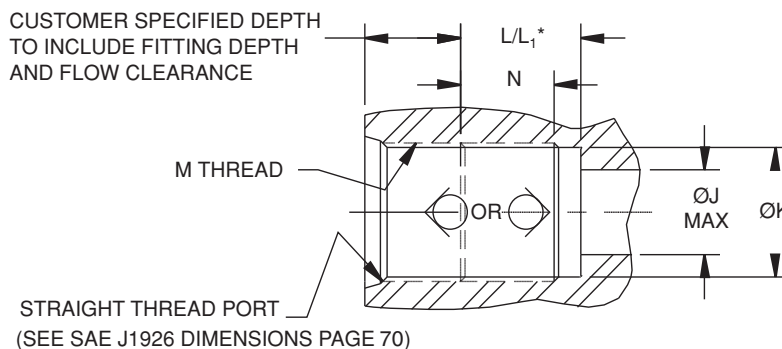
Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK CARRIER  
THREAD-IN  
TYPE





CARRIER TYPE	VALVE SIZE	D DIA.	B	B <sub>1</sub> *	T	THREAD SIZE UNRF/UNR-2A	HEX SIZE
ICC-A-06	02	.494	.688	.884	.44	9/16-18	5/32
ICC-A-08	04	.673	.750	1.025	.50	3/4-16	7/32
ICC-A-10	06	.787	.875	1.072	.56	7/8-14	5/16
ICC-A-12	08	.963	.984	1.142	.69	1 1/16-12	7/16
ICC-A-16	12	1.210	1.142	1.456	.75	1 5/16-12	5/8
ICC-A-20	16	1.535	1.366	1.800	.88	1 5/8-12	3/4
ICC-A-24	20	1.769	2.020	2.800	1.25	1 7/8-12	1 1/16
ICC-A-32	24	2.391	2.392	2.886	1.63	2 1/2-12	1 1/4



MACHINED CAVITY DIMENSIONS								TIGHTENING TORQUE (ft-lbs)
CARRIER TYPE	VALVE SIZE	J DIA. MAX.	K DIA. +.000 - .005	L ±.010	L <sub>1</sub> * ±.010	N ±.03	M THREAD SIZE UNF/UN-2B	
ICC-A-06	02	.157	.508	.688	.884	.53	9/16-18	6-8
ICC-A-08	04	.236	.689	.750	1.025	.59	3/4-16	12-16
ICC-A-10	06	.315	.804	.875	1.072	.66	7/8-14	26-30
ICC-A-12	08	.433	.978	.984	1.142	.78	1 1/16-12	55-60
ICC-A-16	12	.591	1.228	1.142	1.456	.88	1 5/16-12	115-120
ICC-A-20	16	.787	1.541	1.366	1.800	1.00	1 5/8-12	180-185
ICC-A-24	20	1.031	1.798	1.909	2.688	1.38	1 7/8-12	250-260
ICC-A-32	24	1.250	2.416	2.392	2.886	1.75	2 1/2-12	325-335

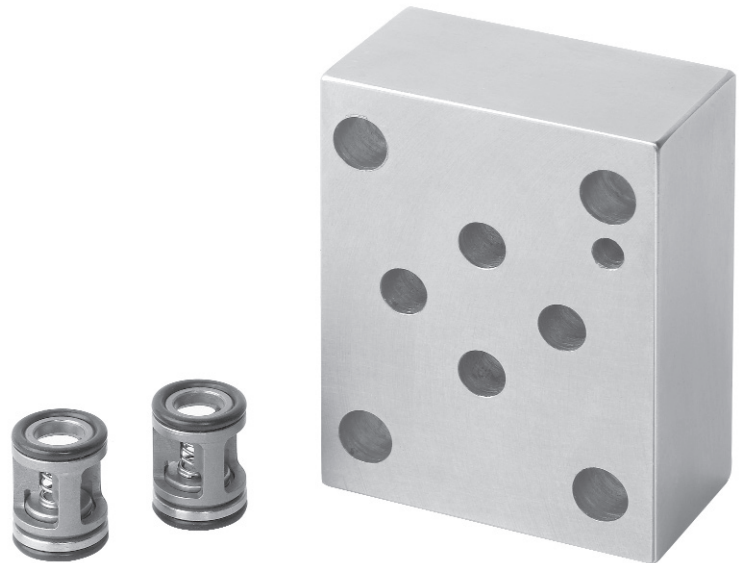
**CRACKING PRESSURE:**  
 \*60 PSI & 90 PSI, OPTIONAL WITH LONGER CHECK VALVE.  
 (FOR OTHER DETAILS, REFER TO INSERTA® ICS CHECK VALVE ON PAGES 46 & 47).

<p><b>Inserta Products, Inc.</b>                  Blue Bell, Pa. 19422</p>	<p><b>CHECK CARRIER                  THREAD-IN                  TYPE</b></p>	
--	--	--

# Inserta Products, Inc.

## D03 CHECK VALVE MODULES

**INSERTA® ICD D03 Check Valve Modules** are a compact means to provide check and fixed orifice flow control in a D03 stack assembly. Each module may be ordered with either one or two **INSERTA® ICS Check Valves**, Slip-in type. The **INSERTA® ICS Check Valves**, Slip-in type, can be installed with the free flow in either direction. Steel construction allows operating pressures up to 5000 psi. In-line flow paths through the valve inserts minimize any additional pressure drops and wasted horsepower.



### ORDERING INFORMATION

**ICD - A - D03 - 04 - XXCC - S - N - 015 R.030 - 015 R.040**

INSERTA®  
DIRECTIONAL  
MODULE  
CHECK TYPE

DESIGN CODE

NFPA PATTERN

VALVE SIZE

POSITIONAL INFORMATION

P-T-B-A  
C-CHECK PRESENT  
X-NO CHECK PRESENT

SECOND VALVE ORIFICE  
SIZE (INCHES)  
(IF ORIFICE NOT  
REQUIRED R.000)  
(OMIT IF VALVE NOT  
REQUIRED)

SECOND VALVE  
CRACKING PRESSURE  
(OMIT IF VALVE NOT  
REQUIRED)

FIRST VALVE ORIFICE SIZE (INCHES)  
(IF ORIFICE NOT REQUIRED R.000)

FIRST VALVE  
CRACKING PRESSURE

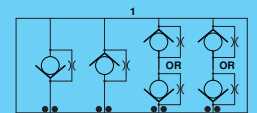
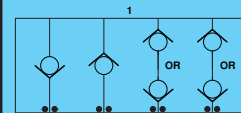
SEAL  
MATERIAL

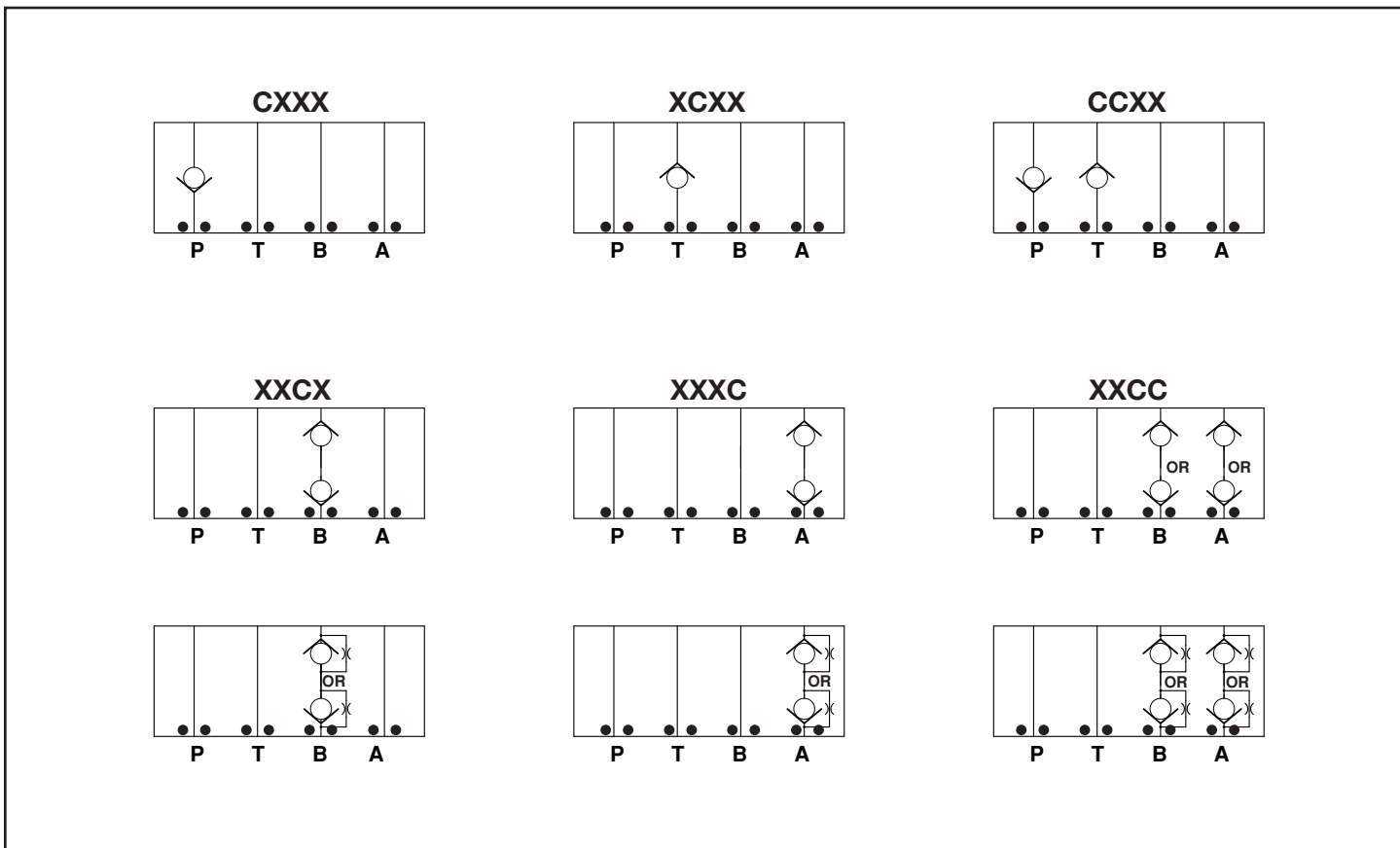
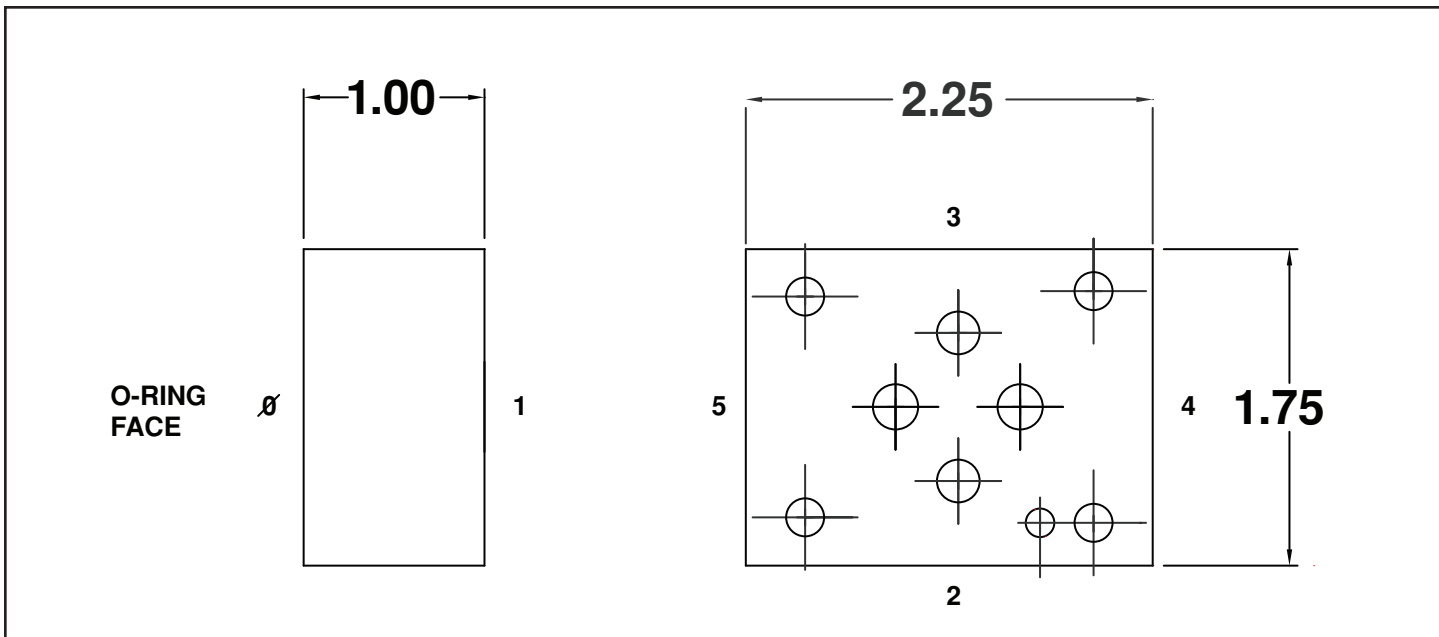
N-BUNA N  
V-VITON

BODY MATERIAL  
S-STEEL

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

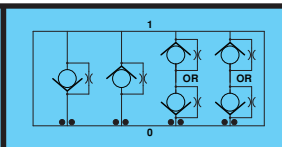
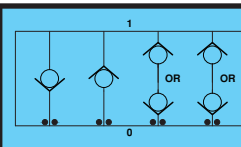
**D03 CHECK VALVE  
MODULES**





**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**D03 CHECK VALVE  
MODULES**



# Inserta Products, Inc.

## CHECK VALVES THREAD-IN TYPE

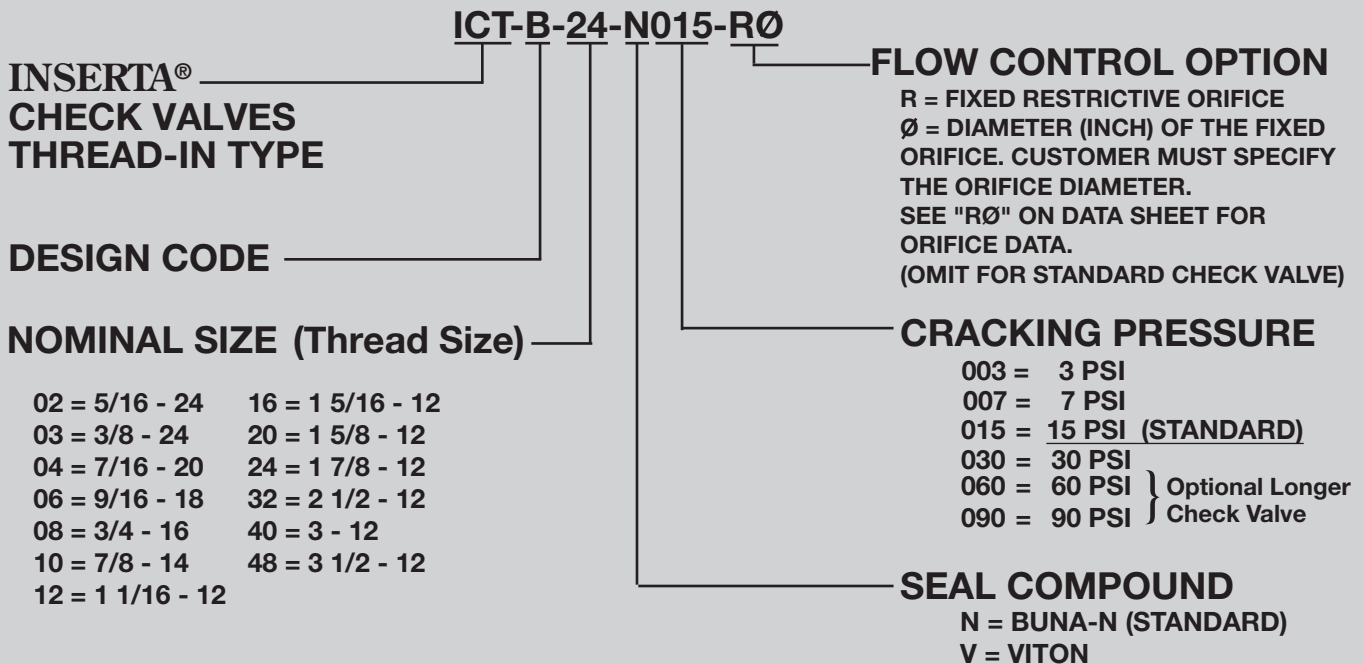
**INSERTA® ICT Check Valves**, Thread-In Type, with external SAE threads, can be inserted in manifolds, subplates, flanges or integrated valve systems. This compact design eliminates external leak points associated with line mounted check valves.

These disc check valves are also available with a fixed orifice for customer's specific quantity requirement.

**INSERTA® ICT Check Valves**, Thread-In Type, are all steel construction with hardened, lapped discs and seats providing positive fluid shut off. They come complete with a sealing O-ring.

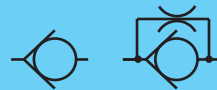


### ORDERING INFORMATION



**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**CHECK VALVES  
THREAD-IN  
TYPE**

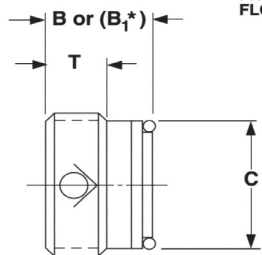
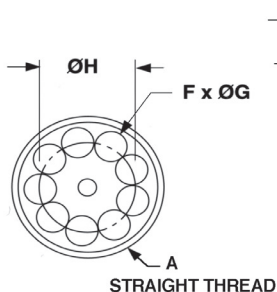




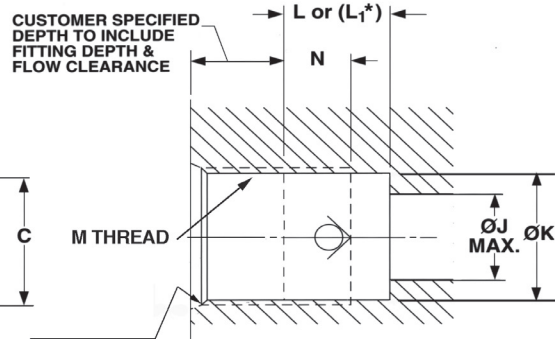
VALVE SIZE	NOMINAL FLOW (GPM)	VALVE DIMENSIONS								RØ MAX	T	O-RING SIZE NO. (mm)	INSTALLATION TOOL	SEATING TORQUE LB-FT
		A	B	B1 *	C	F	G	H						
02	1.0	5/16-24	.412	—	.245	4	.06	.175	.024	.270	(4.5x1)	IMT-C-02	.5-1	
03	1.8	3/8-24	.428	—	.333	4	.07	.224	.039	.270	(6.2X1)	IMT-C-03	.5-1	
04	3.0	7/16-20	.435	.630	.376	4	.10	.228	.039	.255	010	IMT-C-04	1-2	
06	6.0	9/16-18	.455	.710	.494	6	.12	.328	.078	.255	012	IMT-C-06	1-2	
08	12	3/4-16	.535	.750	.673	8	.15	.453	.078	.285	(13x2)	IMT-C-08	2-3	
10	17	7/8-14	.630	.770	.787	8	.17	.565	.078	.350	(16x2)	IMT-C-10	7-8	
12	25	1 1/16-12	.750	1.045	.963	8	.22	.693	.140	.430	116	IMT-D-12	16-17	
16	35	1 5/16-12	.910	1.340	1.210	9	.28	.875	.218	.510	213	IMT-D-16	27-29	
20	63	1 5/8-12	1.420	2.440	1.535	10	.31	1.161	.275	.940	219	IMT-E-20	45-50	
24	80	1 7/8-12	1.655	3.000	1.769	10	.37	1.340	.394	1.055	222	IMT-E-24	80-90	
32	135	2 1/2-12	2.520	—	2.391	10	.50	1.804	.394	1.531	227	IMT-E-32	90-100	
40	155	3-12	2.988	—	2.883	10	.59	2.187	.394	1.750	231	IMT-E-40	300-340	
48	175	3 1/2-12	3.113	—	3.385	10	.69	2.562	.394	1.750	235	IMT-E-48	400-430	

In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System) the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required.

**NOMINAL FLOW RATES ARE WITH A ΔP OF 30 TO 40 PSI**



**NOTE: MINIMUM ORFICE = .016 DIAMETER**



STRAIGHT THREAD PORT  
(SEE SAE J1926 DIMENSIONS ON PAGE 78)

MACHINED CAVITY DIMENSIONS						
VALVE SIZE	J	K -.005	L	L1*	M	N
02	.125	.255	.412	-	5/16-24	.291
03	.190	.345	.428	-	3/8-24	.291
04	.188	.389	.435	.630	7/16-20	.275
06	.281	.508	.455	.710	9/16-18	.275
08	.406	.689	.535	.750	3/4-16	.335
10	.500	.804	.630	.770	7/8-14	.415
12	.625	.978	.750	1.045	1 1/16-12	.495
16	.813	1.228	.910	1.340	1 5/16-12	.590
20	1.031	1.541	1.420	2.440	1 5/8-12	1.025
24	1.250	1.798	1.655	3.000	1 7/8-12	1.420
32	1.750	2.416	2.520	-	2 1/2-12	1.750
40	2.062	2.915	2.988	-	3-12	1.875
48	2.500	3.415	3.113	-	3 1/2-12	1.875

**SEE PAGE 72 FOR  
INSTALLATION TOOL  
ORDERING INFORMATION**

**MOUNTING POSITION:**  
OPTIONAL  
**MAXIMUM OPERATING PRESSURE:**  
5000 PSI (Contact the Factory for pressures up to 7250 PSI)  
**TEMPERATURE RANGE:**  
-22°F (-30°C) To 175°F (80°C)  
(Depending on seal material)

**OPERATING MEDIUM:**  
HYDRAULIC FLUID  
**VISCOSITY RANGE:**  
50 SSU TO 2000 SSU  
**CRACKING PRESSURE:**  
3 PSI, 7 PSI, 15 PSI (STANDARD)  
OR 30 PSI.  
\*60 PSI & 90 PSI, OPTIONAL WITH LONGER CHECK VALVE.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>CHECK VALVES THREAD-IN TYPE</b></p>	
---	---	--

# Inserta Products, Inc.

## CHECK VALVE GUIDED DISC THREAD-IN TYPE STAINLESS STEEL

INSERTA® IGT (Stainless Steel) Check Valves Guided Disc, Thread-In type, with threads compatible with O-ring port cavities made to SAE J1926-1, can be inserted in manifolds, subplates, flanges, and integrated valve systems.

Valve components are made from austenitic and precipitation hardened stainless steels. They may be considered in applications where broader operating temperature ranges are required, or for use with operating media that may be corrosive to standard steels.

The guided disc design (patent pending) provides superior resistance to wear in conditions prone to turbulence, which may induce valve disc flutter in an unguided disc. The guided disc is also less prone to chatter in low flow states.

Valve discs and seats are hardened and flat lapped for positive fluid shut off.

The valve disc may be provided with a customer specified orifice to provide fixed orifice flow control function in the checked direction.



Patent Pending

### ORDERING INFORMATION

**IGT-A-06-N015-RØ-SS**

INSERTA®  
CHECK VALVES  
GUIDED DISC  
THREAD-IN TYPE

DESIGN CODE

NOMINAL SIZE (Thread Size)

- 04 = 7/16 - 20
- 06 = 9/16 - 18
- 10 = 7/8 - 14
- 12 = 1 1/16 - 12
- 16 = 1 5/16 - 12

BODY MATERIAL  
SS = STAINLESS STEEL

FLOW CONTROL OPTION  
R = FIXED RESTRICTIVE ORIFICE  
Ø = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER SEE "RØ" ON DATA SHEET FOR ORIFICE DATA. (OMIT FOR STANDARD CHECK VALVE)

CRACKING PRESSURE  
003 = 3 PSI  
007 = 7 PSI  
015 = 15 PSI (STANDARD)

SEAL COMPOUND  
N = BUNA-N (STANDARD)  
V = VITON

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
THREAD-IN  
TYPE

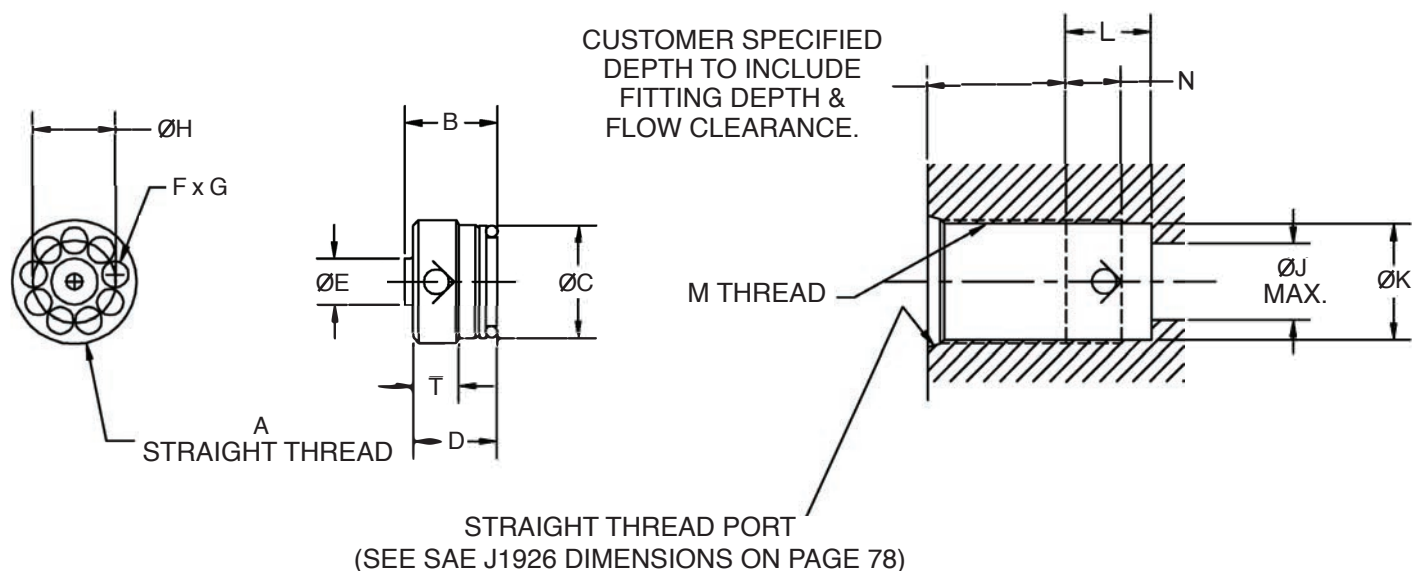


VALVE SIZE	NOMINAL FLOW (GPM)	VALVE DIMENSIONS									O-RING SIZE NO. (mm)	INSTALLATION TOOL	SEATING TORQUE LB-FT	RØ MAX
		A	B	C	D	E	F	G	H	T				
04	3	7/16-20	.470	.372	.470	--	3	**	.248	.352	011	IMT-G-04	1-2	--
06	6	9/16-18	.459	.494	.459	-	6	.10	.345	.271	012	IMT-C-06	1-2	.044
08	12	3/4-16	.575	.673	.530	.240	8	.15	.453	.290	(13X2)	IMT-C-08	2-3	.055
10	17	7/8-14	.690	.787	.635	.300	8	.17	.565	.359	(16X2)	IMT-C-10	7-8	.078
12	12	3/4-16	.575	.673	.530	.240	8	.15	.453	.290	(13X2)	IMT-C-08		.055
16	35	1 5/16-12	1.024	1.210	.898	.490	9	.27	.875	.515	213	IMT-C-16	27-29	.200

\*Torques specified are for lubricated surfaces

\*\* .064 Wide Slots

In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System) the nominal rated flow must not be exceeded and a cracking pressure of 15 PSI is recommended.



**SEE PAGE 72 FOR  
INSTALLATION TOOL  
ORDERING INFORMATION**

VALVE SIZE	MACHINED CAVITY DIMENSIONS				
	J	K -.005	L	M	N
04	.188	.389	.470	7/16-20	.315
06	.281	.508	.459	9/16-18	.300
08	.406	.689	.575	3/4-16	.365
10	.500	.804	.690	7/8-14	.430
12	.625	.978	.815	1 1/16-12	.522
16	.813	1.228	1.024	1 5/16-12	.671

**MATERIAL:**  
 BODY 316 STAINLESS STEEL  
 VALVE DISC 17-4 PH STAINLESS STEEL  
 VALVE SEAT 17-4 PH STAINLESS STEEL

**MOUNTING POSITION:**  
 OPTIONAL  
**MAXIMUM OPERATING PRESSURE:**  
 6000 PSI (Contact the Factory for Pressures up to 7250 PSI)  
**TEMPERATURE RANGE:**  
 -40°F (-40°C) To 200°F (93°C)  
 (Depending on seal material)

**OPERATING MEDIUM:**  
 HYDRAULIC FLUID  
**VISCOSITY RANGE:**  
 50 SSU TO 2000 SSU  
**CRACKING PRESSURE:**  
 3 PSI, 7 PSI, 15 PSI (STANDARD)

<b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422	<b>CHECK VALVES GUIDED DISC SLIP-IN TYPE</b>	
---	--	--

# Inserta Products, Inc.

## CHECK VALVE GUIDED DISC THREAD-IN TYPE

INSERTA® IGT (steel) Check Valves, Guided Disc, may be considered as an alternative to standard Inserta® ICT Thread-In Type valves for more demanding applications.

These valves may be used in conjunction with modified SAE J1926-1 ports in manifolds, sub-plates, flanges, and components.

The guided disc design (patent pending) affords improved longevity in applications prone to significant turbulence, as well as in higher cycling and higher flow applications.

With only minor dimensional differences in length only, The IGT Thread-In type valve may often be directly substituted for the ICT valve, including in the INSERTA® ICFT 4-Bolt Flange Type Valve Assembly.

The valve components are steel. The valve discs and seats are hardened and flat lapped for positive fluid shut off.

The valve disc may be provided with a customer specified orifice to provide fixed orifice flow control function in the checked direction.



Patent Pending

### ORDERING INFORMATION

**IGT-A-16-N015-R0**

INSERTA®  
CHECK VALVES  
GUIDED DISC  
THREAD-IN TYPE

DESIGN CODE

NOMINAL SIZE (Thread Size)

- 16 = 1 5/16 - 12
- 20 = 1 5/8 - 12
- 24 = 1 7/8 - 12
- 32 = 2 1/2 - 12
- 40 = 3 - 12
- 48 = 3 1/2 - 12

FLOW CONTROL OPTION

R = FIXED RESTRICTIVE ORIFICE  
0 = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER  
SEE "R0" ON DATA SHEET FOR ORIFICE DATA.  
(OMIT FOR STANDARD CHECK VALVE)

CRACKING PRESSURE

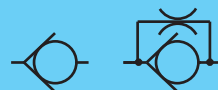
- 003 = 3 PSI
- 007 = 7 PSI
- 015 = 15 PSI (STANDARD)

SEAL COMPOUND

- N = BUNA-N (STANDARD)
- V = VITON

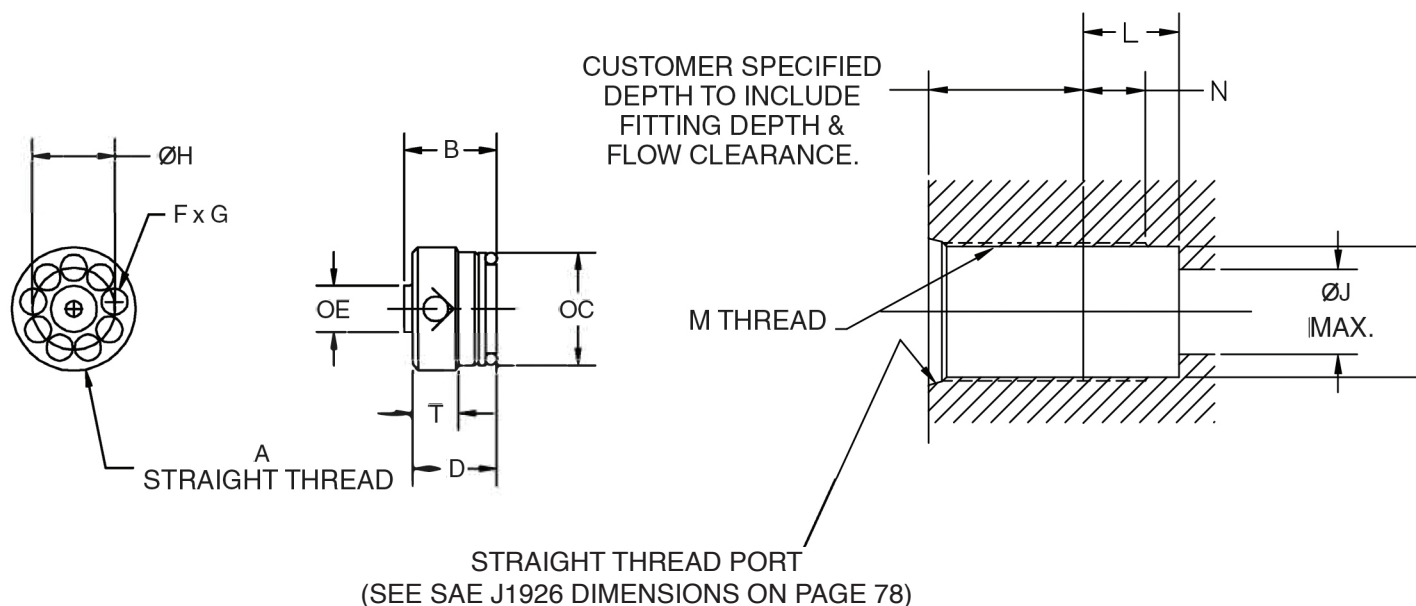
Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE



VALVE SIZE	NOMINAL FLOW (GPM)	VALVE DIMENSIONS								RØ MAX	T	O-RING SIZE NO. (mm)	INSTALLATION TOOL	SEATING TORQUE LB-FT
		A	B	C	D	E	F	G	H					
16	35	1 5/16-12	1.024	1.210	.898	0.495	9	.28	.875	0.177	.510	213	IMT-D-16	27-29
20	63	1 5/8-12	1.420	1.535	1.420	--	10	.31	1.161	0.247	.940	219	IMT-E-20	45-50
24	80	1 7/8-12	1.655	1.769	1.655	--	10	.37	1.340	0.283	1.055	222	IMT-E-24	80-90
32	135	2 1/2-12	2.520	2.391	2.520	--	10	.50	1.804	0.368	1.750	227	IMT-E-32	90-100
40	155	3-12	2.988	2.883	2.988	--	10	.59	2.187	0.417	1.750	231	IMT-E-40	300-340
48	175	3 1/2-12	3.113	3.385	3.385	--	10	.69	2.562	0.394	1.750	235	IMT-E-48	400-430

In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System) the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required.



SEE PAGE 72 FOR  
INSTALLATION TOOL  
ORDERING INFORMATION

VALVE SIZE	MACHINED CAVITY DIMENSIONS				
	J	K -.005	L	M	N
16	.813	1.228	1.024	1 5/16-12	0.904
20	1.031	1.541	1.420	1 5/8-12	1.025
24	1.250	1.798	1.655	1 7/8-12	1.420
32	1.750	2.416	1.520	2 1/2-12	1.750
40	2.062	2.915	2.988	3-12	1.875
48	2.500	3.415	3.113	3 1/2-12	1.875

MOUNTING POSITION:  
OPTIONAL  
MAXIMUM OPERATING PRESSURE:  
6000 PSI (Contact the Factory for  
Pressures up to 7250 PSI)  
TEMPERATURE RANGE:  
-40°F (-40°C) To 200°F (93°C)  
(Depending on seal material)

OPERATING MEDIUM:  
HYDRAULIC FLUID  
VISCOSITY RANGE:  
50 SSU TO 2000 SSU  
CRACKING PRESSURE:  
3 PSI, 7 PSI, 15 PSI (STANDARD)

Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVES  
GUIDED DISC  
SLIP-IN TYPE



# Inserta Products, Inc.

## CHECK VALVES 4-BOLT FLANGE TYPE

INSERTA® ICFT Check Valves, Flange Type, provide an effective way to install a Check Valve or Fixed Orifice Flow Control Valve in a piping system that uses SAE 4-Bolt flange ports. These flange bodies include the INSERTA® ICT Thread-In Type Check Valves, with the option to include an INSERTA® IGT Guided Disc, Thread-In Type Check Valve on select sizes. The free flow direction is always from the surface with the seal to the surface without the seal. The nominal size INSERTA® ICT Thread-In Type or INSERTA® IGT Guided Disc, Thread-In Type Check Valve, matches the nominal flange size to meet most flow requirements for the given flange size. The ICFT Check Valves, Flange Type, 6132 and 6232 are also available with -24 size Check Valves for those applications that do not require the flow capacity of the -32 size.



A split flange connection should not be mounted directly to Face 1 of the valve. An optional IPS port spacer may be used between Face 1 of the valve and a split flange connection. The IPS port spacer is not required to mount a solid flange connection on Face 1 of the valve.

For those applications where one requires the free flow from the plain surface to the surface with the seal, the INSERTA® ICF Check Valve Body or INSERTA® ICFS Check Valve Body with Support Member, Flange type, should be used with the INSERTA® ICS / IGS Check Valve, Slip-In Type. The INSERTA® ICS / IGS Check Valve, Slip-In Type, can be inserted from either end to permit free flow through the body in either direction. The ICF bodies use a larger nominal size INSERTA® ICS / IGS Check Valve, and are the check valves of choice in higher flow applications.

The INSERTA® IGT Guided Disc Thread-In Type Check Valve may be considered for in demanding applications that may subject the valve to considerable turbulence or higher cycling.

INSERTA® ICFT Check Valves, Flange Type, are all steel construction.

### ORDERING INFORMATION

ICFT - A - 61 - 32 - (24) - N - 015 - \*\* - RØ - GT

INSERTA®  
CHECK VALVE  
FLANGE TYPE  
(w/ICT CHECK)

DESIGN CODE

MOUNTING PATTERN

61 = SAE CODE 61  
62 = SAE CODE 62

NOMINAL SIZE

08 = 1/2      24\* = 1 1/2  
12 = 3/4      32\* = 2  
16\* = 1        40 = 2 1/2  
20\* = 1 1/4    48 = 3

(USED WHEN ICT  
CHECK SIZE IS  
SMALLER THAN THE  
NOMINAL SIZE)  
OMIT WHEN THE SAME

(OMIT FOR ICT INSERT)  
GT = IGT THREAD-IN TYPE  
CHECK VALVE

FLOW CONTROL OPTION

R = FIXED RESTRICTIVE ORIFICE  
Ø = DIAMETER (INCH) OF THE FIXED  
ORIFICE. CUSTOMER MUST SPECIFY  
THE ORIFICE DIAMETER.  
SEE "RØ" ON DATA SHEET FOR  
ORIFICE DATA.

SURFACE FINISH

ZN = ZINC NICKEL  
\*\* = UNPLATED

CRACKING PRESSURE

003 = 3 PSI  
007 = 7 PSI  
015 = 15 PSI (STANDARD)  
030 = 30 PSI

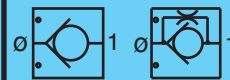
SEAL COMPOUND

N = BUNA-N (STANDARD)  
V = VITON

\*IGT Guided Disc Valve element available

Inserta Products, Inc.  
Blue Bell, Pa. 19422

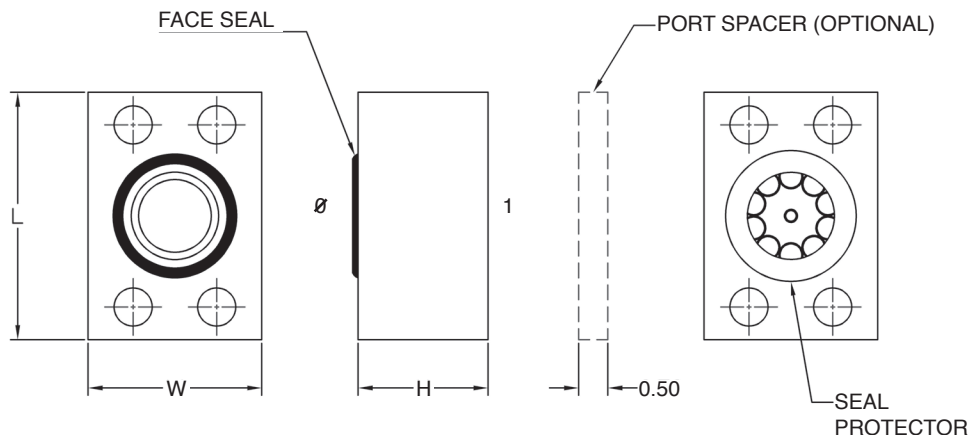
CHECK VALVE  
4-BOLT  
FLANGE TYPE



A flange head should not be affixed directly to surface 1 of the valve. A planar element, such as an INSERTA® IPS Port Spacer must be used between Face 1 of the valve and a flange head.

\*\*See Page 63 for Flow Control Option Orifice data.

CAUTION - Care must be exercised when installing check valve to insure the free flow path is correct for the system in which it is installed.



### CODE 61

MOUNTING PATTERN-SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	L	O-RING SIZE NO.	ICT THREAD-IN CHECK VALVE PART NO.	IGT THREAD-IN CHECK VALVE PART NO.
6108	1/2	12	1.37	1.00	2.12	210	ICT-B-08-***	--
6112	3/4	25	1.75	1.25	2.50	214	ICT-B-12-***	--
6116	1	35	2.00	1.50	2.75	219	ICT-B-16-***	IGT-A-16-***
6120	1 1/4	63	2.25	2.00	3.00	222	ICT-B-20-***	IGT-A-20-***
6124	1 1/2	80	2.75	2.25	3.75	225	ICT-B-24-***	IGT-A-24-***
6132 (24)	2	80	3.00	2.00	4.00	228	ICT-B-24-***	IGT-A-24-***
6132	2	135	3.25	3.50	4.00	228	ICT-B-32-***	IGT-A-32-***
6140	2 1/2	155	3.50	3.75	4.50	232	ICT-B-40-***	--
6148	3	175	4.00	4.00	5.00	237	ICT-B-48-***	--

### CODE 62

MOUNTING PATTERN-SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	L	O-RING SIZE NO.	ICT THREAD-IN CHECK VALVE PART NO.	IGT THREAD-IN CHECK VALVE PART NO.
6208	1/2	12	1.50	1.00	2.25	210	ICT-B-08-***	--
6212	3/4	25	1.87	1.25	2.75	214	ICT-B-12-***	--
6216	1	35	2.25	1.50	3.00	219	ICT-B-16-***	IGT-A-16-***
6220	1 1/4	63	2.50	2.00	3.50	222	ICT-B-20-***	IGT-A-20-***
6224	1 1/2	80	3.00	2.25	4.25	225	ICT-B-24-***	IGT-A-24-***
6232 (24)	2	80	3.50	2.00	5.00	228	ICT-B-24-***	IGT-A-24-***
6232	2	135	4.00	3.50	5.00	228	ICT-B-32-***	IGT-A-32-***
6240	2 1/2	155	4.25	4.00	6.00	232	ICT-B-40-***	--
6248	3	175	5.00	4.00	8.00	237	ICT-B-48-***	--

REFERENCE DATA

NOMINAL FLOW RATINGS ARE WITH A Δ P OF 30 TO 40 PSI. In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required. THE PRESSURE RATING OF THESE VALVE ASSEMBLIES MAY BE LIMITED BY THE ICT CHECK INSERT. REFER TO THE ICT DATA SHEET.

TEMPERATURE RANGE: -22 F (-30 C) TO 175 F (80 C)

OPERATING MEDIUM: HYDRAULIC FLUID

VISCOSITY RANGE: 50 SSU TO 2000 SSU

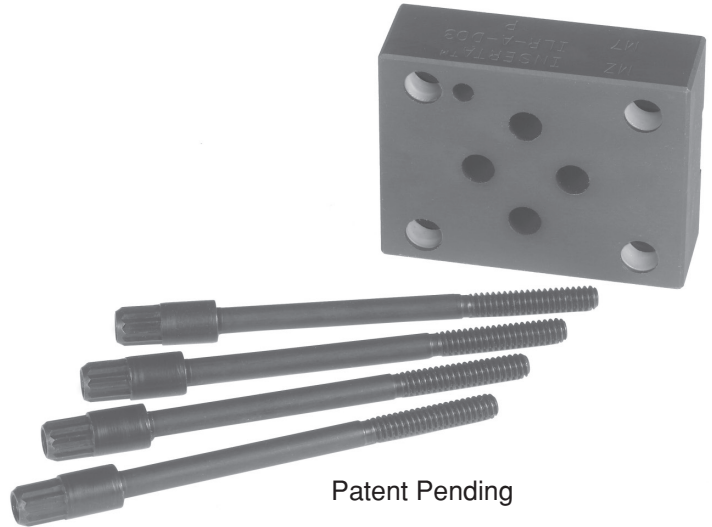
CRACKING PRESSURE: 3 PSI, 7 PSI, 15 PSI (STANDARD) & 30 PSI.

<p><b>Inserta Products, Inc.</b> Blue Bell, Pa. 19422</p>	<p><b>CHECK VALVE</b> <b>4-BOLT</b> <b>FLANGE TYPE</b></p>	
---	--	--

# Inserta Products, Inc.

## LOCKSTACK™ D03 RETAINING SYSTEM

INSERTA® ILR Lockstack™ D03 Retaining System includes four stacking fasteners and an isolation retainer. The stacking fasteners are available in various lengths for use with a variety of D03 sandwich module combinations. This system eliminates the significant labor involved with the use of threaded rods.



The isolation retainer contains a nylon insert in each stacking fastener bore. These are deformed around the 12-pointed hex of each stacking fastener as the screws of the directional control valve or other component(s) above are tightened. The interface between the stacking fastener head and the insert provides a significant holding torque to the stacking fasteners as long as the isolation retainer is in place. This enables removal of the directional control valve or other components above while minimizing the possibility of the stacking fasteners loosening.

The isolation retainer may be easily removed via slots on its underside to allow access to the stacking fastener heads.

**ORDERING INFORMATION**

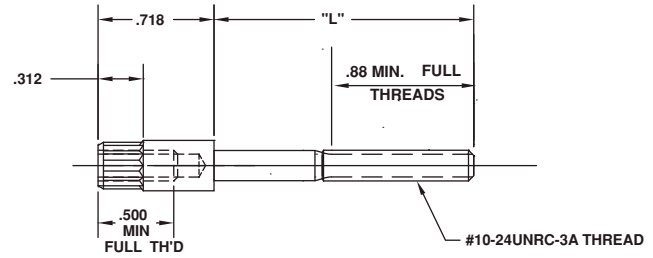
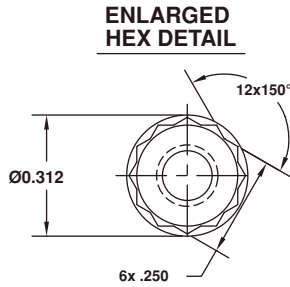
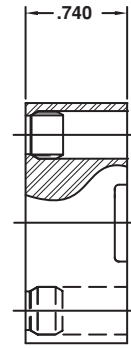
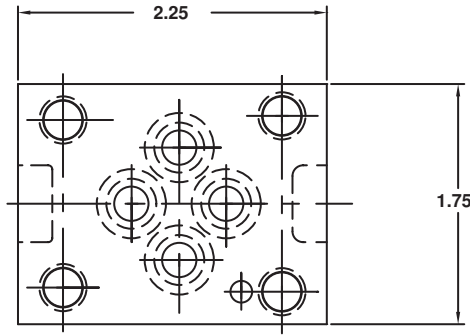
**ILR - A - D03 - S - 4 010 - 24 - 1.75 - N**

<p>INSERTA® LOCKSTACK™ RETAINING SYSTEM</p> <p>DESIGN CODE</p> <p>RETAINER NFPA PATTERN</p> <p>RETAINER MATERIAL S-STEEL</p>	<p>FASTENER NOMINAL LENGTH "L" (INCHES)</p> <table border="0"> <tr><td>1.50</td><td>3.00</td><td>4.50</td></tr> <tr><td>1.75</td><td>3.25</td><td>4.75</td></tr> <tr><td>2.00</td><td>3.50</td><td>5.00</td></tr> <tr><td>2.25</td><td>3.75</td><td>5.25</td></tr> <tr><td>2.50</td><td>4.00</td><td>5.50</td></tr> <tr><td>2.75</td><td>4.25</td><td></td></tr> </table> <p>FASTENER THREAD #10-24</p> <p>FASTENER QUANTITY</p>	1.50	3.00	4.50	1.75	3.25	4.75	2.00	3.50	5.00	2.25	3.75	5.25	2.50	4.00	5.50	2.75	4.25		<p>SEAL COMPOUND N = BUNA N V = VITON</p>
1.50	3.00	4.50																		
1.75	3.25	4.75																		
2.00	3.50	5.00																		
2.25	3.75	5.25																		
2.50	4.00	5.50																		
2.75	4.25																			

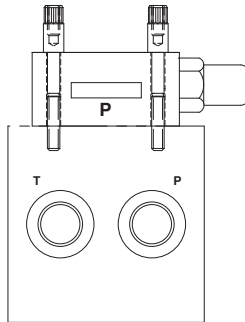
**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

**LOCKSTACK™ D03  
RETAINING SYSTEM**

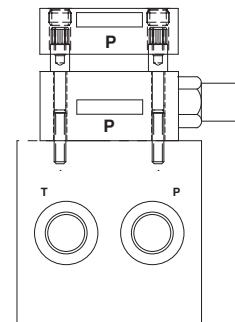




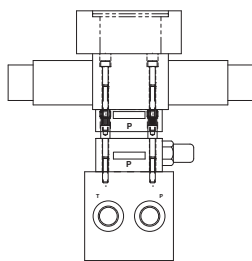
**To Assemble:**



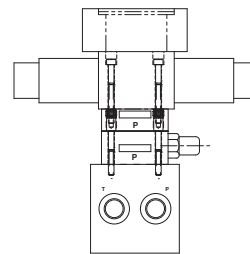
**Step 1:** Use **INSERTA® Lockstack™** Fasteners to secure sandwich component(s).



**Step 2:** Rest the Isolation Retainer on the **INSERTA® Lockstack™** Fasteners.



**Step 3:** Place the Directional Control Valve or other component(s) above the Isolation Retainer. Engage the screws into the heads of the **INSERTA® Lockstack™** Fasteners.



**Step 4:** Partially tighten the screws in a sequential pattern until the bottom of the Isolation Retainer is flush with the top of the superior sandwich component. Fully torque the screws.

**Inserta Products, Inc.**  
Blue Bell, Pa. 19422

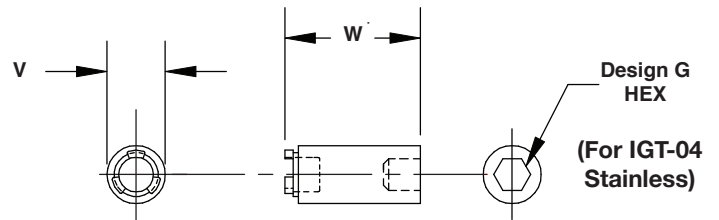
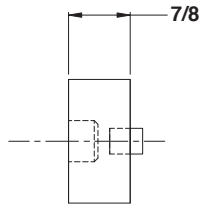
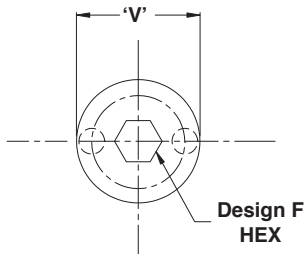
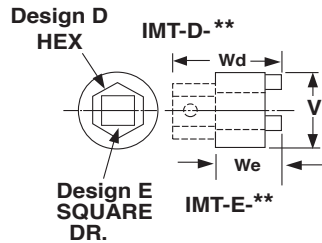
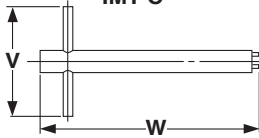
**LOCKSTACK™ D03**  
**RETAINING SYSTEM**

# Inserta Products, Inc.

## CHECK VALVE TOOL



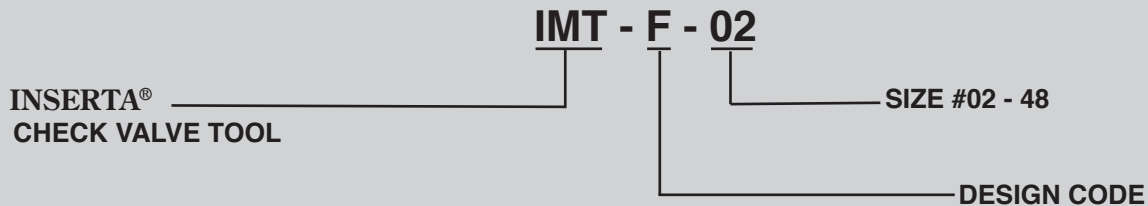
\*FOR C, D, & E DESIGNS.  
IMT-C-\*\*



## INSTALLATION TOOL

PART NO.	V	W*	HEX
IMT-C-02	2.00	4.0	
IMT-C-03	2.00	4.0	
IMT-C-04	2.00	4.0	
IMT-C-06	2.50	4.5	
IMT-C-08	3.00	5.0	
IMT-C-10	3.50	5.5	
IMT-D-12	.95	1.38	9/16 Hex
IMT-D-16	1.19	1.38	3/4 Hex
IMT-E-20	1.55	1.0	1/2 Square
IMT-E-24	1.72	1.0	1/2 Square
IMT-E-32	2.39	1.5	3/4 Square
IMT-E-40	2.90	1.5	3/4 Square
IMT-E-48	3.38	1.5	3/4 Square
IMT-F-02	.270	-	3/16 Hex
IMT-F-03	.343	-	3/16 Hex
IMT-F-04	.343	-	3/16 Hex
IMT-F-06	.468	-	3/16 Hex
IMT-F-08	.625	-	1/4 Hex
IMT-F-10	.750	-	1/4 Hex
IMT-G-04	.343	-	3/16 Hex

## ORDERING INFORMATION



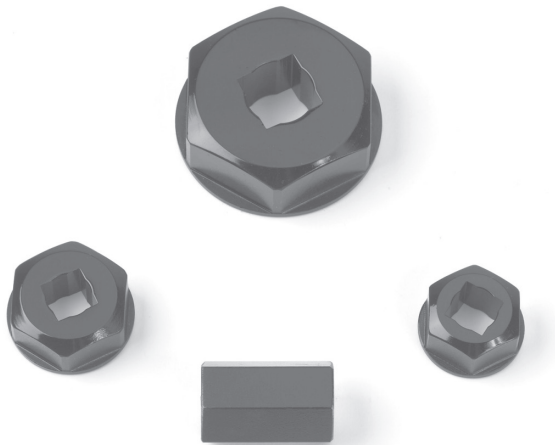
Inserta Products, Inc.  
Blue Bell, Pa. 19422

CHECK VALVE  
TOOL



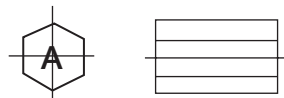
# ADACONN®

## ADAFLANGE® ADAPTERS WRENCH/BIT TOOLS

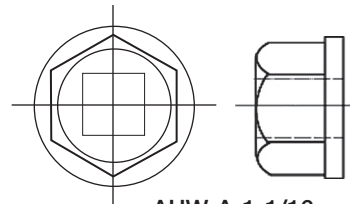


BIT or WRENCH TOOL			
FLANGE HEAD SIZE	HEXAGON DRIVE SIZE	BIT or WRENCH NO.	BIT or WRENCH DRIVE SIZE
6108 or 6208	7/16	AHB-A-7/16	7/16 Hex
6112 or 6212	5/8	AHB-A-5/8	5/8 Hex
6116 or 6216	7/8	AHB-A-7/8	7/8 Hex
6120 or 6220	1-1/16	AHW-A-1-1/16	1/2 Sqr.
6124 or 6224	1-5/16	AHW-A-1-5/16	1/2 Sqr.
6132 or 6232	1-3/4	AHW-A-1-3/4	3/4 Sqr.
6140 or 6240	2-3/16	AHW-A-2-3/16	3/4 Sqr.
6148 or 6248	2-5/8	AHW-A-2-5/8	3/4 Sqr.

TOOLS



AHB-A-7/8  
BIT



AHW-A-1-1/16  
WRENCH  
(PATENTED)

### ORDERING INFORMATION

**AHB - A - 7/16**

ADACONN®  
ADAPTER TOOL

HB = BIT

HW = WRENCH (PATENTED)

DRIVE SIZE

DESIGN CODE

**ADACONN®**  
Blue Bell, Pa. 19422

**ADAFLANGE® ADAPTERS  
WRENCH/BIT TOOLS**

## FASTENER REQUIREMENTS for SAE J518 4-BOLT SPLIT FLANGE CONNECTIONS

For inch fasteners, SAE J518-1 JAN2013 (Code 61) and SAE J518-2 APR2017 (Code 62) specify that either SAE J429 Grade 8 hex head screws or ASME 18.3 socket head cap screws of ASTM A574 material be used.

For metric fasteners, these standards specify that hexagon head screws, conforming to ISO 4017, or socket head screws, conforming to ISO 4762, either of property class 10.9 (minimum) be used.

Relevant References:

SAE J429 Mechanical and material requirements for externally threaded fasteners.

ASME B18.3 2003 Socket, cap, shoulder, and set screws, hex and spline keys (inch series).

ISO 898-1 Mechanical properties of fasteners made of carbon steel and alloy steel.

ISO 4017 Hexagon head screws- product grades A & B

ISO 4762 Hexagon socket head cap screws

### FASTENER COMPARISONS

QUALITY	GRADE 8 HHCS	INDUSTRY SHCS	UNBRAKO® SHCS*	Metric HHCS Class 10.9	Metric SHCS Class 12.9
<b>STRENGTH</b> UTS-KSI min (SIZES)	150 (1/4 thru 1 1/2)	180 ( ≤ 1/2) 170 ( > 1/2)	190 ( ≤ 1/2) 180 ( > 1/2)	150 5-100mm	176 1.6-100mm
<b>PROOF</b> <b>STRENGTH</b> PTS – KSI	120 (1/4 thru 1 1/2)	140 ( ≤ 1/2) 135 ( > 1/2)	148 ( ≤ 1/2) 140 ( > 1/2)	120 5-100mm	140 1.6-100mm
<b>ROCKWELL</b> <b>HARDNESS</b>	C33 – C39	C39 – C45 C37 – C45	C39 – C43 C38 – C43	C33 – 39	C38 – 44
<b>MARKING</b>	SIX RADIAL LINES	SHCS CONFIGURATION	MFG'S ID	CLASS NO. (10.9)	CLASS NO. (12.9)

\* UNBRAKO® is a registered trade-mark of SPS Technologies.

## BOLT KIT AVAILABILITY WITH 1960 SERIES SOCKET HEAD CAP SCREWS (UNRC COURSE THREAD SERIES- INCH SIZES)

ADACONN® and INSERTA® offer Bolt Kits that include Alloy Steel 1960 Series Socket Head Cap Screws that conform to ASTM A574. Sizes through 1/2" size have minimum ultimate tensile strength of 180,000 PSI and those over 1/2" have minimum ultimate tensile strength of 170,000 PSI. They are furnished with a thermal black finish. The threads are Unified standard: Class 3A, UNRC series for screw sizes through 1 inch, and Class 2A UNRC series for sizes over 1 inch. The availability of these Socket Head Cap Screws is listed in the following chart.

LENGTH ( INCH )	SIZE - THREADS PER INCH										
	8-32	10-24	1/4-20	5/16-18	3/8-16	7/16-14	1/2-13	5/8-11	3/4-10	7/8-9	1 1/8-7
.50	S										
.63	S	S	S								
.75		S	S								
.88		S	S								
1.00	S	S	S	S	S						
1.25	S	S	S	S	S	S	S				
1.50	S	S	S	S	S	S	S	S			
1.75	S	S	S	S	S	S	S	S	S		
2.00		S	S	S	S	S	S	S	S		
2.25			S	S	S	S	S	S	S	S	
2.50			S	S	S	S	S	S	S	S	S
2.75				S	S	S	S	S	S	S	
3.00				S	S	S	S	S	S	S	SS
3.25				S	S		S	S	S	S	
3.50				S	S	S	S	S	S	S	
3.75				SS	SS		S	S	S	S	
4.00				S	S	S	S	S	S	S	SS
4.50				SS	S	S	S	S	S	S	
5.00				SS	S	S	S	S	S	S	SS
5.50				SS	S		S	S	S	S	
6.00				SS	S		S	S	S	S	SS
6.50					SS		S	S	S	S	
7.00					SS		S	S	S	S	SS
7.50				SS			S	S			
8.00					SS		S	S	S	S	SS
8.50							SS	SS	SS		
9.00							SS	SS	SS		
10.00							SS	SS	SS		
11.00							SS	SS	SS		
12.00							SS	SS	SS		
13.00									SS		
14.00									S		

S = STANDARD, NORMALLY IN STOCK

SS = SEMI-STANDARD, MAY NOT BE IN STOCK

### ORDERING INFORMATION

**IBK — SH 4 038 — 16 x 1.00**

ADACONN® OR INSERTA®

A = ADACONN®  
I = INSERTA®

BOLT KIT

TYPE

SH = SOCKET HEAD CAP SCREW

BOLTS PER BOLT KIT

4 = 4 BOLTS PER BOLT KIT  
2 = 2 BOLTS PER BOLT KIT

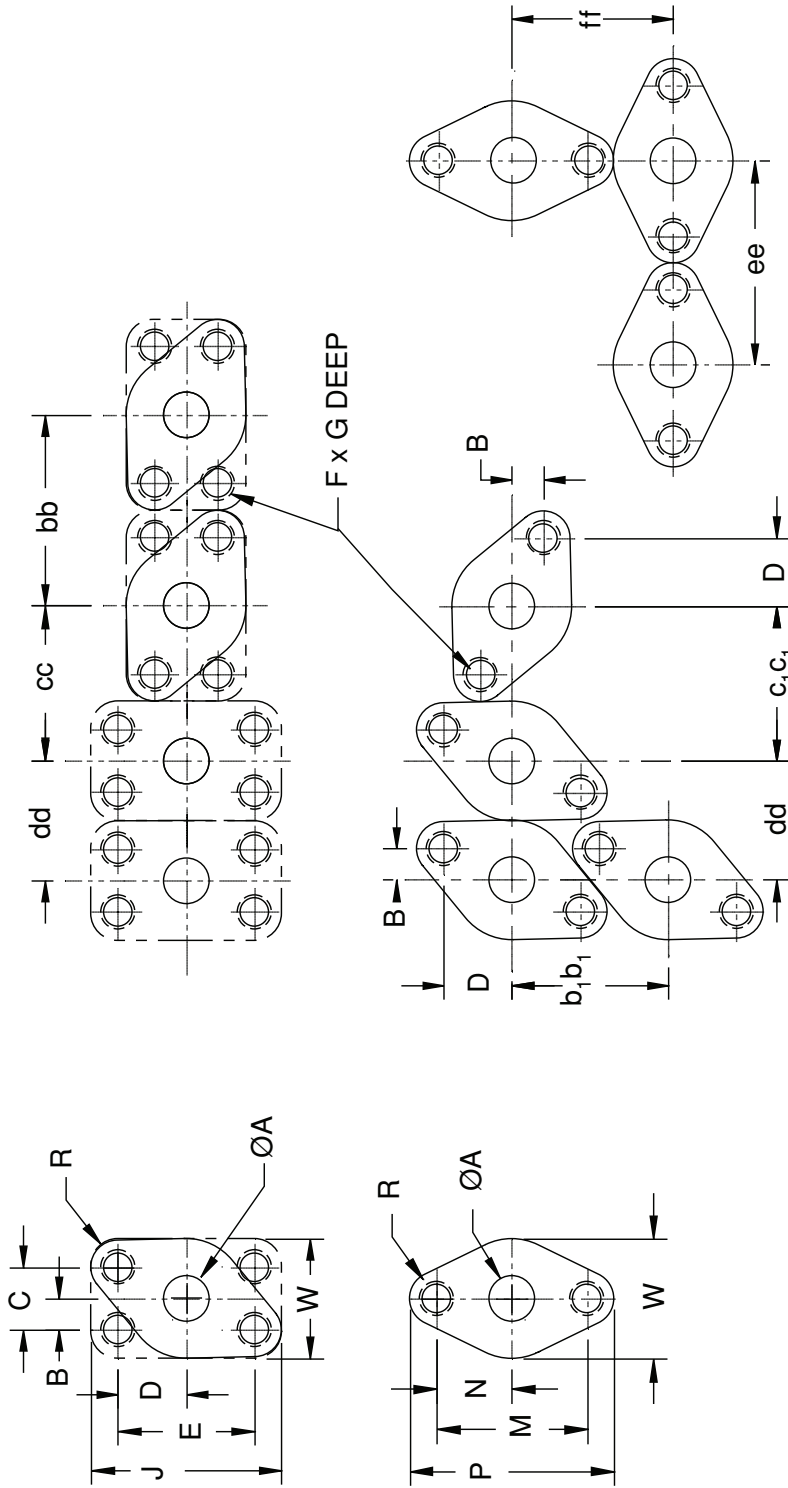
BOLT LENGTH

1.00 = 1.00 LONG

SIZE-THREADS PER INCH

008-32 = #8-32    050-13= 1/2-13  
010-24 = #10-24    063-11= 5/8-11  
025-20 = 1/4-20    075-10= 3/4-10  
031-18 = 5/16-18    088-9 = 7/8-9  
038-16 = 3/8-16    112-7 = 1 1/8-7  
044-14 = 7/16-14

# UNIFIED CODE U61 4 & 2 BOLT FLANGE PORT DIMENSIONS

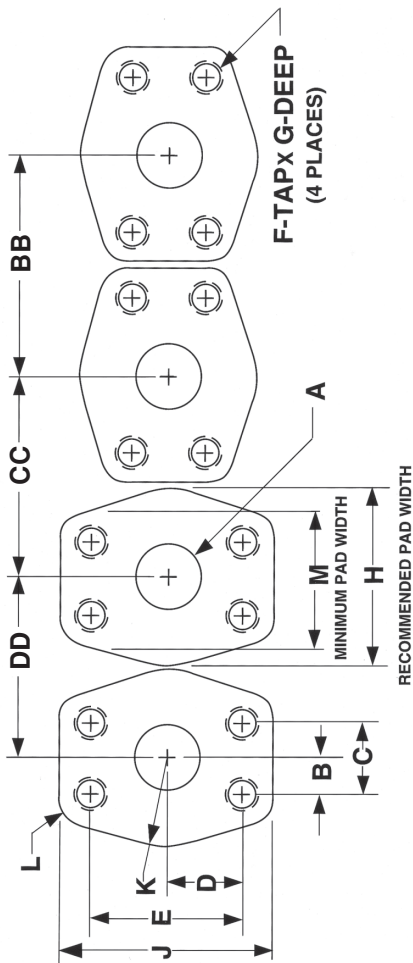


## UNIFIED CODE U61 PORT DIMENSIONS

SIZE CODE	MAX 4-BOLT	PRESS 2-BOLT	A DIA. ±.000/.06	B ±.005	B ±.010	C ±.010	D ±.005	D ±.010	E ±.010	F UNC-2B	G MIN	J MIN	M ±.01	N ±.01	P MIN	R MIN	W MIN	bb MIN	b.b.b. MIN	cc MIN	c.c.c. MIN	dd MIN	ee MIN	ff MIN
02	12,000	10,000	.13	.139	---	.278	.348	---	.696	8-32	.38	1.00	.75	.38	1.07	.16	.62	1.00	.89	.81	.81	.62	1.07	.84
04	11,000	8,000	.25	.173	---	.346	.402	---	.804	10-24	.44	1.25	.88	.44	1.26	.19	.75	1.25	1.03	1.00	.96	.75	1.26	1.00
06	8,500	6,000	.38	.215	---	.430	.519	---	1.038	1/4-20	.56	1.50	1.12	.56	1.54	.20	.87	1.50	1.22	1.18	1.16	.87	1.54	1.20
08	6,000	5,000	.50	---	.344	.688	---	.750	1.500	5/16-18	.69	2.12	1.65	.82	2.25	.29	1.31	2.12	1.72	1.71	1.70	1.31	2.25	1.78
12	6,000	5,000	.75	---	.438	.875	---	.938	1.875	3/8-16	.81	2.56	2.07	1.03	2.72	.32	1.62	2.56	2.04	2.09	2.06	1.62	2.72	2.17
16	6,000	4,000	1.00	---	.515	1.031	---	1.031	2.062	3/8-16	.81	2.75	2.30	1.15	3.05	.37	1.87	2.75	2.33	2.31	2.35	1.87	3.05	2.46
20	6,000	4,000	1.25	---	.594	1.188	---	1.156	2.312	7/16-14	.94	3.12	2.60	1.30	3.36	.37	2.12	3.12	2.48	2.62	2.55	2.12	3.36	2.74
24	6,000	3,000	1.50	---	.703	1.406	---	1.375	2.750	1/2-13	1.06	3.69	3.09	1.54	3.97	.44	2.50	3.69	2.93	3.09	3.02	2.50	3.97	3.23
32	6,000	3,000	2.00	---	.844	1.688	---	1.531	3.062	1/2-13	1.06	4.00	3.49	1.74	4.38	.44	3.00	4.00	3.28	3.50	3.37	3.00	4.38	3.69

NOTE: 1. THE ABOVE BOLT THREAD DEPTH IS BASED ON A MATERIAL YIELD STRESS OF 47,000 PSI MIN.  
 2. THESE FLANGE PORTS USE SOCKET HEAD CAP SCREWS FOR FASTENING.  
 3. THE 'CC' DIMENSION FOR SIZE 16 MUST BE INCREASED FROM 2.312 TO 2.328 IF A 2 BOLT ADAPTER IS PLACED ADJACENT TO A 4-BOLT ADAPTER AT 90°.

**SAE 4 BOLT FLANGE PORT DIMENSIONS**



**CODE 61**

SIZE CODE	MAX PRESS	A	B	C	D	E	F	G	H	J	K	L	M	DD MIN	CC MIN	BB MIN
08	5000	.50	.344	±.01	.750	±.01	5/16-18	.94	±.01	2.12	.91	.31	1.31	1.91	2.06	2.22
12	5000	.75	.438	.875	.938	1.875	3/8-16	.88	2.06	2.56	1.03	.34	1.62	2.16	2.41	2.66
16	5000	1.00	.515	1.031	1.031	2.062	3/8-16	.88	2.31	2.75	1.16	.34	1.88	2.41	2.62	2.84
20	4000	1.25	.594	1.188	1.156	2.312	7/16-14	1.12	2.88	3.12	1.44	.41	2.12	2.97	3.09	3.22
24	3000	1.50	.703	1.406	1.375	2.750	1/2-13	1.06	3.25	3.69	1.62	.47	2.50	3.34	3.56	3.78
32	3000	2.00	.844	1.688	1.531	3.062	1/2-13	1.06	3.81	4.00	1.91	.47	3.00	3.91	4.00	4.09
40	2500	2.50	1.000	2.000	1.750	3.500	1/2-13	1.19	4.28	4.50	2.14	.50	3.50	4.38	4.50	4.59
48	2000	3.00	1.219	2.438	2.094	4.188	5/8-11	1.19	5.16	5.31	2.58	.56	4.19	5.25	5.34	5.41
56	500	3.50	1.375	2.750	2.375	4.750	5/8-11	1.31	5.50	6.00	2.75	.62	4.69	5.59	5.84	6.09
64	500	4.00	1.531	3.062	2.562	5.125	5/8-11	1.19	6.00	6.38	3.00	.62	5.19	6.09	6.28	6.47
80	500	5.00	1.812	3.625	3.000	6.000	5/8-11	1.31	7.12	7.25	3.56	.62	6.19	7.22	7.28	7.34

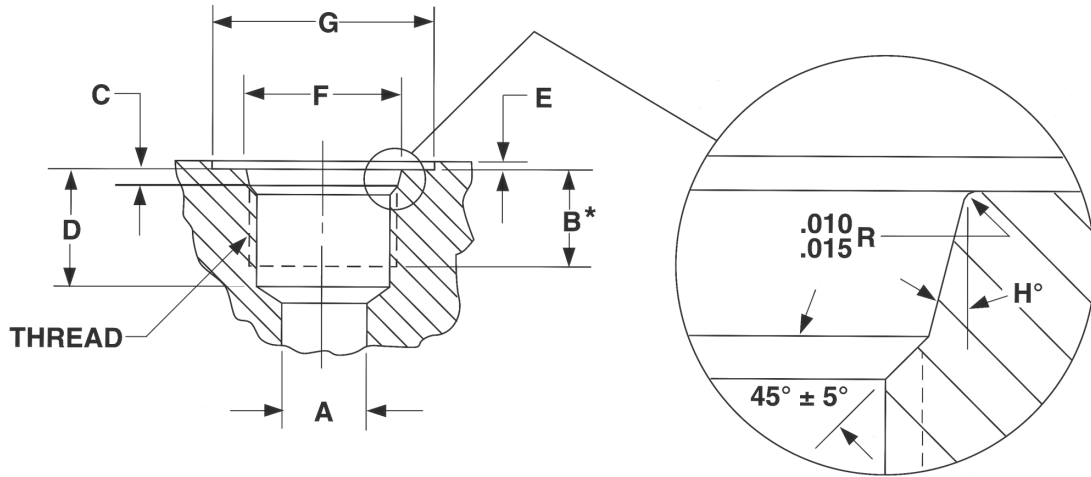
**CODE 62**

08	6000	.50	.359	.718	.797	1.594	5/16-18	.81	1.88	2.22	.94	.31	1.50	2.09	2.22	2.34
12	6000	.75	.469	.937	1.000	2.000	3/8-16	.94	2.38	2.81	1.19	.41	1.88	2.59	2.75	2.94
16	6000	1.00	.547	1.093	1.125	2.250	7/16-14	1.06	2.75	3.19	1.38	.47	2.12	2.97	3.16	3.31
20	6000	1.25	.625	1.250	1.312	2.625	1/2-13	1.00	3.06	3.75	1.53	.56	2.38	3.25	3.56	3.88
24	6000	1.50	.719	1.437	1.562	3.125	5/8-11	1.38	3.75	4.44	1.88	.66	2.75	3.97	4.25	4.56
32	6000	2.00	.875	1.750	1.906	3.812	3/4-10	1.50	4.50	5.25	2.25	.72	3.38	4.72	5.03	5.38
40*	6000	2.50	1.156	2.312	2.437	4.875	7/8-9	1.81	5.87	6.87	2.94	1.00	4.38	6.09	6.54	7.00
48*	6000	3.00	1.406	2.812	3.000	6.000	1 1/8-7	2.31	7.00	8.50	3.50	1.25	5.38	7.22	7.92	8.62

\*INDUSTRY STANDARD, NOT AN SAE STANDARD

## SAE STRAIGHT THREAD PORT DIMENSIONS

SAE information is provided as an aid to designers. For complete specifications refer to SAE Standards J1926-1 for straight thread ports and J518 Parts 1 and 2 for 4-bolt flange ports.



FOR BEST RESULTS USE A FORM TOOL TO MACHINE CAVITY

SIZE CODE	NOMINAL TUBE SIZE	THREAD SIZE	A MIN	B* MIN	C +.015 -.000	D MIN	E MAX	F +.005 -.000	G MIN	H ±1°
- 2	1/8	5/16-24	.062	.390	.074	.468	.062	.358	.672	12
- 3	3/16	3/8-24	.125	.390	.074	.468	.062	.421	.750	12
- 4	1/4	7/16-20	.172	.454	.093	.547	.062	.487	.828	12
- 5	5/16	1/2-20	.234	.454	.093	.547	.062	.550	.906	12
- 6	3/8	9/16-18	.297	.500	.097	.609	.062	.616	.969	12
- 8	1/2	3/4-16	.391	.562	.100	.688	.094	.811	1.188	15
- 10	5/8	7/8-14	.484	.656	.100	.781	.094	.942	1.344	15
- 12	3/4	1 1/16-12	.609	.750	.130	.906	.094	1.148	1.625	15
- 14	7/8	1 3/16-12	.719	.750	.130	.906	.094	1.273	1.765	15
- 16	1	1 5/16-12	.844	.750	.130	.906	.125	1.398	1.910	15
- 20	1 1/4	1 5/8-12	1.078	.750	.132	.906	.125	1.713	2.270	15
- 24	1 1/2	1 7/8-12	1.312	.750	.132	.906	.125	1.962	2.560	15
- 32	2	2 1/2-12	1.781	.750	.132	.906	.125	2.587	3.480	15
- 40 **	2 1/2	3-12	2.344	.750	.132	1.250	.094	3.088	3.875	15
- 48 **	3	3 1/2-12	2.844	.750	.132	1.250	.094	3.588	4.438	15

\*REQUIRES USING A BOTTOM TAP

\*\*NOT AN SAE STANDARD. ADACONN® INSERTA® STANDARD.

**ADACONN® INSERTA®**  
Blue Bell, Pa. 19422

**SAE 4-BOLT  
THREAD PORT  
DIMENSIONS**



## FLUID POWER FORMULAE

### CYLINDERS

$$\text{GALLONS PER INCH} = \frac{A \text{ (in}^2\text{)}}{231 \text{ (in}^3\text{/GALLON)}}$$

$$\text{CYLINDER SPEED} = \frac{231 \text{ (in}^3\text{/GALLON) x GPM}}{\text{(Inches/Minute) } A \text{ (in}^2\text{)}}$$

### HYDRAULIC MOTORS

$$\text{RPM} = \frac{231 \text{ (in}^3\text{/GALLON) x GPM}}{\text{DISPLACEMENT (in}^3\text{/REV)}}$$

$$\text{THEORETICAL FLOW (GPM)} = \frac{\text{RPM x DISPLACEMENT (in}^3\text{/REV)}}{231 \text{ (in}^3\text{/GALLON)}}$$

$$\text{TORQUE (LB.-IN.)} = \frac{\text{PSI x DISPLACEMENT (in}^3\text{/REV)}}{2 \pi}$$

$$\text{TORQUE (LB.-FT.)} = \frac{\text{PSI x DISPLACEMENT (in}^3\text{/REV)}}{2 \pi \times 12}$$

$$\text{HORSE POWER} = \frac{\text{TORQUE (LB.-IN.) x RPM}}{63,025}$$

$$\text{HORSE POWER} = \frac{\text{TORQUE (LB.-FT.) x RPM}}{5,252}$$

### FLUID PIPING

$$\text{VELOCITY IN CONDUIT} = \frac{0.3208 \text{ x GPM}}{\text{(Feet per Second) } A \text{ (in}^2\text{)}}$$

### TUBE BURST

BURST PRESSURE =  
(Barlow Formula)

$$\frac{2ST}{D}$$

S = ULTIMATE TENSILE STRENGTH (PSI)  
T = NOMINAL WALL THICKNESS (IN.)  
D = NOMINAL OD OF TUBING (IN.)


### FLOW THROUGH AN ORIFICE

$$Q = C_o \times A \times \sqrt{\frac{2\Delta P}{\rho}}$$

Q = FLOWRATE  
C<sub>o</sub> = ORIFICE COEFFICIENT  
(0.61 – 0.98; 0.65 for thin, sharp edge orifice)  
A = ORIFICE AREA  
ΔP = PRESSURE DROP  
ρ = FLUID DENSITY

### HORSE POWER

$$\text{HORSE POWER TO DRIVE PUMP} = \frac{\text{GPM x PSI}}{1,715} \times \text{EFFICIENCY}$$

 Blue Bell, Pa. 19422	<b>FLUID POWER FORMULAE</b>		
---	-----------------------------	--	--

## FLUID POWER EQUIVALENTS & CONVERSIONS

### FLUID POWER EQUIVALENTS

1 ATMOSPHERE AT SEA LEVEL = 1.013 BAR  
29.921 INCHES Hg  
14.696 PSI  
760 mm Hg

1 HP = 33,000 FT-LB / MINUTE  
550 FT-LB / SECOND  
2545 BTU / HR  
42.4 BTU / MINUTE  
746 WATTS

1 US GALLON = 231 CUBIC INCHES  
128 LIQUID OUNCES  
3.785 LITERS  
0.8333 IMPERIAL GALLONS

1 BAR AT SEA LEVEL = 14.504 PSI  
0.98692 ATMOSPHERES  
41 FEET OIL COLUMN  
33.6 FEET WATER COLUMN

1 PSI = 2.0416 INCHES OF MERCURY  
27.771 INCHES OF WATER

### FLUID POWER CONVERSIONS

TO CONVERT	INTO	MULTIPLY BY	TO CONVERT	INTO	DIVIDE BY
BAR	PSI	14.5	PSI	BAR	14.5
CC	CUBIC INCH	0.06102	CUBIC INCH	CC	0.06102
KW	HP	1.341	HP	KW	1.341
LITERS	GALLONS	0.2642	GALLONS	LITERS	0.2642
MPa	PSI	145.037	PSI	MPa	145.037
In Hg	PSI	0.4912	PSI	In Hg	0.4912
In H <sub>2</sub> O	PSI	0.03613	PSI	In H <sub>2</sub> O	0.03613

<b>ADACONN<sup>®</sup>  INSERTA<sup>®</sup></b> Blue Bell, Pa. 19422	<b>FLUID POWER EQUIVALENTS &amp; CONVERSIONS</b>		
--	--	--	--



**ADACONN®  
LIMITED WARRANTY**

**INSERTA PRODUCTS, INC.  
LIMITED WARRANTY**

**ADACONN® and INSERTA® warrants that its products are free from defects in material or workmanship for a period of 18 months from the date of our shipment. O-Rings and seals are specifically exempted from this warranty. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY. THERE IS NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.**

Written permission for any warranty returns must be obtained from **ADACONN®** and/or **INSERTA®** prior to shipment. Ship all warranty returns Freight Prepaid and include a complete explanation of the defects and circumstances.

**ADACONN®  
LIMITATION OF REMEDY**

**INSERTA PRODUCTS, INC.  
LIMITATION OF REMEDY**

**ADACONN® and INSERTA® LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH ITEMS SOLD SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLERS SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.**

 **WARNING**

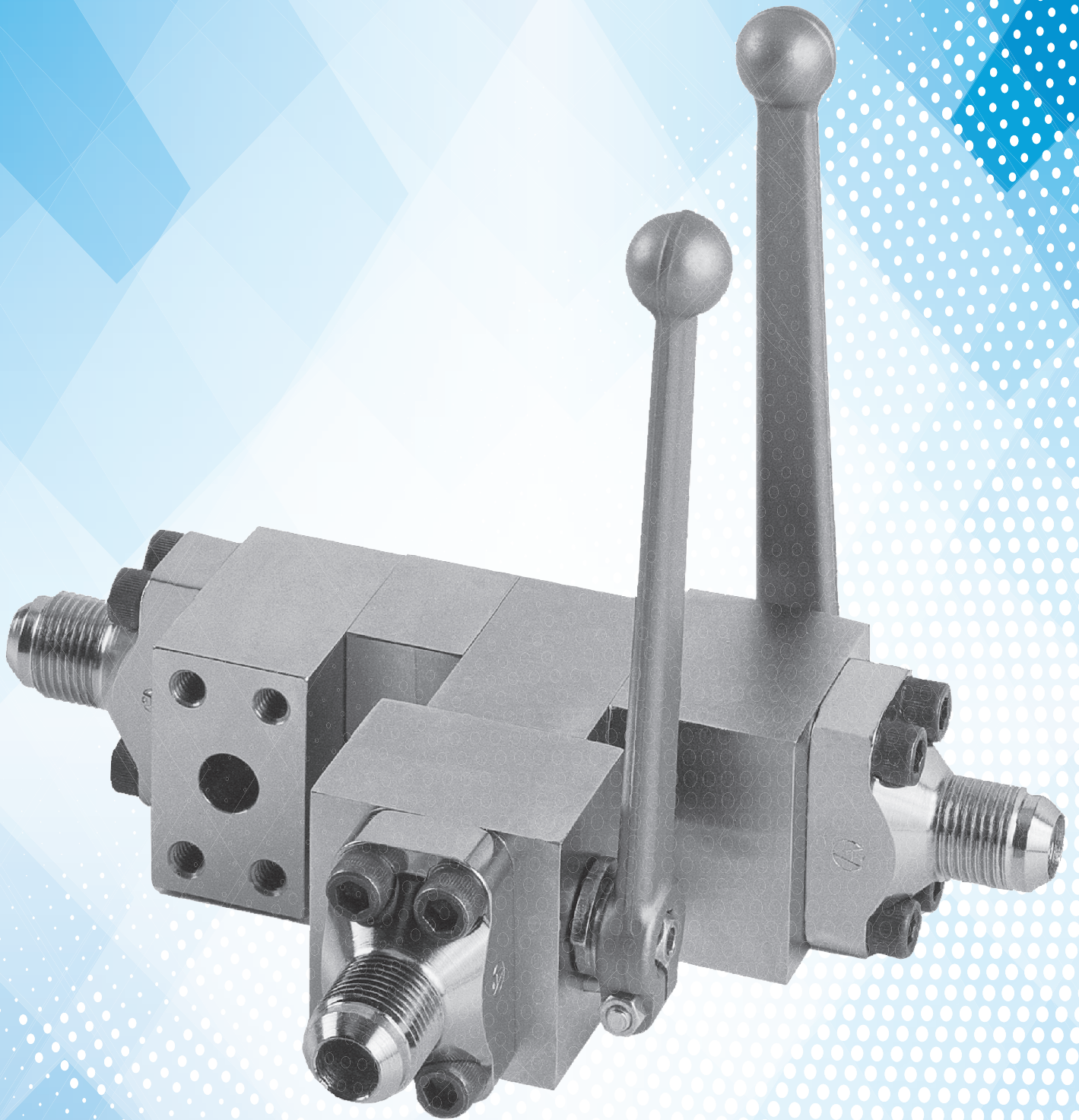
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from **ADACONN®** and **INSERTA®** and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety, and warning requirements of the application are met.

The product described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by **ADACONN®** and **INSERTA®** at any time without notice.

**ADACONN®**  
Blue Bell, PA 19422  
(215) 643-1900  
FAX: (215) 643-4017  
[www.adaconn.com](http://www.adaconn.com)  
email: [sales@adaconn.com](mailto:sales@adaconn.com)

**INSERTA®**  
Blue Bell, PA 19422  
(215) 643-0192  
FAX: (215) 643-4017  
[www.inserta.com](http://www.inserta.com)  
email: [sales@inserta.com](mailto:sales@inserta.com)



**ADACONN®**

Blue Bell, PA 19422

(215) 643-1900

FAX: (215) 643-4017

[www.adaconn.com](http://www.adaconn.com)

email: [sales@adaconn.com](mailto:sales@adaconn.com)

**INSERTA®**

Blue Bell, PA 19422

(215) 643-0192

FAX: (215) 643-4017

[www.inserta.com](http://www.inserta.com)

email: [sales@inserta.com](mailto:sales@inserta.com)