TABLE OF CONTENTS

INTRODUCTION

ADACONN® products include a proprietary line of adapters and connectors, and **INSERTA®** 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®** and **INSERTA®** 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®** and **INSERTA®** products to meet your Integrated Hydraulic system needs.


1/8" to 4" 4-BOLT and 1/8" to 2" 2-BOLT MODULAR CONNECTORS

INSERTA® ICX, IEL, ITR, ITB, IPC, 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® 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® IFRA Rotational Retaining Adapters are used to retain **INSERTA® Flange Valve Modules** and **INSERTA® 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® IFRC Rotational 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® 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 ADAPTERS

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

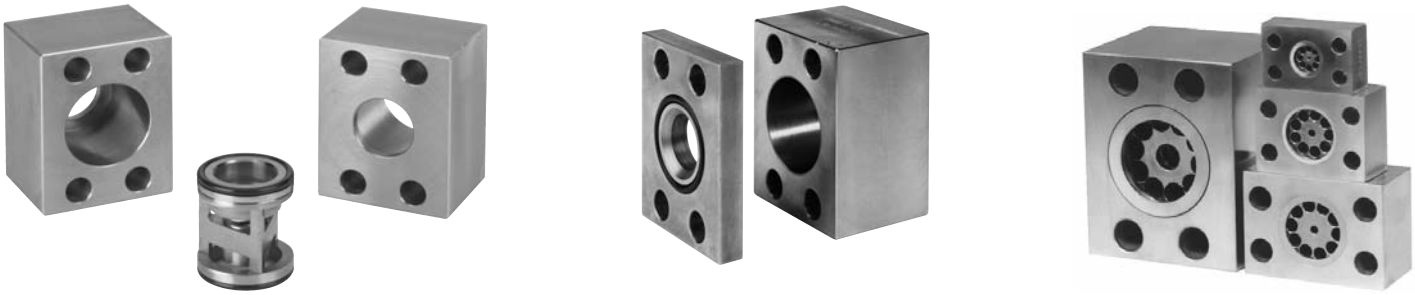
INSERTA® IBF and IBF3D Ball Valves, Flange Type, are used by mounting them between 4 and 2-Bolt Flange Ports and their retainers.

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.

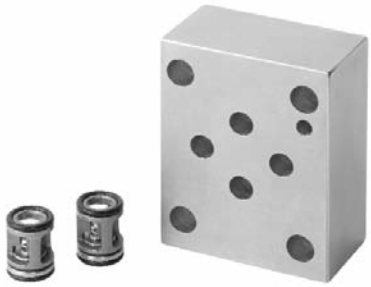
INSERTA® ICS Check Valves, Slip-In Type, are used by inserting them into **ICS** bored cavities.



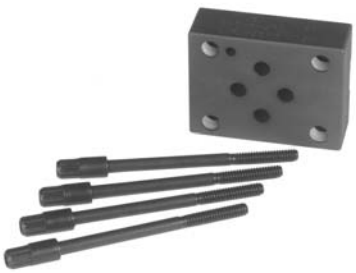
1/8" to 3" CHECK VALVES FLANGE TYPE

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

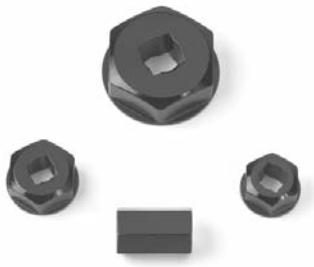
INSERTA® ICC Check Carriers are used to install Inserta® ICS Slip-In Check Valves into an SAE threaded port, with free flow in either direction.



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.

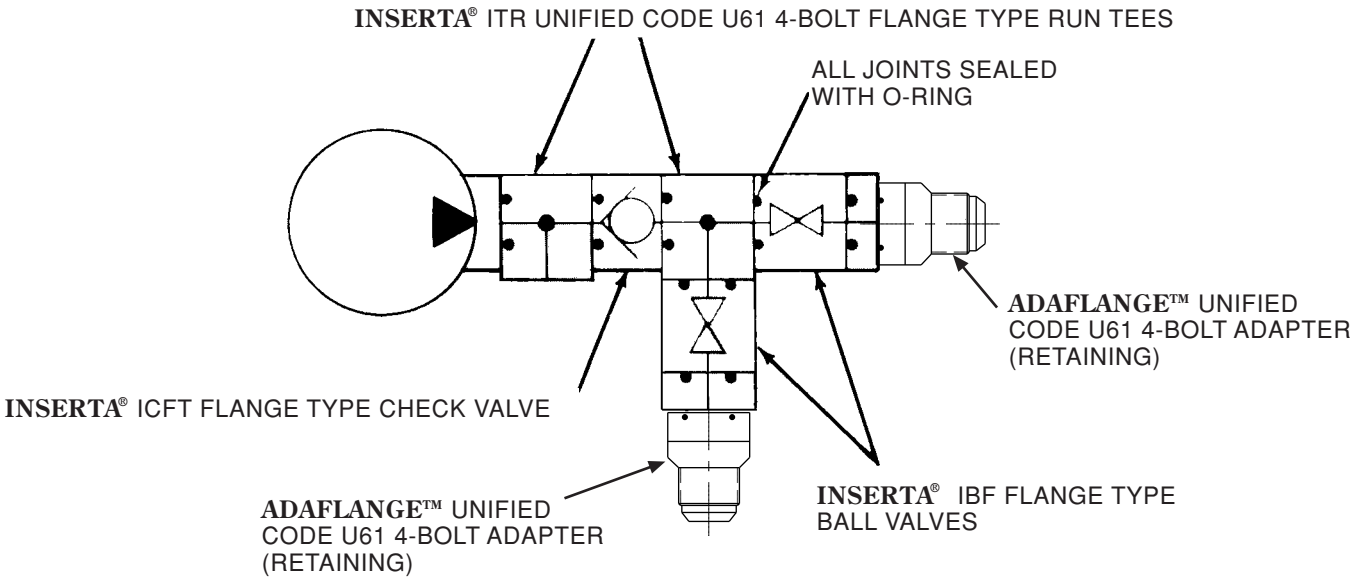
ADACONN® + INSERTA® Bolt Kits

ADACONN® ABK AND INSERTA® IBK BOLT KITS are used for joining **ADACONN®** + **INSERTA®** products. The length of Socket Head Cap Screws given in the catalog are the minimum length required to fasten to a Unified Code U61, Code 61 or 62 port pattern and 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 additonal modules.

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.

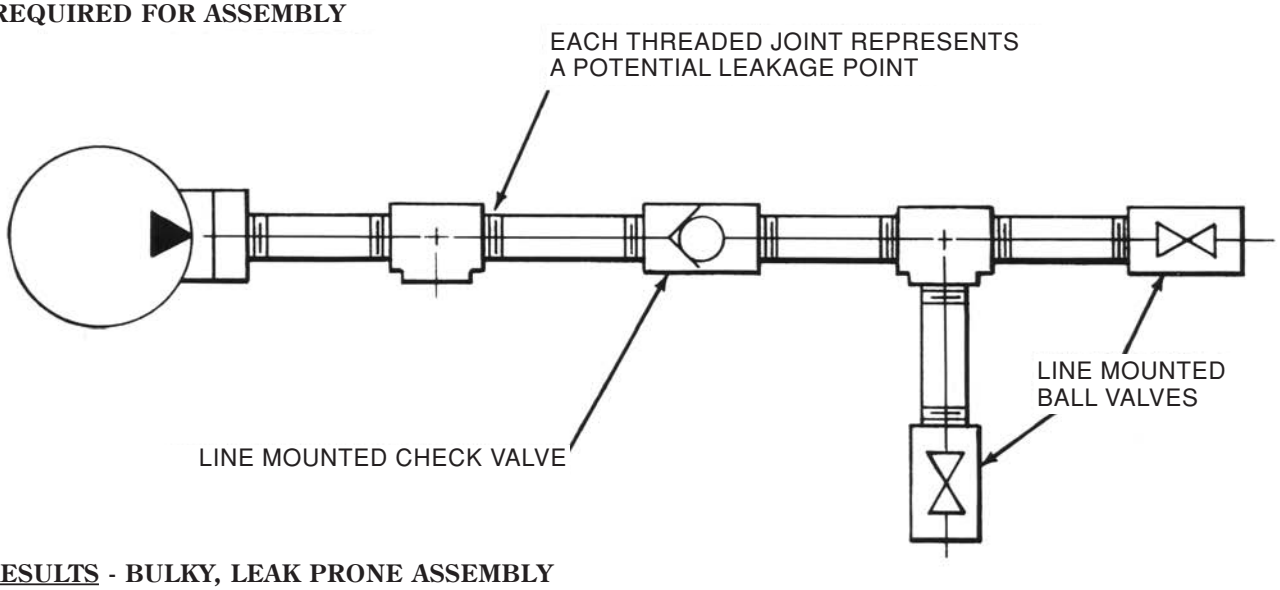
USE THE ADACONN® + INSERTA® ALTERNATIVES

SMALL WRENCHES ONLY
REQUIRED FOR ASSEMBLY



IN PLACE OF THE OLD METHODS OF PIPING

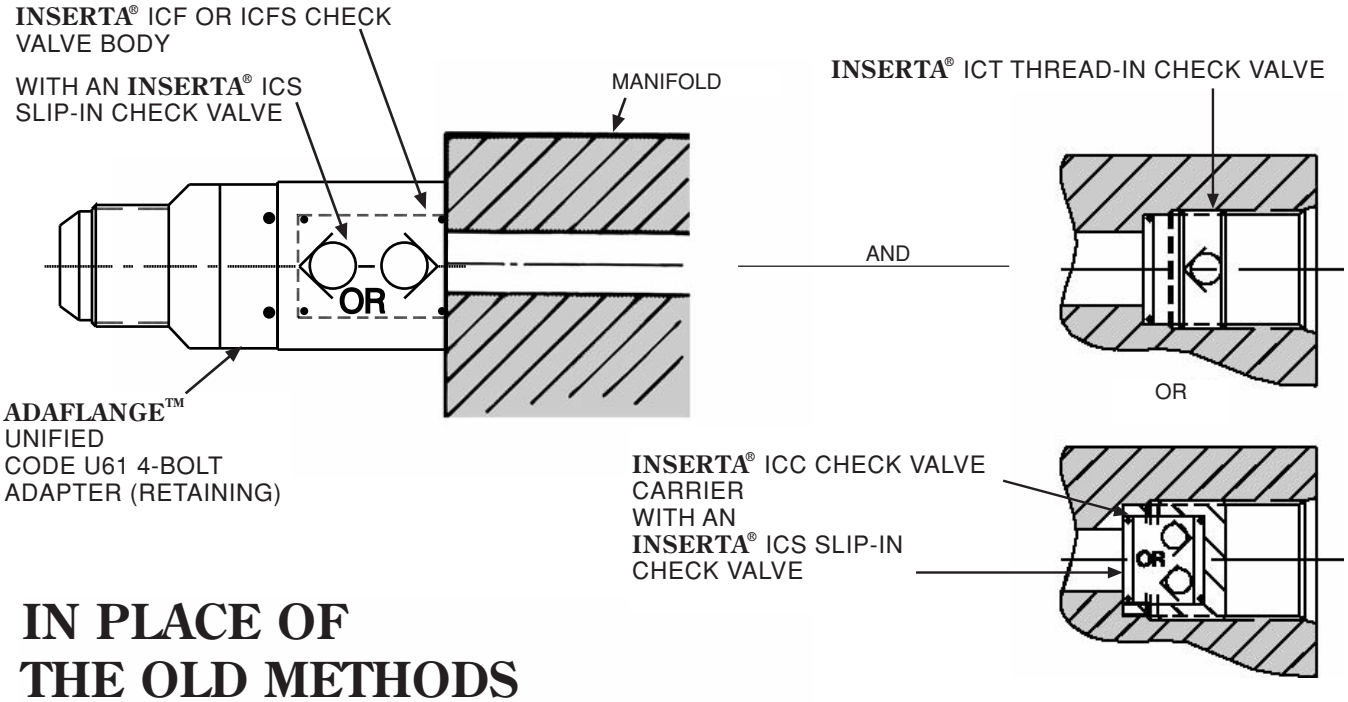
LARGE WRENCHES
REQUIRED FOR ASSEMBLY



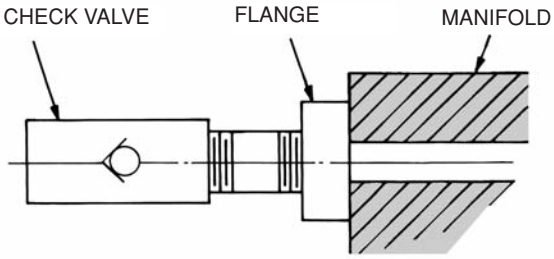
RESULTS - BULKY, LEAK PRONE ASSEMBLY

ADACONN® INSERTA® Blue Bell, PA 19422	USE THE ADACONN® INSERTA® ALTERNATIVES		

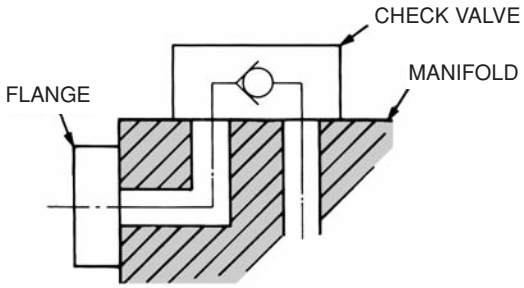
USE THE ADACONN® + INSERTA® ALTERNATIVES



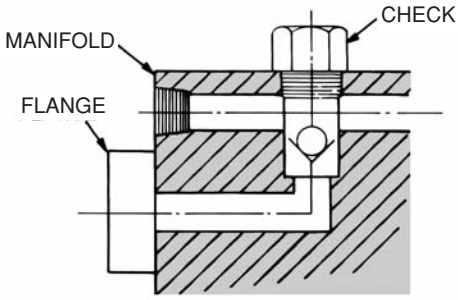
IN PLACE OF THE OLD METHODS



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®

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

Adaconn® and Inserta® have introduced a unique four- and two-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.

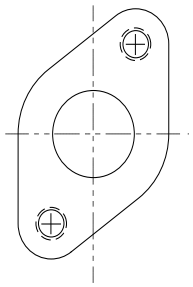
The relative narrowness of the Unified Code U61 flange adatpers gives the component and manifold designer the ability to place adjacent four-bolt ports closely together. The potential for higher pressures also can result in an increased “power density” on a component or manifold surface.

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.

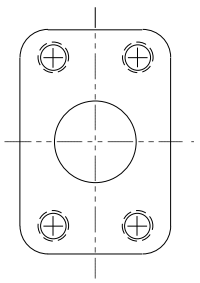
Unified Code 61 2-bolt adapters are also available. The distance between bolt centers of the U61 2-bolt pattern are similar to the diagonal bolt patterns of the SAE Code 61 4-bolt patterns.

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

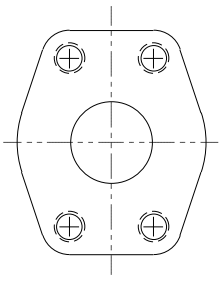
UNIFIED CODE U61 2-BOLT



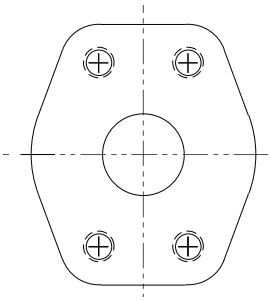
UNIFIED CODE U61 4-BOLT



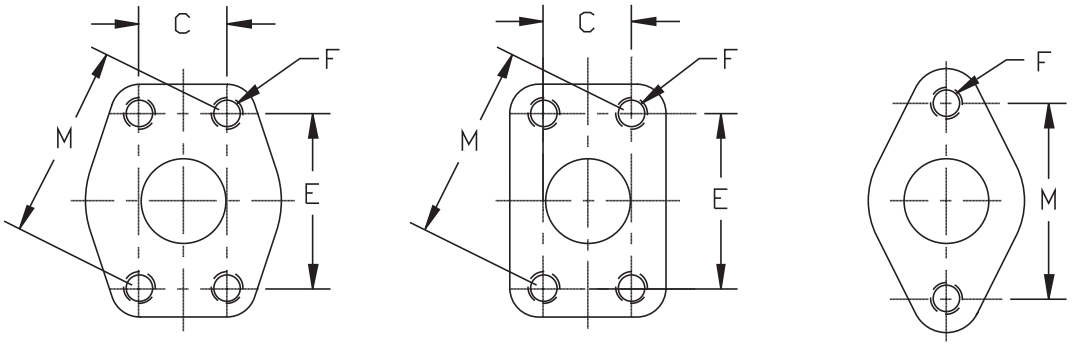
SAE J518 CODE 61 4-BOLT



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:



SAE CODE 61 4-BOLT

UNIFIED CODE U61 4-BOLT

UNIFIED CODE U61 2-BOLT

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.

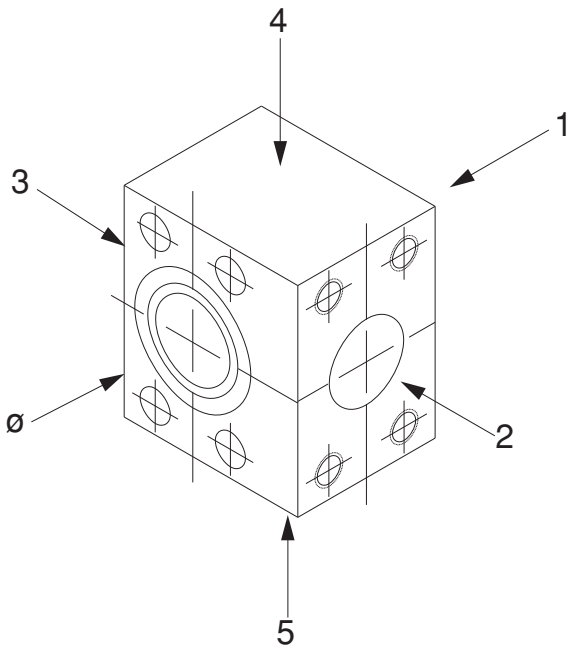
Modular fittings by Inserta® are also offered and are to be used with Adaconn® four- and two-bolt Unified Code U61 one-piece flange adapters. These unique modular fittings (Elbows, T-runs, Branch Tee's, Crosses, and Port Spacers) are more compact and lighter weight than the standard line of modular fittings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

Adaconn® four- and two-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 face 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.

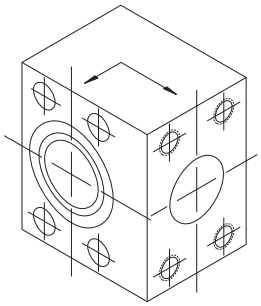
INSERTA® Modular Connectors 4-Bolt, Flange Type, is made in Elbow, Tee Run, Tee Branch and Cross configurations. The Modular Connectors are made in three design configurations A, B, and C. Design-A Modular Connectors have a seal groove with its O-ring on Face Ø and a flat pattern on Face 1 with through 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.

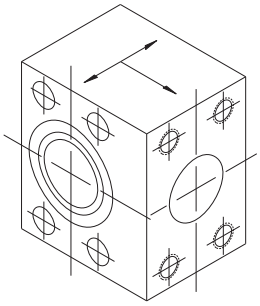
Inserta Products, Inc. **Blue Bell, Pa. 19422**	**MODULAR CONNECTORS** **4-BOLT** **FLANGE TYPE**	Ø 1 2 EL · Ø 1 2 TR · Ø 3 1 2 TB · Ø 3 1 2 CX

The following views illustrate the basic **INSERTA® Modular Connectors 4-Bolt,** Flange Type, Design-A with equal size flange connections on appropriate Faces Ø, 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 Ø.



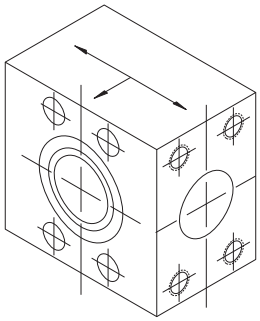
ELBOW

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



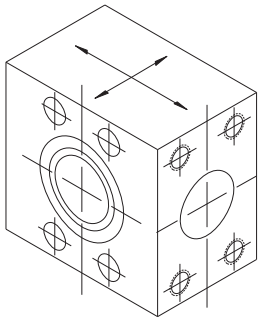
TEE RUN

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



TEE BRANCH

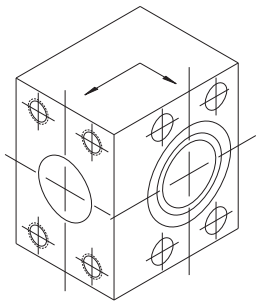
ITB-A-****
ITB-B-****
ITB-C-****



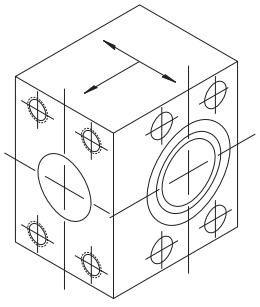
CROSS

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

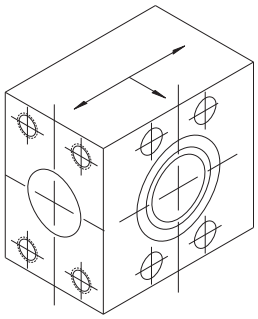
**** Denotes the Code and Size of the 4-Bolt Flange pattern on Face Ø, i.e. IEL-A-6124 denotes an **INSERTA®** Elbow Code 61 Size 24 4-Bolt Flange Pattern on Face Ø. On the Standard Modular Connectors the same size flange pattern is on all appropriate faces, i.e. on Faces 1, 2, and/or 3. Note that when 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.



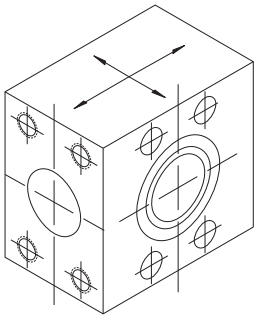
ELBOW



TEE RUN

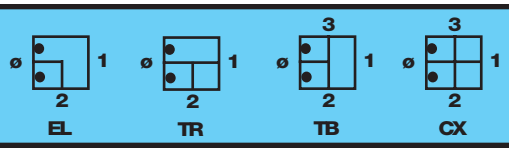


TEE BRANCH



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.

Inserta Products, Inc. **Blue Bell, Pa. 19422**	**MODULAR CONNECTORS** **4-BOLT** **FLANGE TYPE**	

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.

Standard **CODE 61 and CODE 62 Modular Connectors,** have all flange ports of the same size, and are made of steel.

ORDERING INFORMATION

STANDARD OUTLETS

ICX — A — 61 24 — N — G* — T*

INSERTA®

PRODUCT TYPE
- 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

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

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

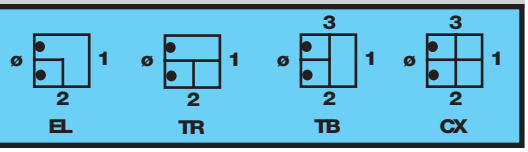
GAUGE PORT**
- G = #6 SAE (9/16-18)
- * = 1, 3, 4 and 5 PORT FACE POSITIONS

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

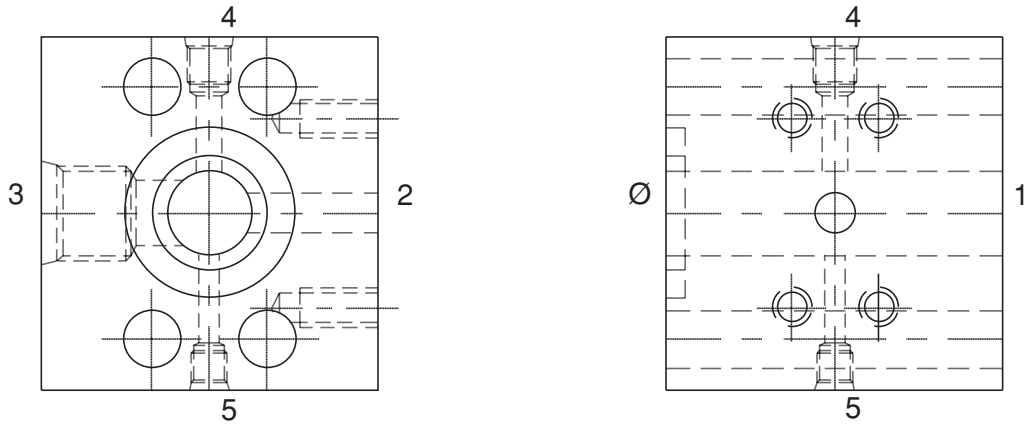
**Gauge & Test Port Guidelines (Refer to Page 15).

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

PORT POSITION

Ø 1 2 3 4 5

ICX — A — 6124 — N — F 24 — F24 — S 20 — G* — T*

See Standard Outlet Format

FLANGE MOUNTING PATTERN

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

TEST PORT**
T = #4 SAE (7/16-20) or P=1/4 NPTF
* = 1 THRU 5 PORT FACE POSITIONS

GAUGE PORT**
G = #6 SAE (9/16-18)
* = 1 THRU 5 PORT FACE POSITIONS

NOMINAL SIZE

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

SAE STRAIGHT THREAD

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

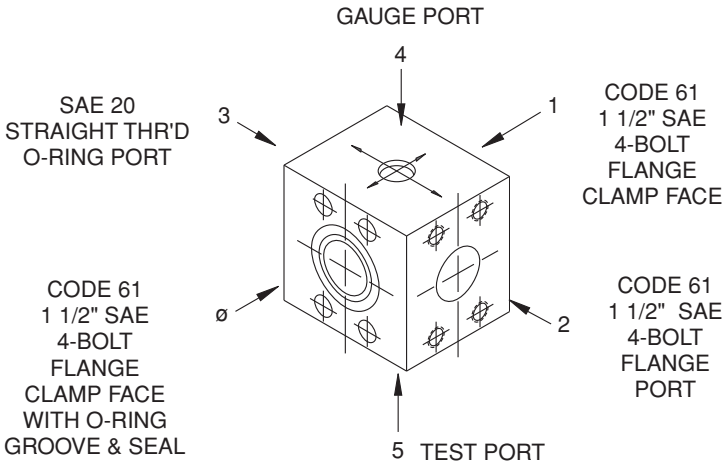
Gauge & Test Port Guidelines (Refer to Page 15).

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:

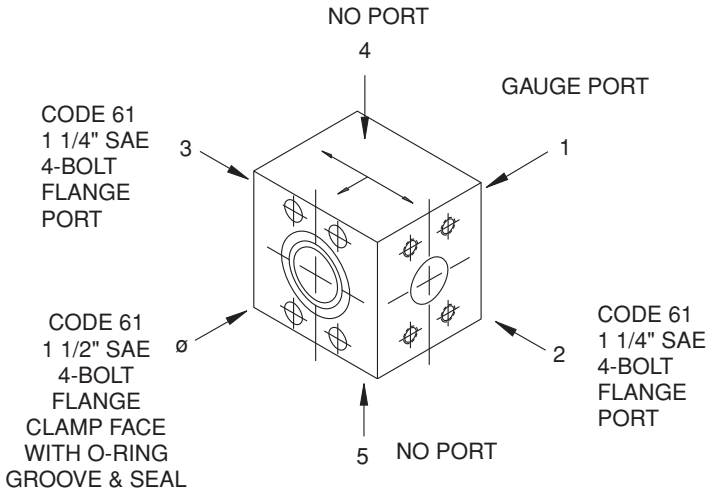
INSERTA® Design A Cross, Code 61 with 1/2" Code 61 flange side outlet, #12 SAE straight thread side outlet, gauge port on Face 4 and Test Port on Face 5.



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

Example 2:

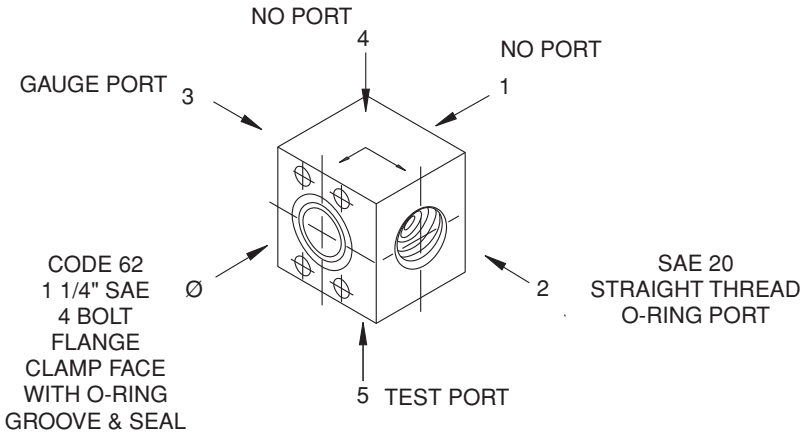
INSERTA® Branch tee, 1 1/2" Code 61 with 2-1" Code 61, flange side outlet and a gauge port at position 1.



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

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.

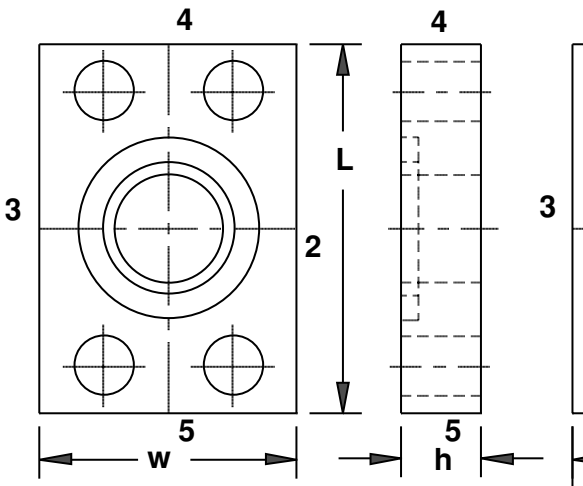
MODULAR CONNECTORS WITH OPTIONAL OUTLETS:

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.

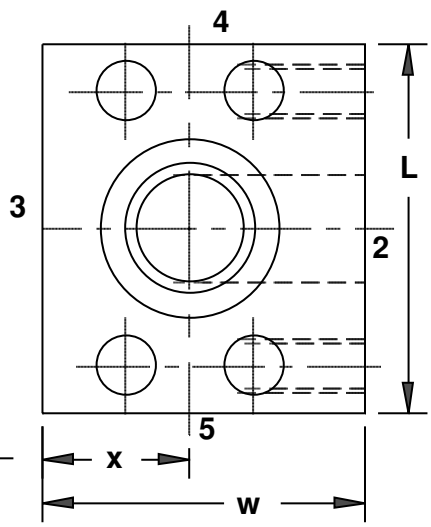
INSERTA® Modular connector Smart Part Numbers give you the tool to specify what you need for your integrated hydraulic system.

Inserta Products, Inc. **Blue Bell, Pa. 19422**	**MODULAR CONNECTORS** **CODE 61 AND CODE 62** **4-BOLT SPLIT FLANGE TYPE**	Ø 1 2 EL · Ø 1 2 TR · Ø 3 1 2 TB · Ø 3 1 2 CX

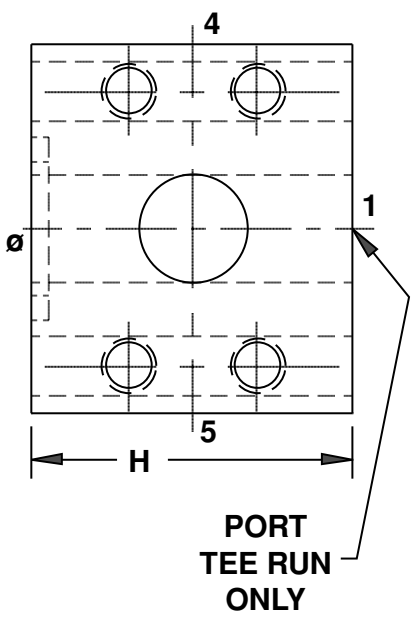
CODE 61 PORT SPACER



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.

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	2.47	2.75	2.47	1.24	1.00	1.88	219
6120	2.47	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	6.96	8.50	6.96	3.50	—	—	237

Mounting Dimensions and O-Ring Grooves Conform to SAE Standard J518 JUN93.

Mounting Bolts should conform to one of these standards:
Socket Head Cap Screws — 1960 Series Alloy — ANSI B18.3
Hexagon Head Cap Screws — SAE J 429 Grade 5, ASTM A449.

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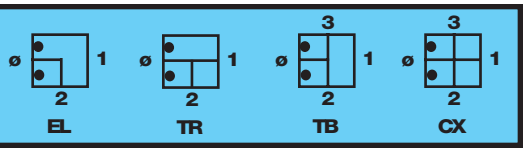
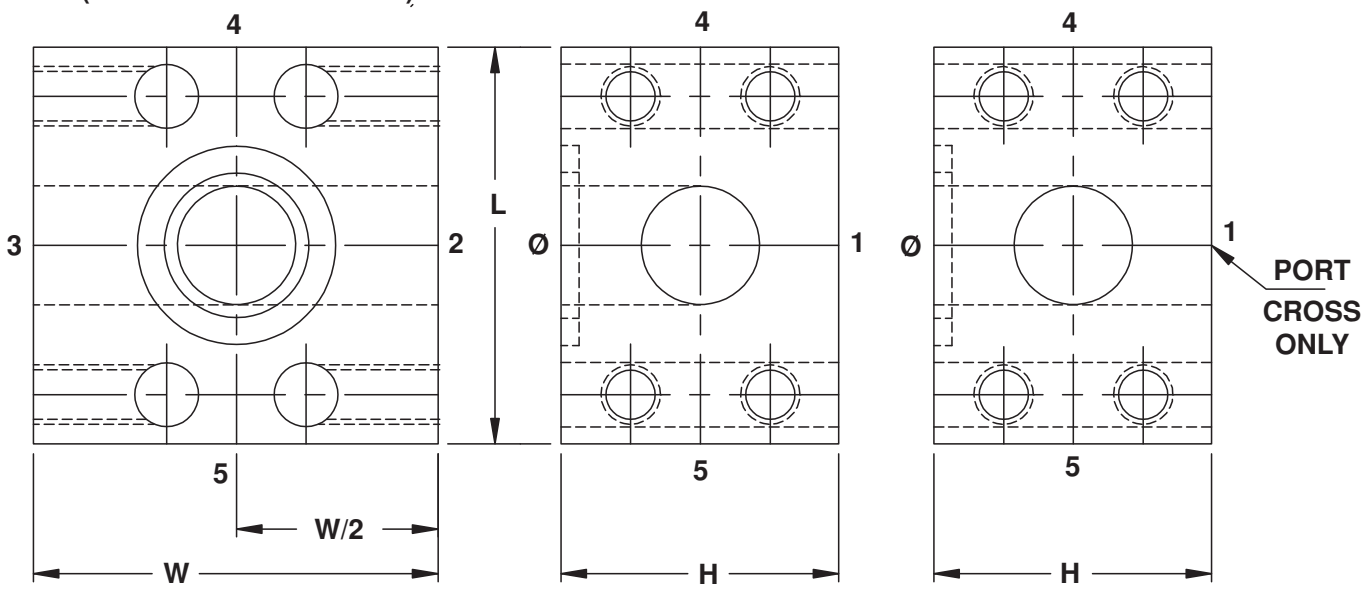
MODULAR CONNECTORS
CODE 61 AND CODE 62
4-BOLT SPLIT FLANGE TYPE





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	2.50	2.75	2.50	219
6120	3.00	3.12	3.00	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

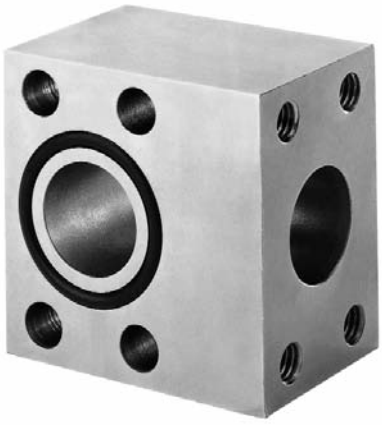
6208	2.00	2.20	2.00	210
6212	2.50	2.82	2.50	214
6216	3.00	3.20	3.00	219
6220	3.25	3.80	3.50	222
6224	3.75	4.50	4.00	225
6232	4.50	5.25	5.00	228
6240	6.00	6.88	6.00	232
6248	7.00	8.50	7.00	237

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.

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 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 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 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

ICX – A – U461 24* – N – G* – T*

INSERTA®

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

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

'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 PC = .62

SEAL COMPOUND

(OMIT FOR B & C DESIGNS)
- N = BUNA N (STANDARD)
- V = VITON

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

(See Page 25 for Selection Availability)

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

(See Page 25 for Selection Availability)

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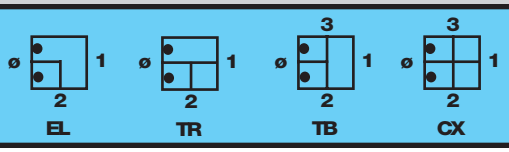
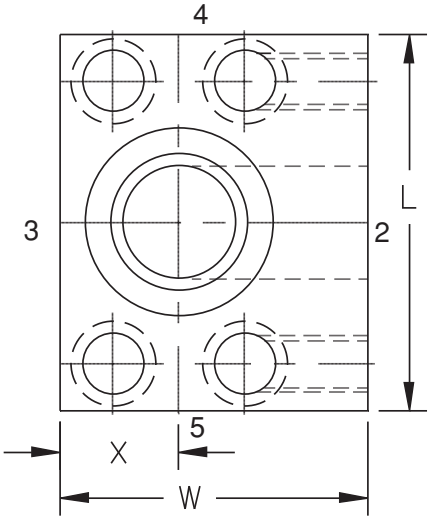
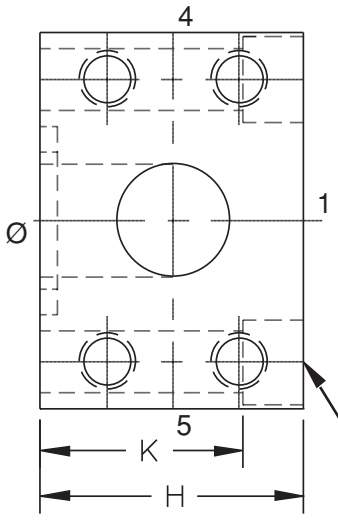
MODULAR CONNECTORS CODE U61 4-BOLT FLANGE TYPE



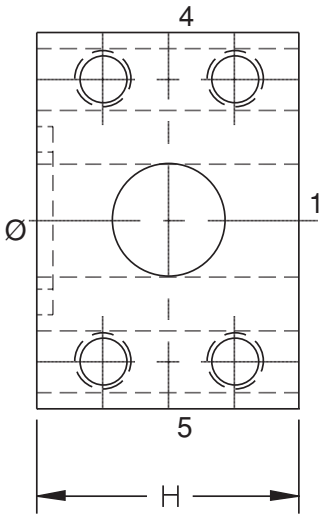
ELBOW/TEE, RUN
FACE Ø VIEW

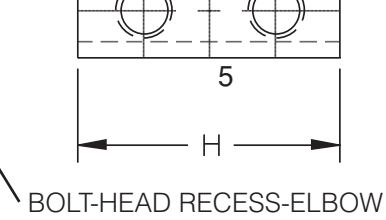


ELBOW
FACE 2 VIEW



TEE, RUN
FACE 2 VIEW

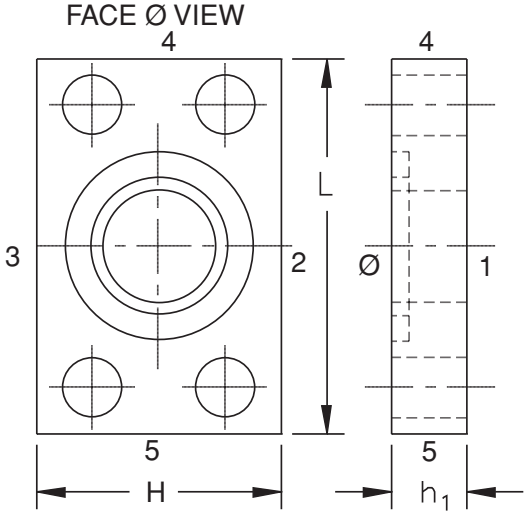




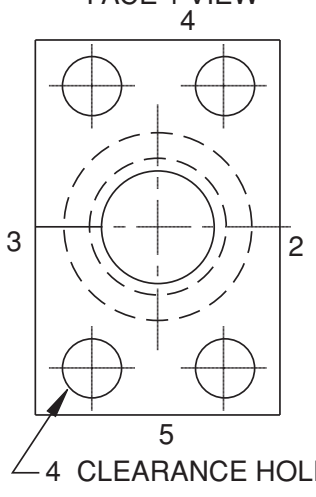
DESIGN A = AS SHOWN on drawings above and the title block schematics below.
DESIGN B = Eliminates seal groove and O-Ring from Face-Ø.
DESIGN C = UNIFIED CODE U61 4-Bolt Pattern on all designated faces. Tapped holes without O-Ring groove.
NOTE: Port Spacers have clearance holes thru. Port Connector has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

NOMINAL PATTERN SIZE	H	L	W	X	K	h_1		O-RING SIZE NO.	ELBOW CLAMP FACE BOLT KITS (4 BOLTS)
						PS	PC		
U46102	.62	1.00	1.00	.31	.37	.12/.25	.62	010	IBK-SH4008-32x0.62
U46104	.75	1.25	1.12	.38	.50	.12/.25	.75	011	IBK-SH4010-24x0.87
U46106	.87	1.50	1.38	.44	.62	.12/.25	1.00	014	IBK-SH4025-20x1.00
U46108	1.31	2.12	2.00	.66	1.00	.50	1.25	210	IBK-SH4031-18x1.50
U46112	1.62	2.56	2.38	.81	1.12	.50	1.50	214	IBK-SH4038-16x1.75
U46116	1.87	2.75	2.50	.94	1.38	.50	1.50	219	IBK-SH4038-16x2.00
U46120	2.12	3.12	2.88	1.06	1.66	.50	1.75	222	IBK-SH4044-14x2.50
U46124	2.50	3.69	3.38	1.25	1.94	.50	2.00	225	IBK-SH4050-13x2.75
U46132	3.00	4.00	3.75	1.50	2.44	.50	2.00	228	IBK-SH4050-13x3.25

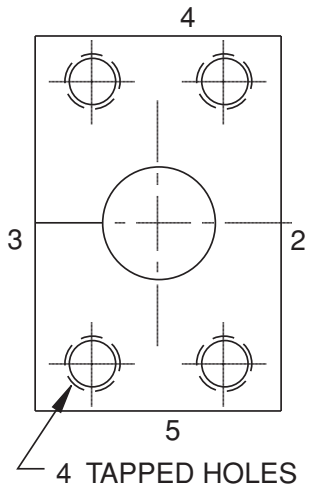
U461 4-BOLT PORT SPACER
FACE Ø VIEW



PORT SPACER
FACE 1 VIEW

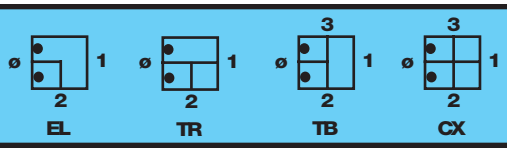


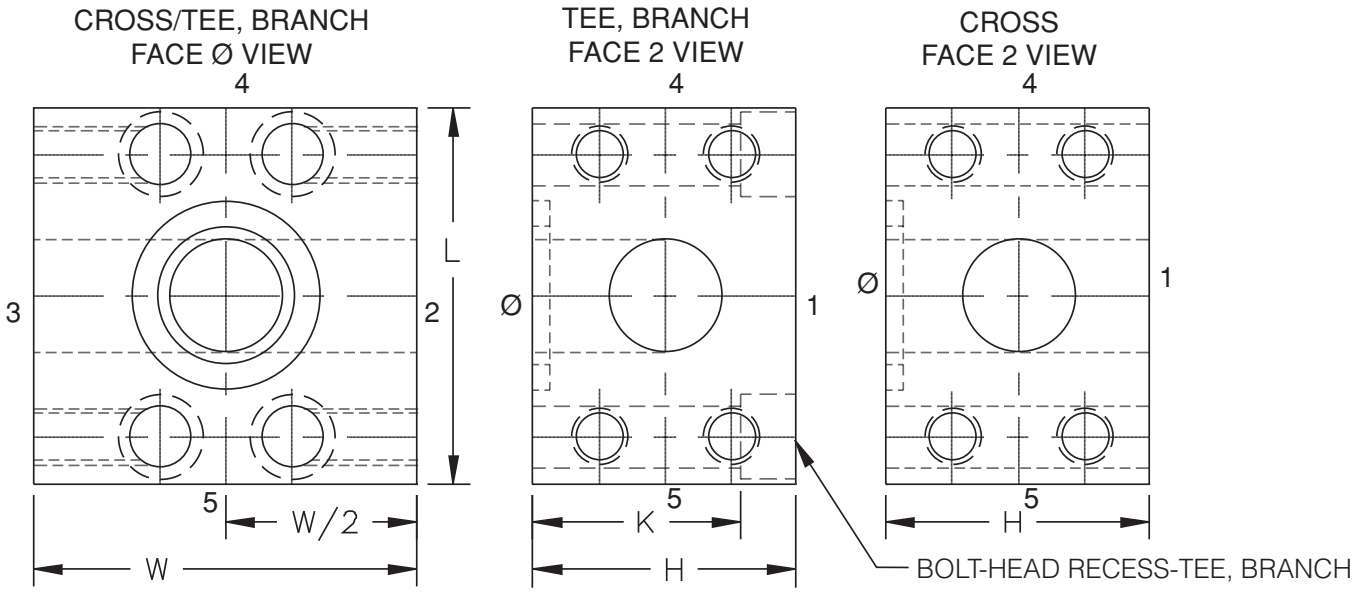
PORT CONNECTOR
FACE 1 VIEW



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: 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 of Gauge Port.

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 61and 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

ICX — A — U261 24 * — N — G* — T*

INSERTA®

PRODUCT TYPE
- CX = CROSS
- EL = ELBOW
- RC = RETAINING CROSS
- RT = RETAINING TEE RUN
- TR = TEE, RUN
- TB = TEE, BRANCH
- PS = PORT SPACER (A & B DESIGN)
- PC = 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

NOMINAL SIZE

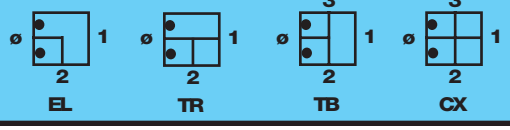
02 = 1/8	16 = 1
04 = 1/4	20 = 1 1/4
06 = 3/8	24 = 1 1/2
08 = 1/2	32 = 2
12 = 3/4	

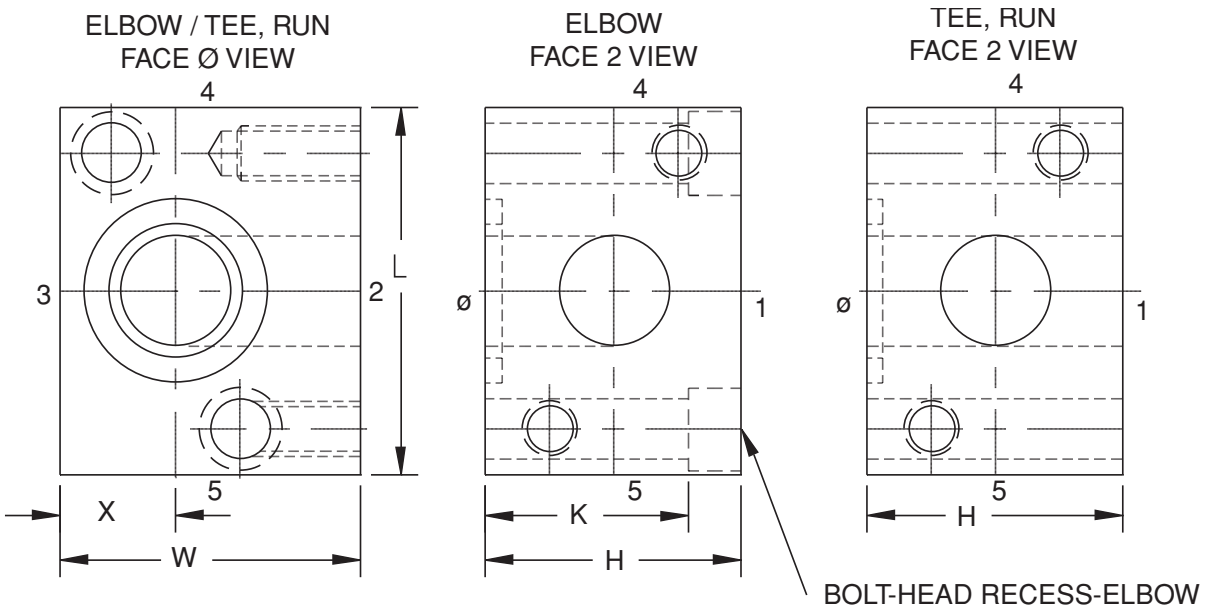
PORT SPACER/CONNECTOR
- h_1 DIMENSION (1/4 INCREMENTS)
- 1 = 1/4 THICK
- 2 = 1/2 THICK
- OMIT = The non 1/4 increment standard PS or PC

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

GAUGE PORT
- G = #6 SAE (9/16-18)
- * = 1, 3, 4 and 5 PORT FACE POSITIONS
- (See Page 25 for Selection Availability)

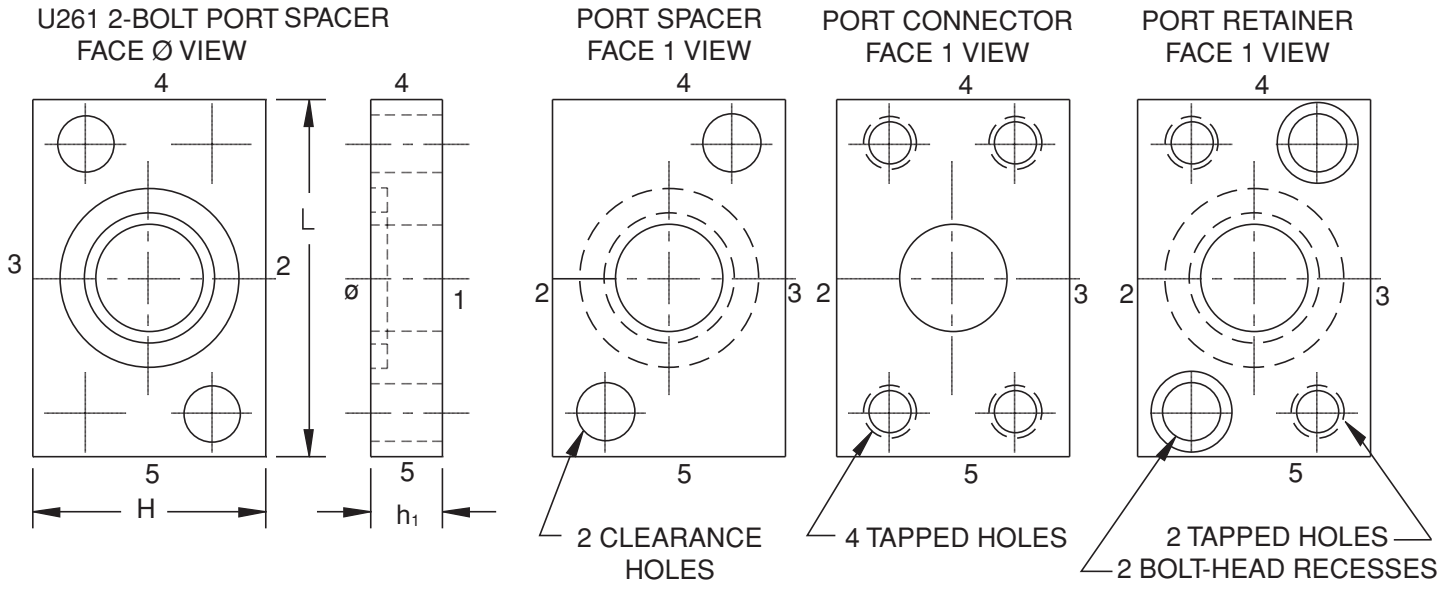
TEST PORT
- T = #4 SAE (7/16-20) or P=1/4 NPTF
- * = 1, 3, 4 and 5 PORT FACE POSITIONS
- (See Page 25 for Selection Availability)

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_1 sizes.

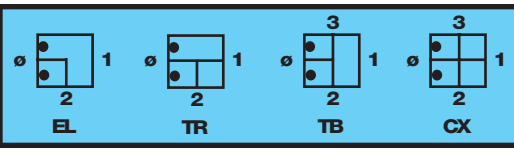
NOMINAL PATTERN SIZE	H	L	W	X	K	h_1			K	O-RING SIZE NO.	ELBOW CLAMP FACE BOLT KITS (2 BOLTS)	PR BOLT LENGTHS
					EL	PS*	PC	PR	PR			
U26102	.62	1.00	1.00	.31	.37	.12/.25	.34	.50	.31	010	IBK-SH2008-32x0.62	0.62
U26104	.75	1.25	1.12	.38	.50	.12/.25	.38	.50	.31	011	IBK-SH2010-24x0.87	0.62
U26106	.87	1.50	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



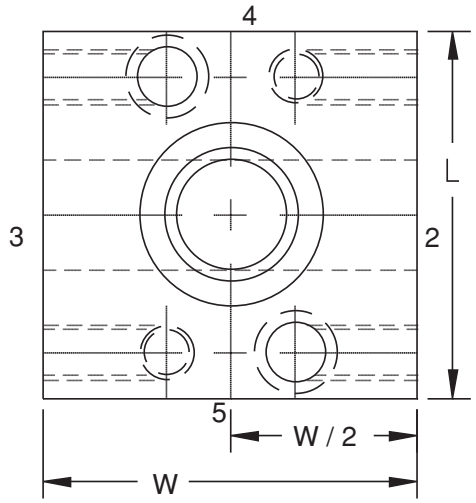
(FACE 1 IS OPPOSITE VIEW OF FACE Ø)

Inserta Products, Inc.
Blue Bell, Pa. 19422

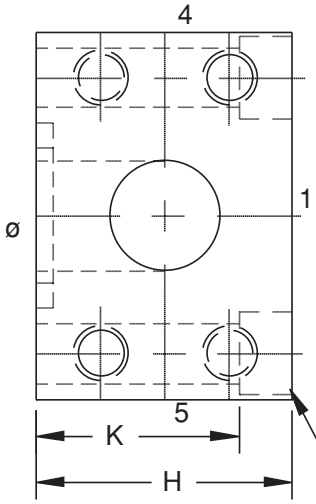
MODULAR CONNECTORS UNIFIED CODE U61 2-BOLT FLANGE TYPE



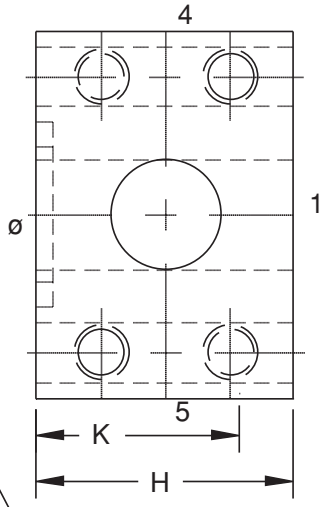
CROSS/TEE, BRANCH
FACE Ø VIEW



TEE, BRANCH
FACE 2 VIEW



CROSS
FACE 2 VIEW



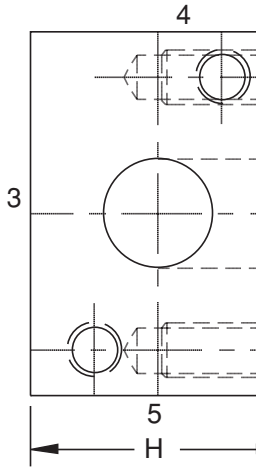
BOLT-HEAD RECESS-TEE, BRANCH

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.

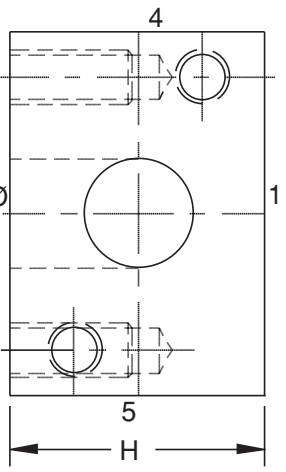
NOMINAL PATTERN SIZE	H	L	W	W/2	K TB, RC, RT	O-RING SIZE NO.	TB, RT, RC CLAMP FACE BOLT KITS (2 BOLTS)
U26102	.62	1.00	1.25	.37	.44	010	IBK-SH2008-32x0.62
U26104	.75	1.25	1.50	.50	.56	011	IBK-SH2010-24x0.87
U26106	.87	1.50	2.00	.62	.62	014	IBK-SH2025-20x1.00
U26108	1.31	2.12	2.50	1.00	1.00	210	IBK-SH2031-18x1.50
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.

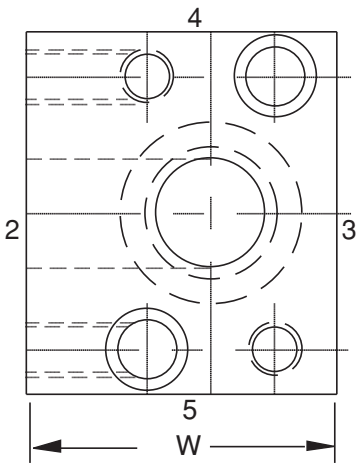
ELBOW DESIGN C
FACE Ø VIEW



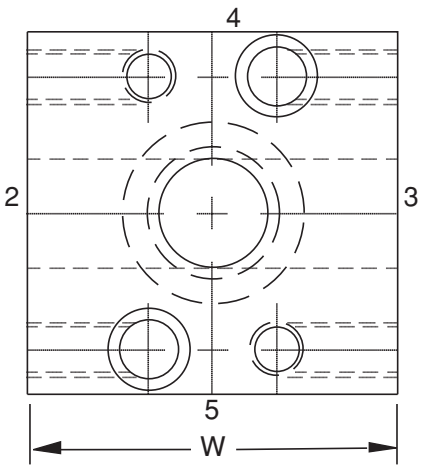
FACE 2 VIEW



RETAINING TEE RUN
FACE 1 VIEW



RETAINING CROSS
FACE 1 VIEW

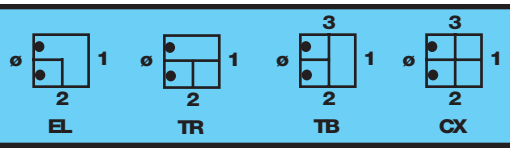


GAUGE and TEST PORT AVAILABILITY

AVAILABLE GAUGE and PORT LOCATIONS ARE THE SAME AS THOSE FOR THE CODE U61 4-BOLT MODULAR CONNECTORS (see page 25).

Inserta Products, Inc.
Blue Bell, Pa. 19422

MODULAR CONNECTORS UNIFIED CODE U61 2-BOLT FLANGE TYPE



Inserta Products, Inc.

SPECIALTY FLANGE PLATES

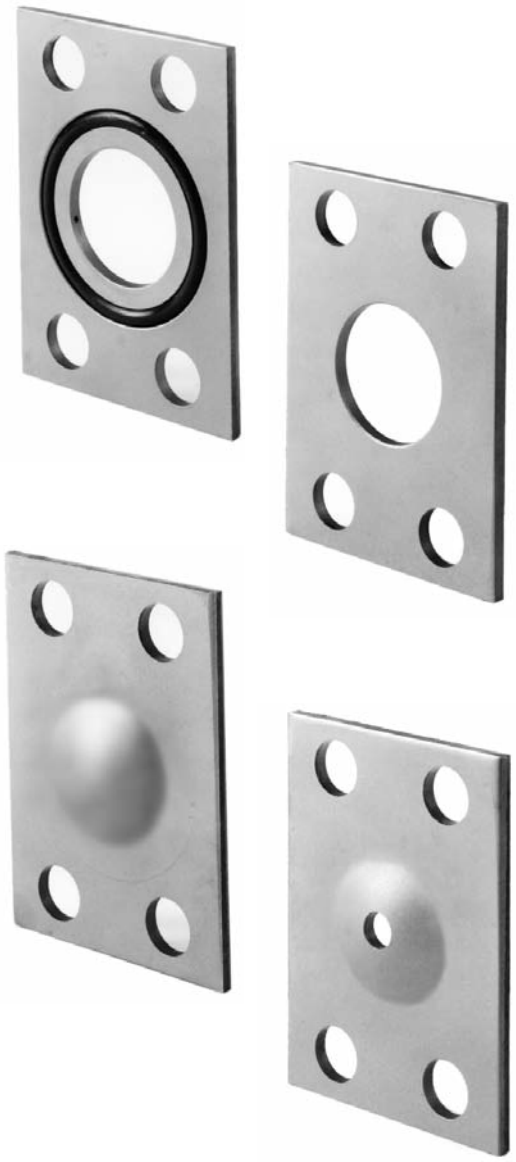
INSERTA® has various proprietary Specialty Flange Plates that gives one great flexibility in the assembly of **INSERTA®** modular valves and connectors. Specialty Flange Plates for use with **INSERTA® Modular Valves and Connectors, 4-Bolt Flange Type** include Seal Plates with seal and optional integrity 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.

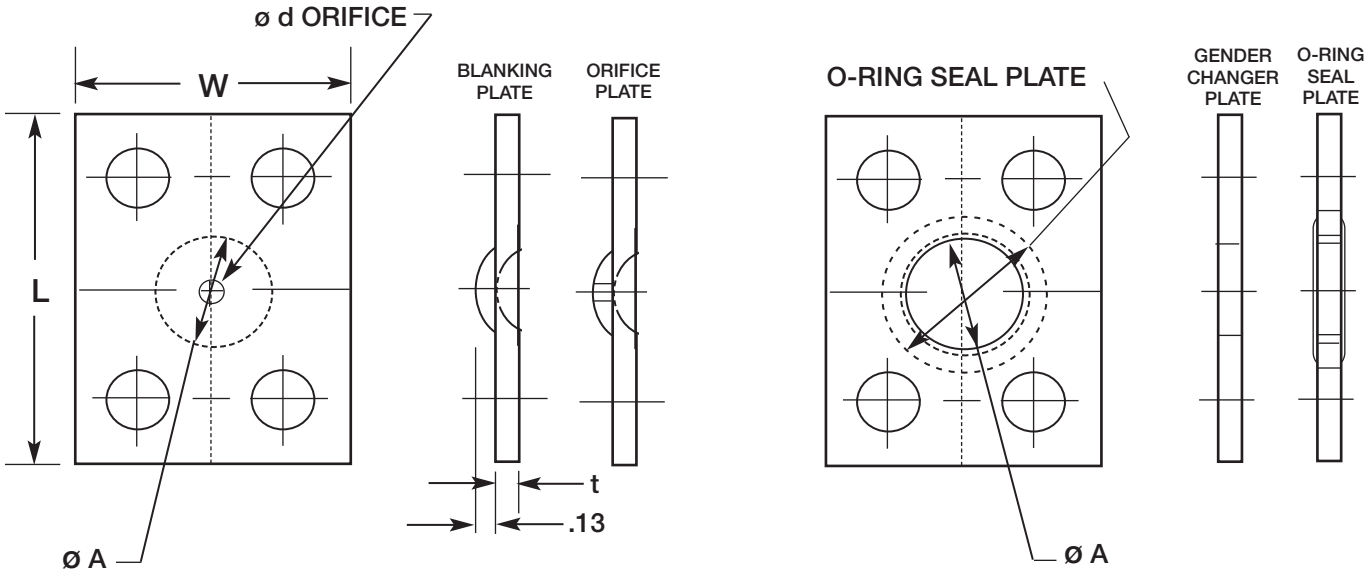
Gender Changer Plate
INSERTA® Gender Changer Plates are made with a nominal size center hole. This permits two O-Ring clamp like flange faces to be joined together with their O-Ring's sealing on the opposing Gender Changer plate's surface.

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



PATTERN SIZE	A DIA.	L	W	t	d* DIA.	O-RING SIZE NO.
U46102	1/8	1.00	.62	.05	CUSTOMER SPECIFIED	010
U46104	1/4	1.25	.75	.05		011
U46106	3/8	1.50	.88	.05		014
6108	1/2	2.12	1.38	.11		210
6112	3/4	2.50	1.75			214
6116	1	2.75	2.00			219
6120	1 1/4	3.00	2.25			222
6124	1 1/2	3.75	2.75			225
6132(1)	2	4.00	3.25	.24		228
6140(2)	2 1/2	4.50	3.50	.11	N/A	232
6148(2)	3	5.25	4.25	.11	N/A	237

PATTERN SIZE	A DIA.	L	W	t	d* DIA.	O-RING SIZE NO.
6208	1/2	2.25	1.50	.11	CUSTOMER SPECIFIED	210
6212	3/4	2.75	1.88			214
6216	1	3.00	2.25			219
6220	1 1/4	3.25	2.50			222
6224	1 1/2	4.25	3.00			225
6232(1)	2	5.00	4.00	.24		228
6240(2)	2 1/2	6.75	4.25	.11	N/A	232
6248(2)	3	8.50	5.25	.11	N/A	237

*MIN. Ø = .016

(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

ISP — A — 61 12 — S — N — IS

INSERTA®

PLATE TYPE
- BP = BLANKING PLATE
- OP = ORIFICE PLATE
- GC = GENDER CHANGER
- SP = SEAL PLATE

DESIGN CODE

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

NOMINAL SIZE

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

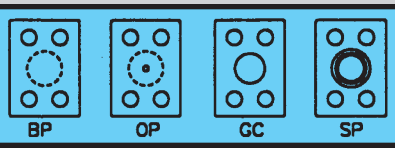
OPTIONS
- IS = INTEGRITY SUPPORT RING
- O*** = ORIFICE SIZE
  - FIRST DIGIT - INCHES
  - 2 & 3 DIGIT ADDS DECIMAL INCREMENTS, I.E. 0.25

SEAL MATERIAL
- N = BUNA N
- V = VITON

SEAL PLATE MATERIAL
- S = STEEL

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

IFRA — A — 6116 — 6116 — N

INSERTA® 90° FLANGE ROTATIONAL RETAINING ADAPTER

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**

CLAMP FACE Ø

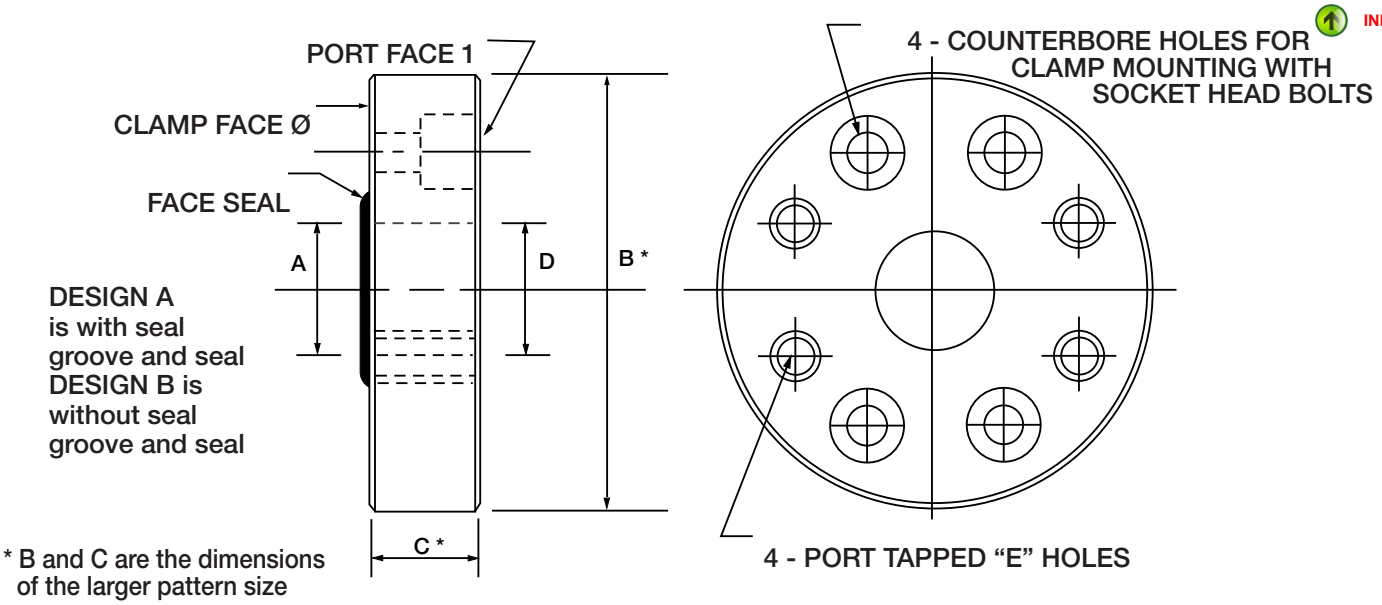
PORT FACE 1

SEAL COMPOUND
- **N = BUNA N (STANDARD)**
- **V = VITON (OMIT FOR DESIGN B)**

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**	Ø 1 Ø 1



* 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 A	B	D	E UNC-2B	CLAMP FACE BOLT KIT (4-BOLTS)	O-RING SIZE NO.
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:
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 clamp Face Ø to the same size Code 61 Port Face 1.
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.

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 51.

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

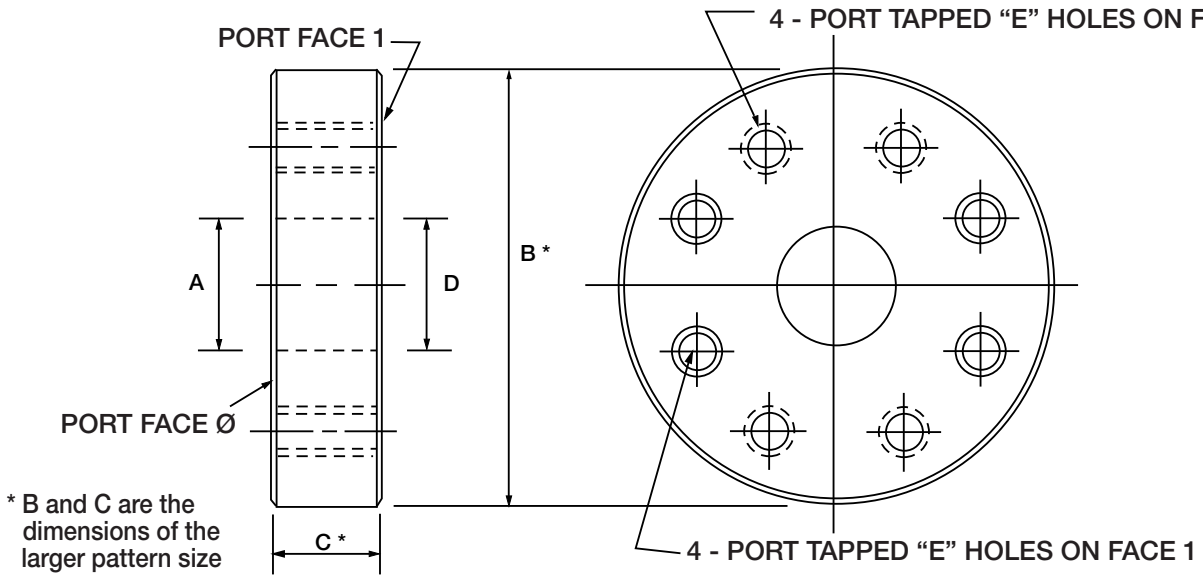
IFRC — A — 6116 — 6116

- **IFRC** — INSERTA® 90° FLANGE ROTATIONAL CONNECTOR
- **A** — MOUNTING DESIGN CODE
- **6116** — PORT FACE Ø
- **6116** — PORT FACE 1

PORT FACE PATTERNS

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	Ø 1	



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.

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

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
T = ANSI B1.20.3 NPTF
P = PORT PLUG (NO THREAD EXTENSION)

MALE THREAD SIZE[1]

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

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

ADAPTER MATERIAL
S = STEEL

ADAPTER FINISH
1 = ZINC CHROMATE

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

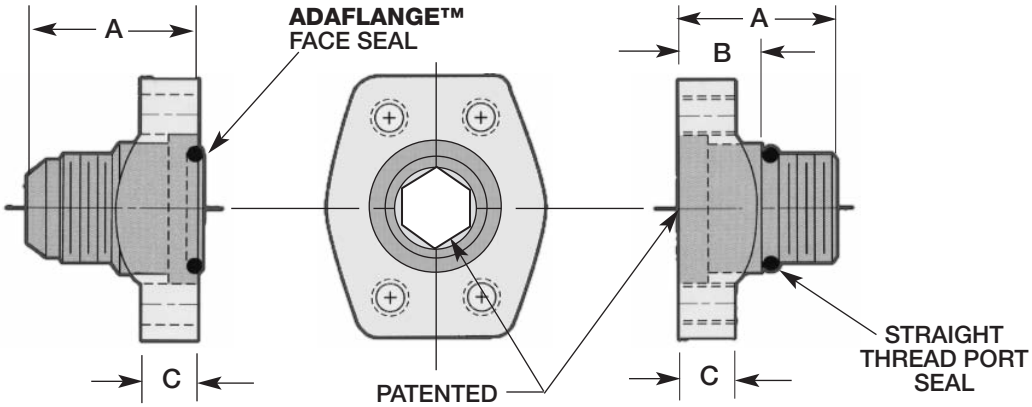
FLANGE TYPE
A = SAE - ONE-PIECE CLAMP TYPE
B = SAE - ONE-PIECE THREADED COMPANION TYPE

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

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

[1]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.

ADACONN® Blue Bell, Pa. 19422	ADAFLANGE™ ADAFLANGEPORT™ CODE 61 & 62 SOCKET HEAD ADAPTERS	



ADAFLANGE™ SOCKET HEAD FLANGE ADAPTER

ADAFLANGEPORT™ SOCKET HEAD FLANGE ADAPTER

SEE PAGE 61 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			HEXAGON BOLT KIT (includes 4 hex bolts with lockwashers)	HEXAGON DRIVE SIZE	BIT or WRENCH NO.	O-RING SIZE NO.	
	A	B	A	B	C				FACE [2]	PORT [1]
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	.56	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			HEXAGON BOLT KIT (includes 4 hex bolts with lockwashers)	HEXAGON DRIVE SIZE	BIT or WRENCH NO.	O-RING SIZE NO.	
	A	B	A	B	C				FACE [2]	PORT [1]
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

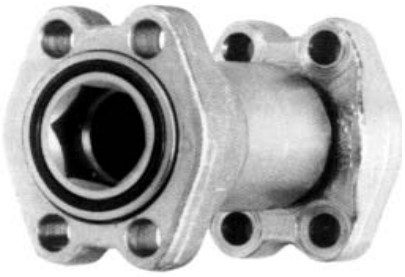
*NOT AN SAE STANDARD—PROVIDES BOLT ENGAGEMENT OF 1 1/2 TIMES NOMINAL BOLT DIAMETER FOR FASTENING TO **INSERTA®** STEEL MODULAR CONNECTORS.

ADACONN®

PORT CONNECTORS

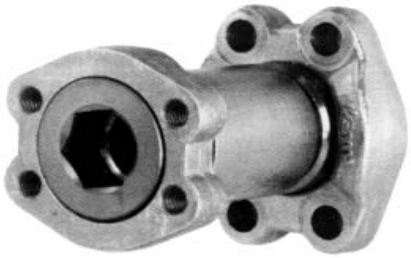
PORT CONNECTOR

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.



PORT CONNECTOR with two **ADAFLANGE™** Adapters

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.



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

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.

ORDERING INFORMATION

A P C – 40 L T – S 1

ADACONN®

PORT
(FOR 37° MALE FLARE FITTING)

CONNECTOR

CONNECTOR SIZE (THREAD SIZE)

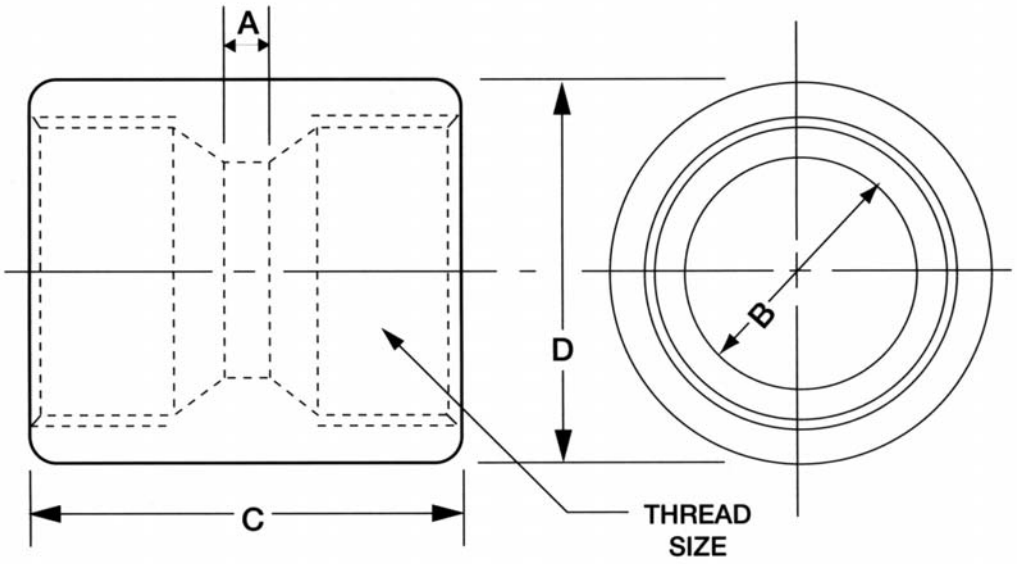
08 = 3/4 - 16	20 = 1 5/8 - 12
10 = 7/8 - 14	24 = 1 7/8 - 12
12 = 1 1/16 - 12	32 = 2 1/2 - 12
14 = 1 3/16 - 12	40 = 3 -12
16 = 1 5/16 - 12	48 = 3 1/2 - 12

WEIGHT
OMIT = STANDARD

L T = LIGHT FOR 4000 PSI MAXIMUM (-40 & -48 SIZES)

MATERIAL
S = STEEL

FINISH
1 = ZINC CHROMATE



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 stationarily 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.

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

ADAPTER TYPE
AFO = ADAFLANGE™

DESIGN
UK4 = UNIFIED CODE 61 4-BOLT MOUNTING PATTERN

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

MALE THREAD TYPE
F = 37° FLARE

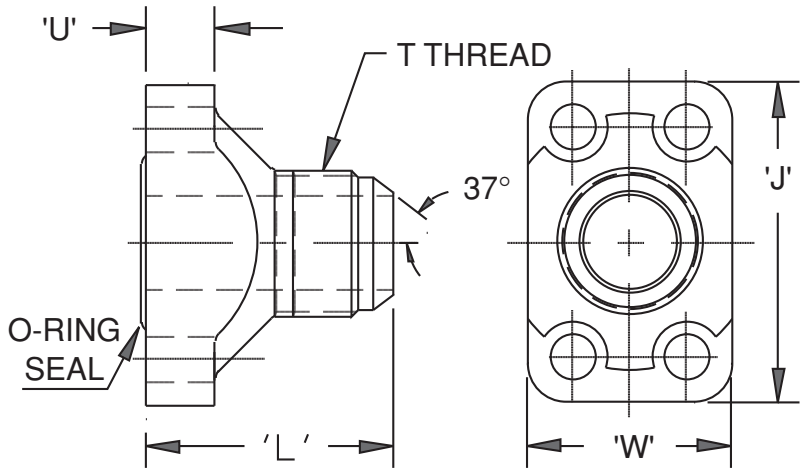
MALE THREAD SIZE
02 = 5/16 – 24 · 03 = 3/8 – 24 · 04 = 7/16 – 20 · 05 = 1/2 – 20 · 06 = 9/16 – 18 · 08 = 3/4 – 16 · 10 = 7/8 – 14 · 12 = 1 1/16 – 12 · 14 = 1 3/16 – 12 · 16 = 1 5/16 – 12 · 20 = 1 5/8 – 12 · 24 = 1 7/8 – 12 · 32 = 2 1/2 – 12

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

ADAPTER MATERIAL
S = STEEL

ADAPTER FINISH
1 = ZINC CHROMATE

SEAL MATERIAL
B = BUNA N
V = VITON



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
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 64.

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 63.

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.

ADACONN®

ADAFLANGE™ ADAPTERS UNIFIED CODE U61 2-BOLT FLANGE TYPE

Patent #6,467,820

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.

Industry standard socket head cap screws that meet or exceed the strength re-quirements 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

AFO – UK2 16 – F 16 – 2.25 – S 1 – B

ADAPTER TYPE
AFO = ADAFLANGE™

DESIGN
UK2 = UNIFIED CODE U61
2 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

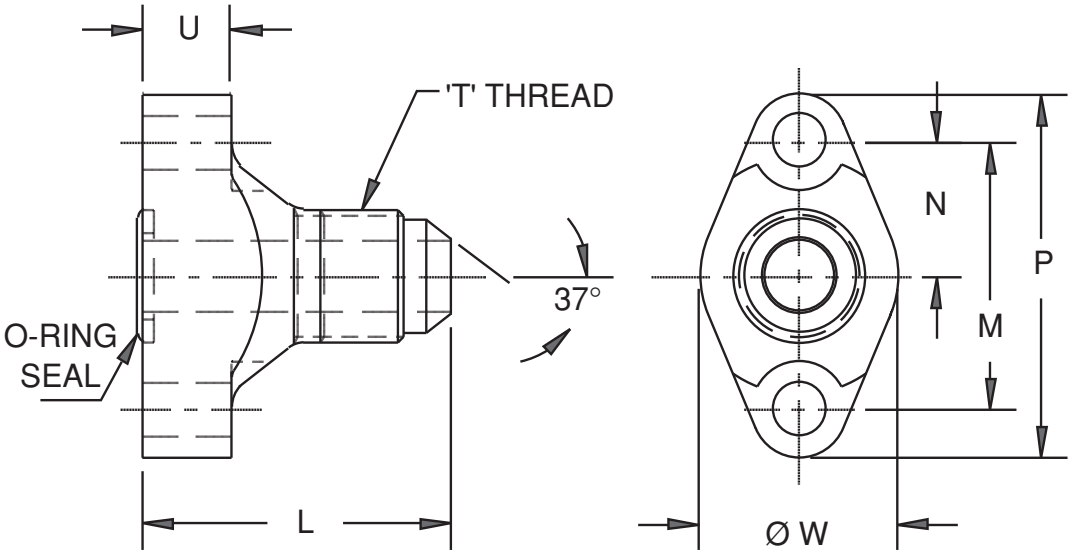
MALE THREAD SIZE
02 = 5/16 - 24 06 = 9/16 - 18 14 = 1 3/16 - 12 32 = 2 1/2 - 12
03 = 3/8 - 24 08 = 3/4 - 16 16 = 1 5/16 - 12
04 = 7/16 - 20 10 = 7/8 - 14 20 = 1 5/8 - 12
05 = 1/2 - 20 12 = 1 1/16 - 12 24 = 1 7/8 - 12

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

ADAPTER MATERIAL
S = STEEL

ADAPTER FINISH
1 = ZINC CHROMATE

SEAL MATERIAL
B = BUNA N
V = VITON



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 64.

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 63.

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.

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 **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.

INSERTA® Flange type, 2 port,**Ball Valves,** have two ball seals, one for each port, i.e. ports ø 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 Ø 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 Ø 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

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

NOMINAL SIZE

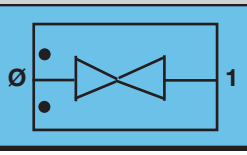
02 = 1/8	12 = 3/4	32 = 2
04 = 1/4	16 = 1	40 = 2 1/2
06 = 3/8	20 = 1 1/4	48 = 3
08 = 1/2	24 = 1 1/2	

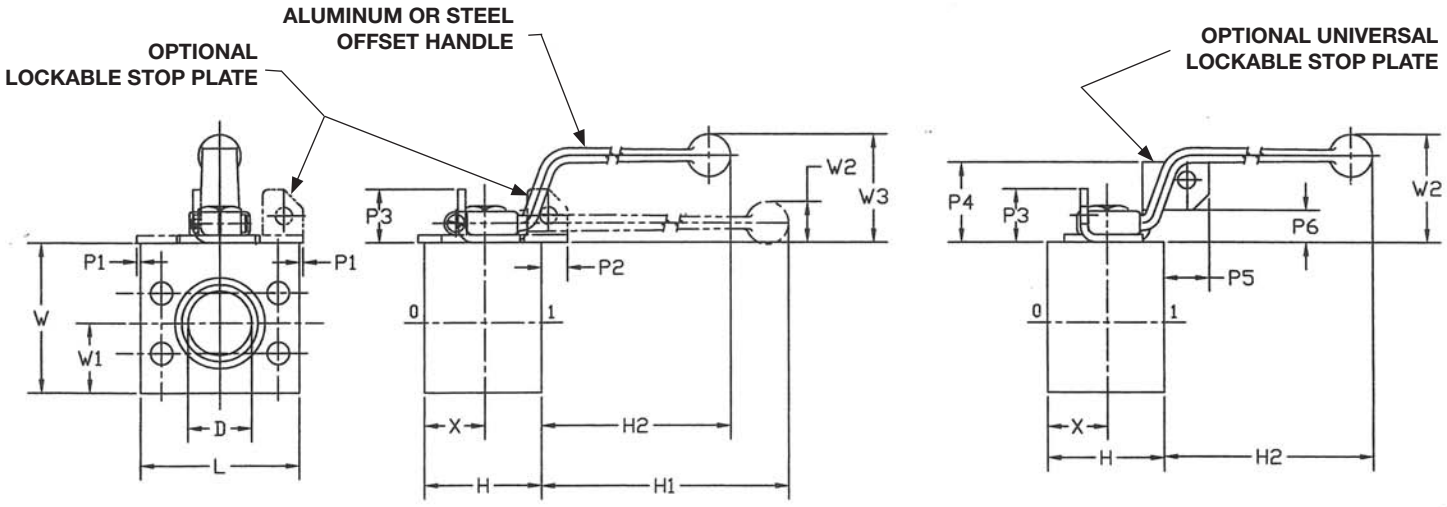
HANDLE OPTION
- OS = OFFSET STEEL HANDLE (STANDARD)
- SA = STRAIGHT ALUMINUM HANDLE
- OA = OFFSET ALUMINUM HANDLE

STOP PLATE OPTION
- * = STANDARD STOP PLATE
- L = LOCKABLE STOP PLATE
- U = UNIVERSAL LOCKABLE STOP PLATE

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	11/4	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	11/2	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	21/2	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 (see photo on Page 4). 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	11/4	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	11/2	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	21/2	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.

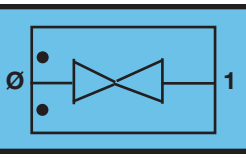
Temperature range is -22°F (-30°C) to 175°F (80°C).
Operating medium is hydraulic fluid.

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



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

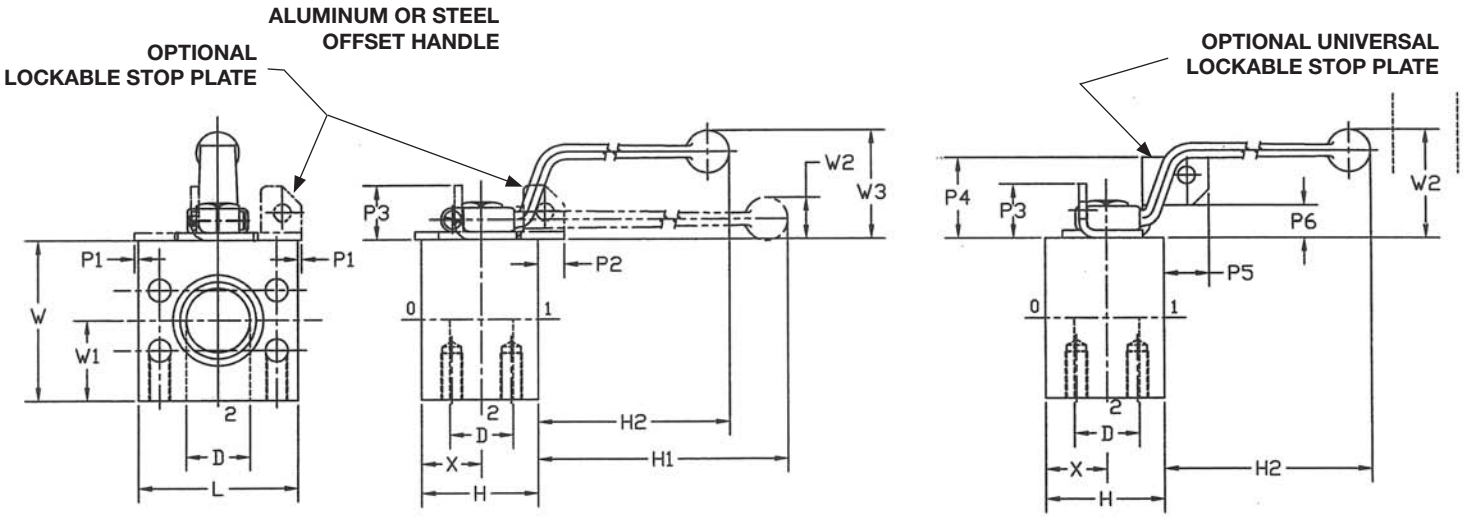
02 = 1/8	12 = 3/4	32 = 2
04 = 1/4	16 = 1	40 = 2 1/2
06 = 3/8	20 = 1 1/4	48 = 3
08 = 1/2	24 = 1 1/2	

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

STOP PLATE OPTION
* = STANDARD STOP PLATE
L = LOCKABLE STOP PLATE
U = UNIVERSAL LOCKABLE STOP PLATE

SEAL COMPOUND (BALL)
D = DELRIN (STANDARD)

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



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 (see photo on Page 4). 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

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.

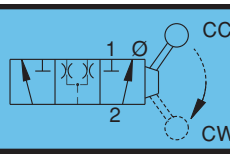
Temperature range is -22°F (-30°C) to 175°F (80°C).
Operating medium is hydraulic fluid.

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 VALVES
FLANGE TYPE
3 PORT DIVERTER



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 available with either an offset aluminum or forged 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 clockwise.

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

MOUNTING PATTERN
- 61 = SAE CODE 61
- 62 = SAE CODE 62

NOMINAL SIZE

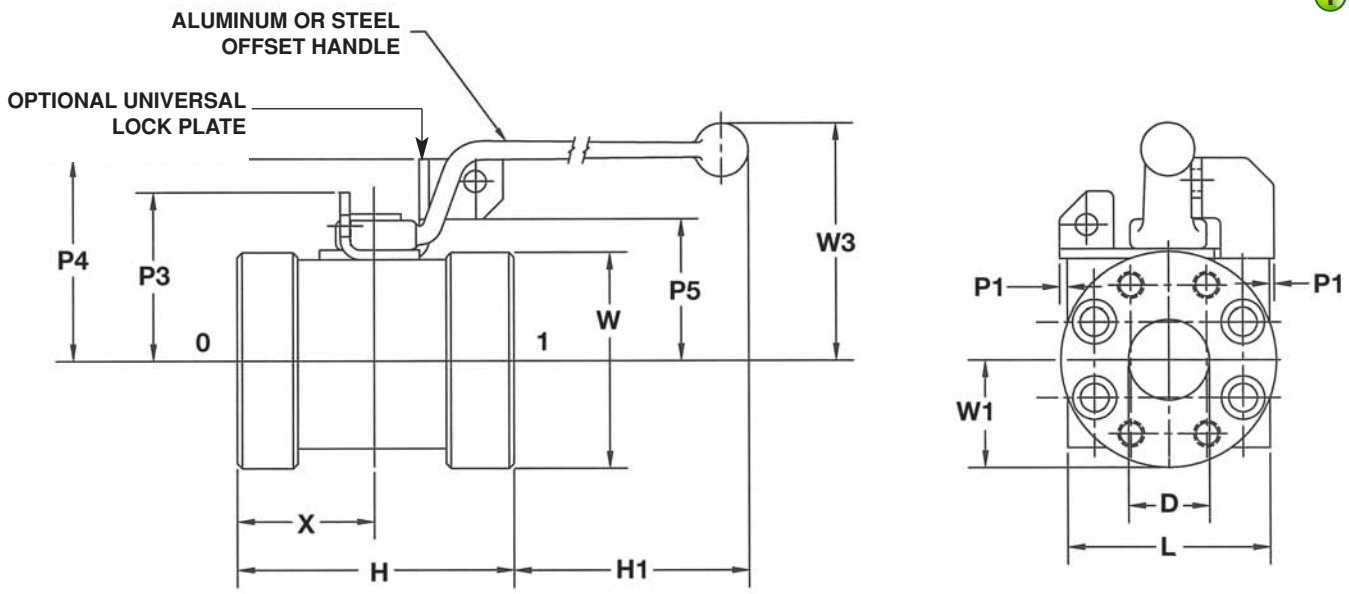
08 = ½	20 = 1¼
12 = ¾	24 = 1½
16 = 1	32 = 2

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

SEAL COMPOUND (BALL)
- D = DELRIN (STANDARD)

STOP PLATE OPTION
- U = UNIVERSAL LOCKABLE STOP PLATE

HANDLE OPTION
- OS = OFFSET STEEL HANDLE (STANDARD)
- OA = OFFSET ALUMINUM HANDLE



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
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
6116	1	1.00	2.75	3.00	4.25	2.14	1.50	4.71	3.90	0.63	2.65	3.22
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
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
6132	2	1.50	4.00	4.50	5.75	2.88	2.25	5.77	4.64	--	3.38	4.01
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	1.50	4.64	3.76	0.63	2.50	3.07
6216	1	1.00	3.00	3.00	4.25	2.16	1.50	4.71	3.90	0.50	2.65	3.22
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
6224	1 1/2	1.25	4.25	4.50	5.50	2.80	2.25	5.93	4.39	--	3.12	3.75
6232	2	1.50	5.00	5.50	6.50	3.25	2.50	5.40	4.65	--	3.37	4.00

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

PATTERN SIZE	NOMINAL SIZE	D	L	W	H	X	W1	H1	W3	P1	P3	P4
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	3.75	0.75	2.50	3.07
6116	1	1.00	2.75	3.00	4.25	2.14	1.50	4.71	3.90	0.63	2.65	3.22
6120	1 1/4	1.25	3.75	4.00	5.00	2.55	2.00	4.64	4.39	0.13	3.12	3.75
6124	1 1/2	1.50	4.00	4.50	5.75	2.88	2.25	5.77	4.64	--	3.38	4.01
6132	2	2.00	4.50	5.00	6.25	3.19	2.50	5.58	4.90	--	3.62	4.25
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	1.50	4.64	3.76	0.63	2.51	3.08
6216	1	1.00	3.00	3.00	4.25	2.16	1.50	4.71	3.90	0.50	2.65	3.22
6220	1 1/4	1.25	4.25	4.50	5.50	2.80	2.25	5.93	4.39	--	3.12	3.75
6224	1 1/2	1.50	5.00	5.50	6.50	3.25	2.75	5.40	4.65	--	3.37	4.00
6232	2	2.00	6.00	7.00	7.00	3.65	3.50	5.21	4.89	--	3.62	--

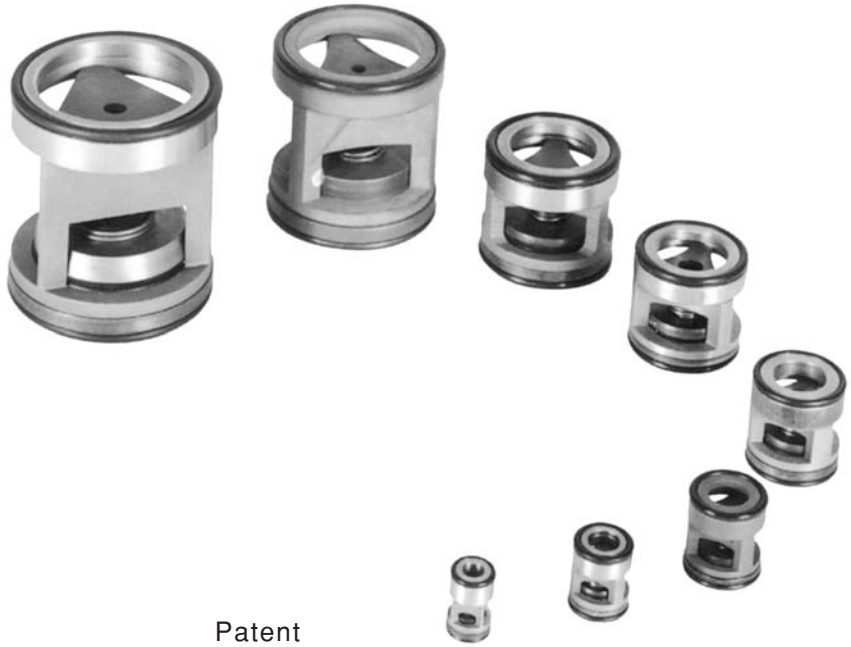
Inserta Products, Inc.

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

ICS-C-24-N15-RØ

INSERTA® CHECK VALVES SLIP-IN TYPE

DESIGN CODE

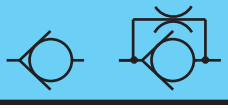
NOMINAL SIZE

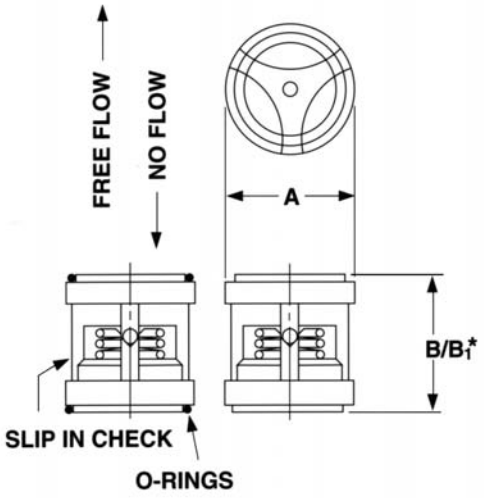
02 = 1/8	20 = 1 1/4
04 = 1/4	24 = 1 1/2
06 = 3/8	32 = 2
08 = 1/2	40 = 2 1/2
12 = 3/4	48 = 3
16 = 1	

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
03 = 3 PSI
07 = 7 PSI
15 = 15 PSI (STANDARD)
30 = 30 PSI
60 = 60 PSI } Optional Longer Check Valve
90 = 90 PSI }

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





VALVE SIZE	NOMINAL FLOW (GPM)	A –.002	B –.002	B1* –.002	Rø MAX	0-RING SIZE NO. (mm)
02	2	.333	.531	.728	.024	(6.2 x 1.0)
04	5	.451	.571	.846	.039	(8.5 x 1.5)
06	10	.589	.669	.866	.078	(12.0 x 1.5)
08	18	.746	.787	.945	.078	(16.0 x 1.5)
12	24	.963	.906	1.220	.140	116
16	45	1.199	1.102	1.535	.218	213
20	75	1.553	1.653	2.434	.315	219
24	110	1.770	2.007	2.500	.394	222
32	200	2.391	2.858	3.582	.394	227
40	300	2.883	3.407	3.532	.394	231
48	400	3.385	3.507	4.119	.394	235

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.

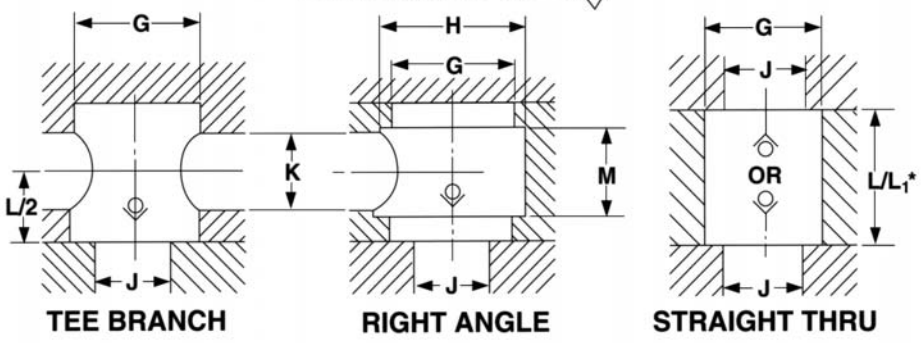
NOMINAL FLOW RATES ARE WITH A ΔP OF 20 TO 40 PSI

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.

MACHINED CAVITY DIMENSIONS

SURFACE FINISH TO BE 63

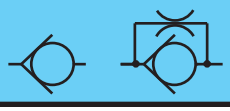


(COMBINATIONS OF THESE CAVITIES CAN BE USED)

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	.4528 / .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	.591	.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	1.031	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	4.203	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.**

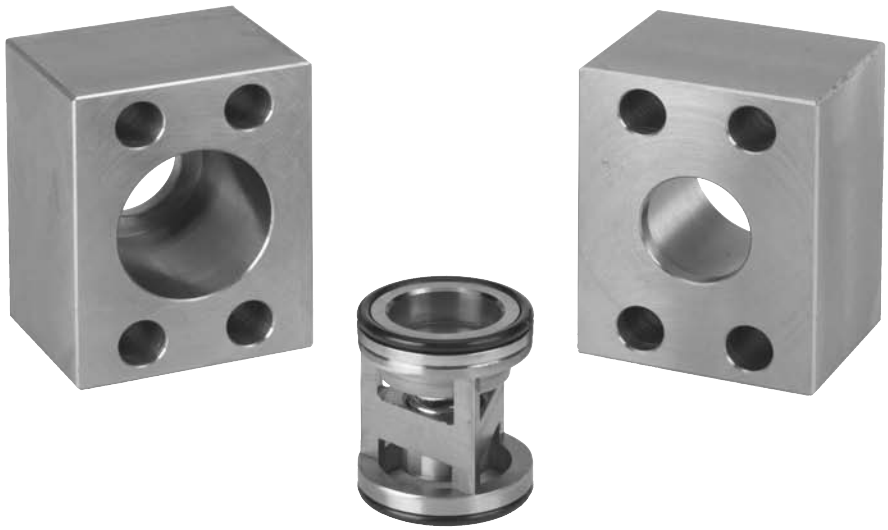


Inserta Products, Inc.

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

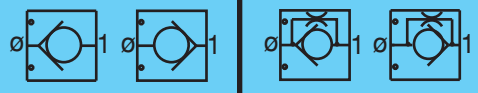
MOUNTING PATTERN

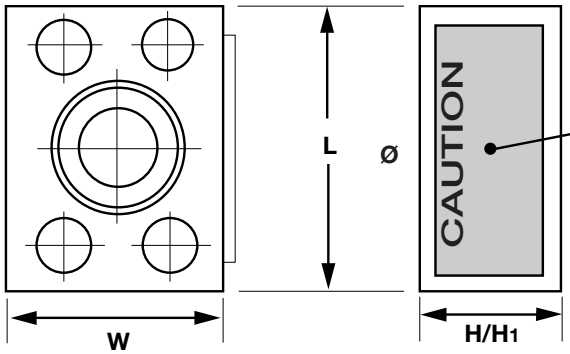
U461 = UNIFIED CODE U61 4-BOLT
61 = SAE CODE 61
62 = SAE CODE 62

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

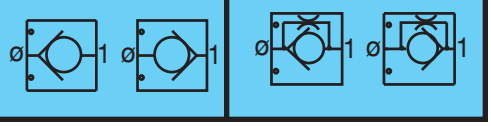
MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H_1*	L	SLIP-IN CHECK VALVE PART NO.
U46102	1/8	2	.62	.69	.88	1.00	ICS-C-02-***
U46104	1/4	5	.75	.75	1.00	1.25	ICS-C-04-***
U46106	3/8	10	.88	.88	1.00	1.50	ICS-C-06-***
6108	1/2	24	1.50	1.00	1.50	2.12	ICS-C-12-***
6112	3/4	45	1.87	1.25	1.75	2.50	ICS-C-16-***
6116	1	75	2.25	2.00	2.75	2.75	ICS-C-20-***
6120	1 1/4	110	2.50	2.25	2.75	3.00	ICS-C-24-***
6124	1 1/2	200	3.50	3.25	4.00	4.00	ICS-C-32-***

CODE 62

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H_1*	L	SLIP-IN CHECK VALVE PART NO.
6208	1/2	24	1.50	1.25	1.50	2.25	ICS-C-12-***
6212	3/4	45	2.00	1.50	1.75	2.75	ICS-C-16-***
6216	1	75	2.50	2.00	2.75	3.00	ICS-C-20-***
6220	1 1/4	110	2.75	2.25	2.75	3.50	ICS-C-24-***
6224	1 1/2	200	4.00	3.25	4.00	4.50	ICS-C-32-***

NOMINAL FLOW RATINGS SHOWN ARE WITH A ΔP 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)

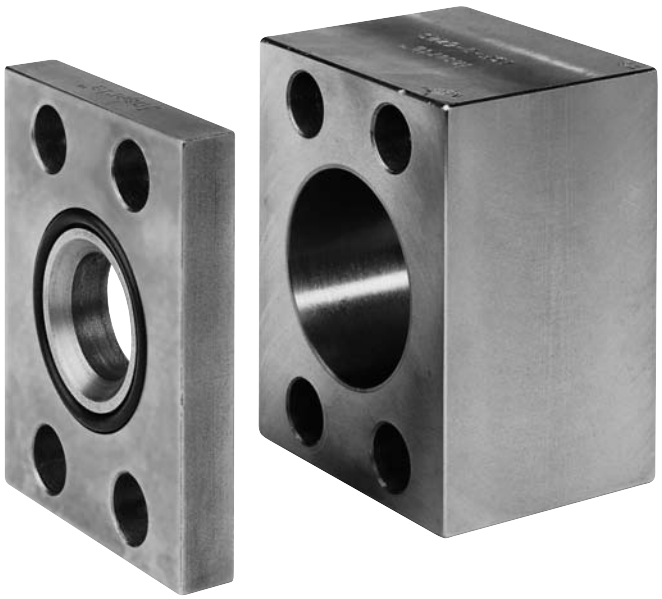


Inserta Products, Inc.

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

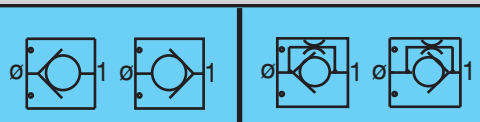
DESIGN CODE

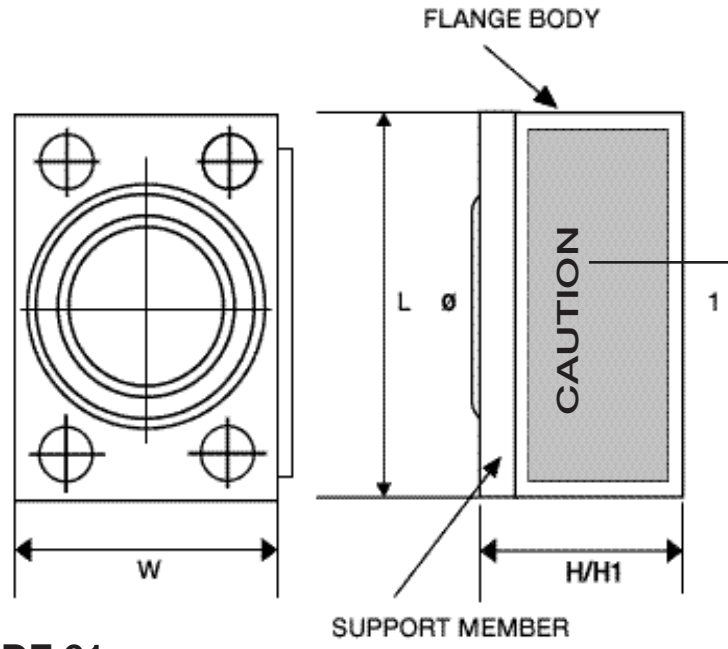
MOUNTING PATTERN
61 = SAE CODE 61
62 = SAE CODE 62

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

SEAL MATERIAL
N = BUNA N
V = VITON

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

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

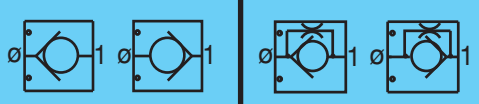
MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H_1*	L	SLIP-IN CHECK VALVE PART NO.	O-RING SIZE NO.
6120	1 1/4	75	2.25	2.25	3.00	3.00	ICS-C-20-***	222
6124	1 1/2	110	2.50	2.75	3.25	3.75	ICS-C-24-***	225
6132	2	200	3.25	3.50	4.25	4.00	ICS-C-32-***	228
6140	2/1/2	300	3.50	4.25	4.50	4.50	ICS-C-40-***	232
6148	3	400	4.00	4.25	5.00	5.00	ICS-C-48-***	237

SAE CODE 62

MOUNTING PATTERN - SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	H_1*	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-C-20-***	222
6224	1 1/2	110	3.00	2.75	3.25	4.25	ICS-C-24-***	225
6232	2	200	3.50	3.75	4.50	5.00	ICS-C-32-***	228
6240	2/1/2	300	4.25	4.25	4.50	6.00	ICS-C-40-***	232
6248	3	400	5.00	4.25	5.00	8.00	ICS-C-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)



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

ICC– A– 12–L

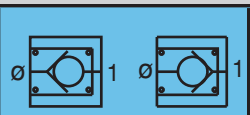
INSERTA® CHECK CARRIER THREAD-IN TYPE

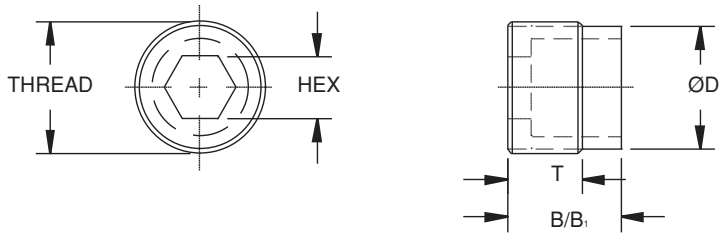
DESIGN CODE

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

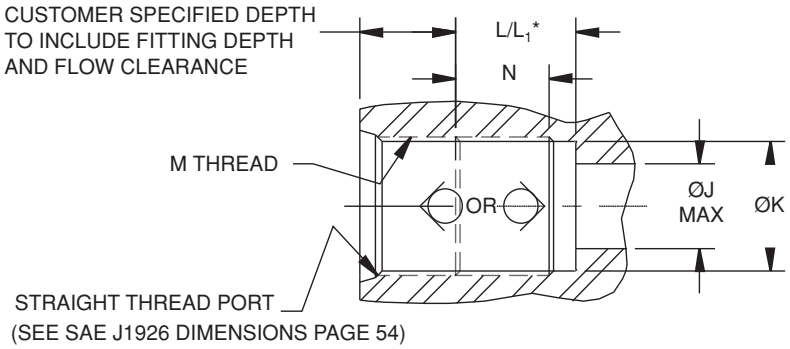
NOMINAL SIZE

06 = 9/16-18	16 = 1 5/16-12
08 = 3/4-16	20 = 1 5/8-12
10 = 7/8-14	32 = 2 1/2-12
12 = 1 1/16-12	



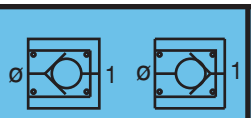


CARRIER TYPE	VALVE SIZE	D DIA.	B	B_1*	T	THREAD SIZE UNRF/UNR-2A	HEX SIZE
ICC-A-06	02	.494	.688	.884	.44	9/16-18	5/32
ICC-A-08	04	.673	.750	1.025	.50	3/4-16	7/32
ICC-A-10	06	.787	.875	1.072	.56	7/8-14	5/16
ICC-A-12	08	.963	.984	1.142	.69	1 1/16-12	7/16
ICC-A-16	12	1.210	1.142	1.456	.75	1 5/16-12	5/8
ICC-A-20	16	1.535	1.339	1.772	.88	1 5/8-12	7/8
ICC-A-32	24	2.391	2.281	2.775	1.63	2 1/2-12	1 5/16



MACHINED CAVITY DIMENSIONS								TIGHTENING TORQUE (ft-lbs)
CARRIER TYPE	VALVE SIZE	J DIA MAX.	K DIA. +.000 –.005	L ±.010	L_1* ±.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	1.339	1.772	1.00	1 5/8-12	180-185
ICC-A-32	24	1.250	2.416	2.281	2.775	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 8 & 9).**



Inserta Products, Inc.

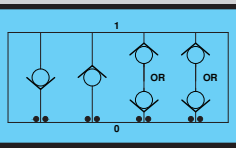
D03 CHECK VALVE MODULES

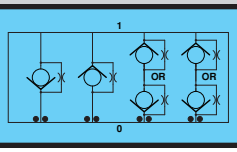
INSERTA® ICD D03 Check Valve Modules are a compact means to provide check and fixed orifice flow control in a D03 stack assembly. Each module may be ordered with either one or two **INSERTA® ICS Check Valves,** Slip-in type. The **INSERTA® ICS Check Valves,** Slip-in type, can be installed with the free 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.

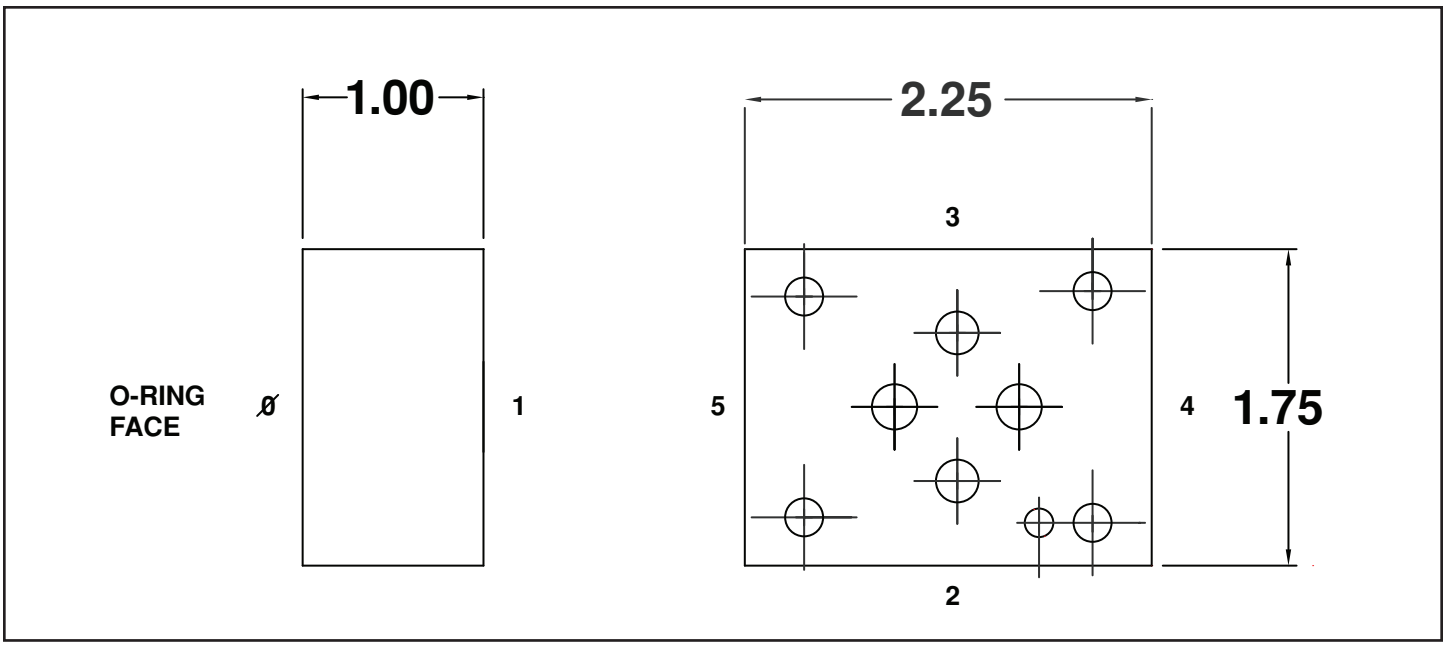
ORDERING INFORMATION

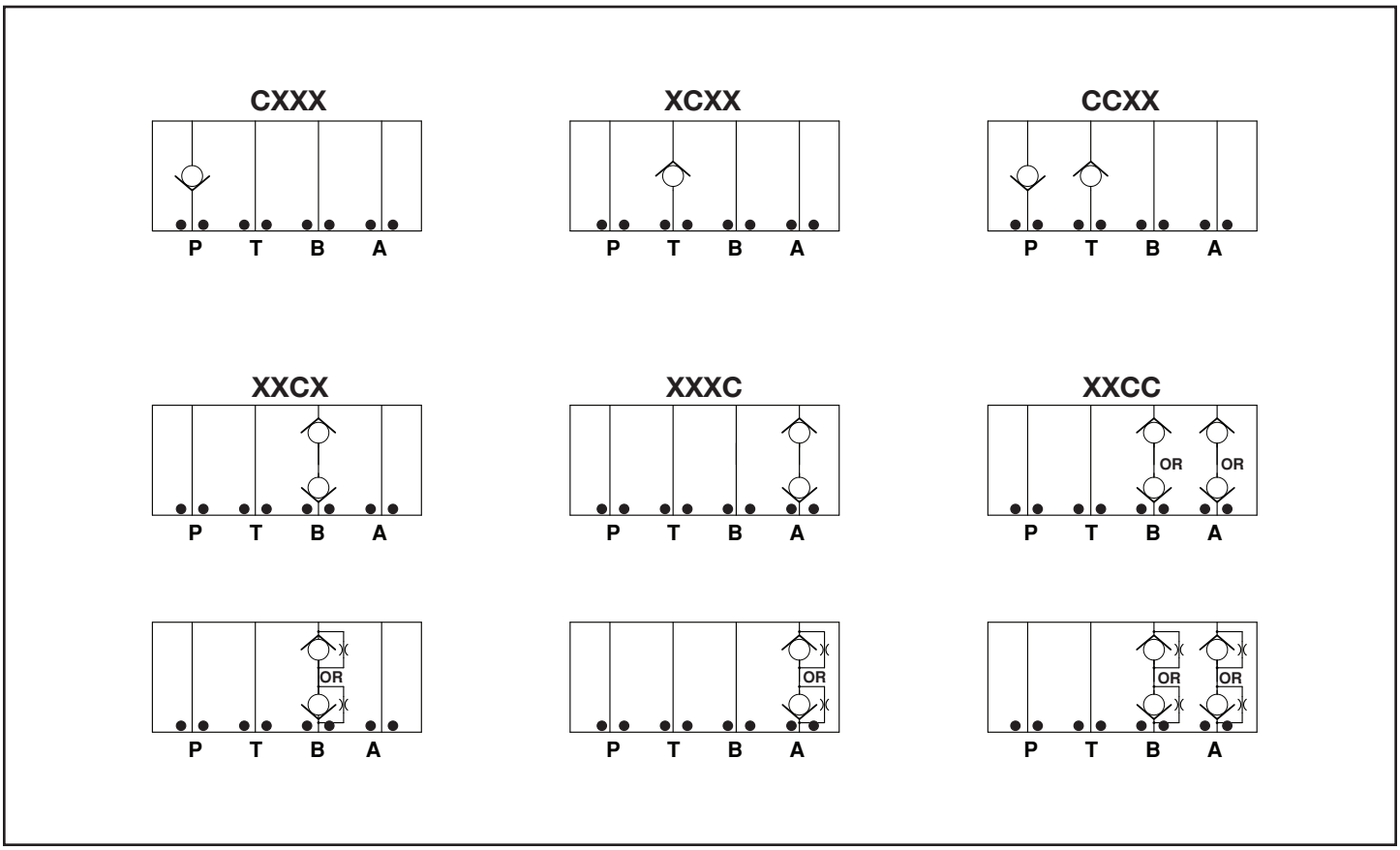
ICD – A - D03 - 04 - XXCC – S – N - 015 R.030 - 015 R.040

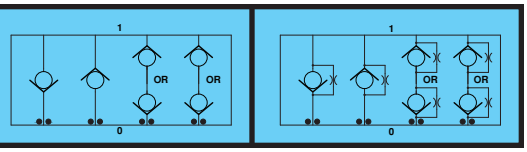
- **INSERTA® DIRECTIONAL MODULE** — CHECK TYPE
- **DESIGN CODE**
- **NFPA PATTERN**
- **VALVE SIZE**
- **POSITIONAL INFORMATION** — P-T-B-A; C-CHECK PRESENT; X-NO CHECK PRESENT
- **BODY MATERIAL** — S-STEEL
- **SEAL MATERIAL** — N-BUNA N; V-VITON
- **FIRST VALVE CRACKING PRESSSURE**
- **FIRST VALVE ORIFICE SIZE (INCHES)** — (IF ORIFICE NOT REQUIRED R.000)
- **SECOND VALVE CRACKING PRESSURE** — (OMIT IF VALVE NOT REQUIRED)
- **SECOND VALVE ORIFICE SIZE (INCHES)** — (IF ORIFICE NOT REQUIRED R.000) (OMIT IF VALVE NOT REQUIRED)











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

ICT-B-24-N15-RØ

INSERTA® CHECK VALVES THREAD-IN TYPE

DESIGN CODE

NOMINAL SIZE

02 = 5/16 - 24	16 = 1 5/16 - 12
03 = 3/8 - 24	20 = 1 5/8 - 12
04 = 7/16 - 20	24 = 1 7/8 - 12
06 = 9/16 - 18	32 = 2 1/2 - 12
08 = 3/4 - 16	40 = 3 - 12
10 = 7/8 - 14	48 = 3 1/2 - 12
12 = 1 1/16 - 12	

FLOW CONTROL OPTION

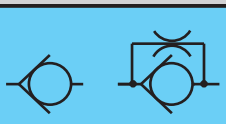
R = FIXED RESTRICTIVE ORIFICE
Ø = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER.
SEE "RØ" ON DATA SHEET FOR ORIFICE DATA.
(OMIT FOR STANDARD CHECK VALVE)

CRACKING PRESSURE

03 =	3 PSI	
07 =	7 PSI	
15 =	15 PSI (STANDARD)	
30 =	30 PSI	
60 =	60 PSI	Optional Longer Check Valve
90 =	90 PSI	Optional Longer Check Valve

SEAL COMPOUND

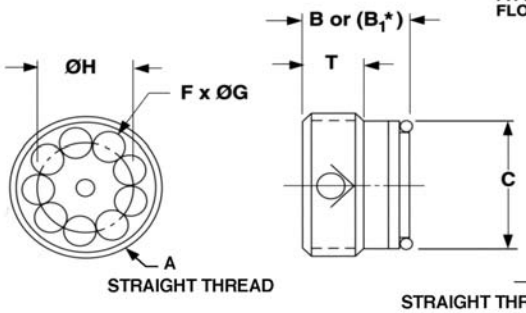
N = BUNA-N (STANDARD)
V = VITON

Inserta Products, Inc. Blue Bell, Pa. 19422	CHECK VALVES THREAD-IN TYPE		

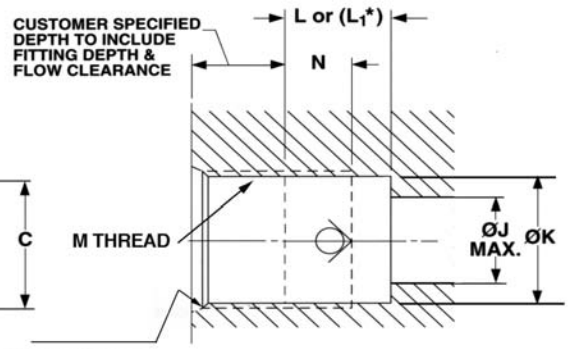
VALVE SIZE	NOMINAL FLOW (GPM)	VALVE DIMENSIONS							RØ MAX	T	O-RING SIZE NO. (mm)	INSTALLATION TOOL	SEATING TORQUE LB-FT
		A	B	B1 *	C	F	G	H					
02	1.0	5/16-24	.412	—	.245	4	.06	.175	.024	.270	(4.5x1)	IMT-C-02	.5–1
03	1.8	3/8-24	.428	—	.333	4	.07	.224	.039	.270	(6.2X1)	IMT-C-03	.5–1
04	3.0	7/16-20	.435	.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	.315	.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



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	2.895	2.988	–	3-12	1.875
48	2.500	3.395	3.113	–	3 1/2-12	1.875

SEE PAGE 60 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)

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.

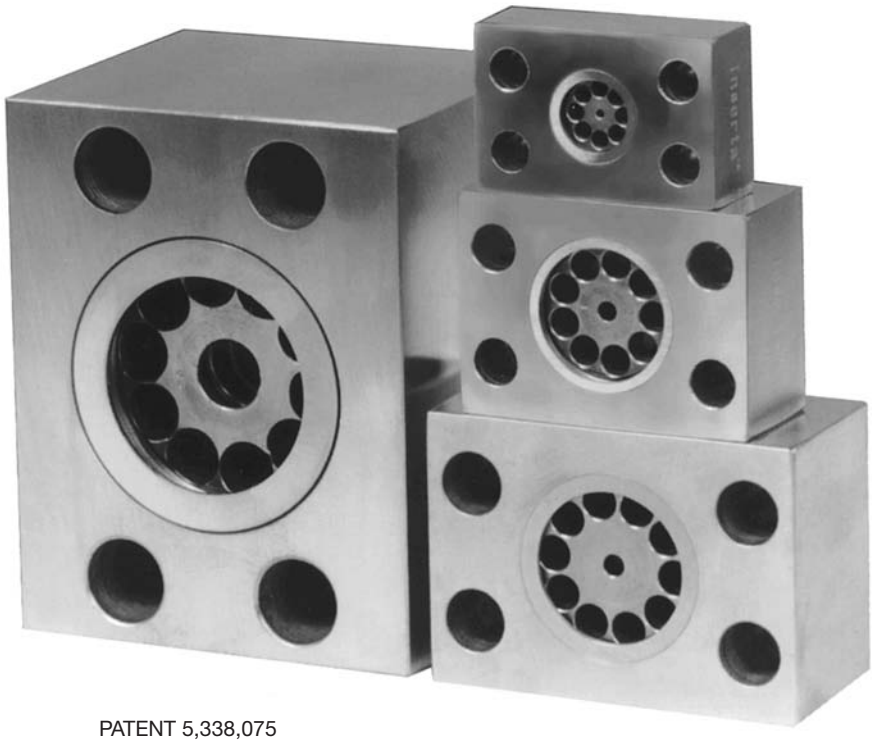
Inserta® Products, Inc.

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**. 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 Check Valve,** matches the nominal flange size to meet most flow requirements for the given flange size. The **INSERTA® 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.

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 Check Valve,** Slip-In Type. The **INSERTA® ICS 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 Check Valve**, and is the check valve of choice in higher flow applications.

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



PATENT 5,338,075

ORDERING INFORMATION

ICFT – A – 61 32 (24) – N 15 – RØ

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

DESIGN CODE

MOUNTING PATTERN
61 = SAE CODE 61
62 = SAE CODE 62

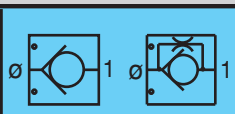
NOMINAL SIZE
08 = 1/2 24 = 1-1/2
12 = 3/4 32 = 2
16 = 1 40 = 2 1/2
20 = 1 1/4 48 = 3

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

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

CRACKING PRESSURE
03 = 3 PSI
07 = 7 PSI
15 = 15 PSI (STANDARD)
30 = 30 PSI

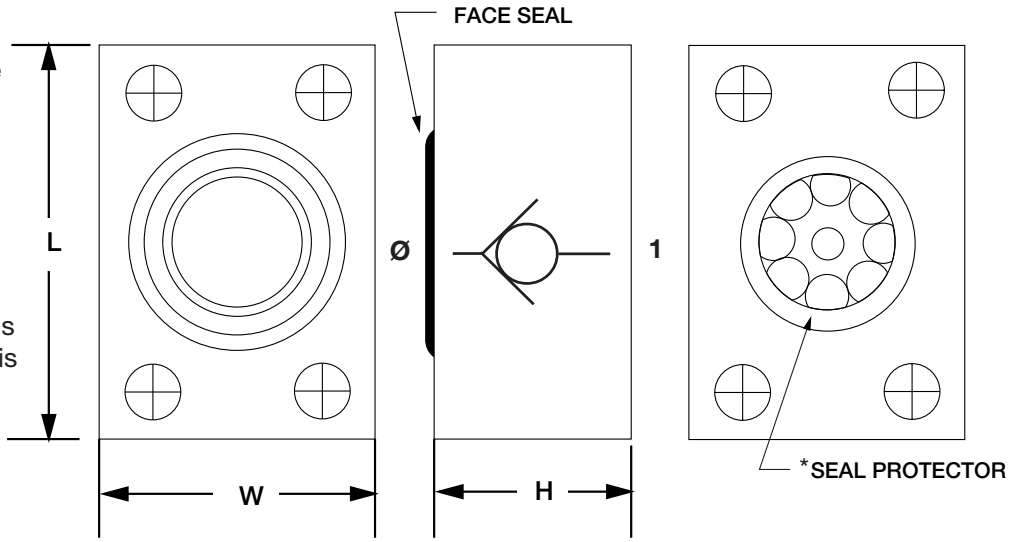
FLOW CONTROL OPTION
R = FIXED RESTRICTIVE ORIFICE
Ø = DIAMETER (INCH) OF THE FIXED ORIFICE. CUSTOMER MUST SPECIFY THE ORIFICE DIAMETER.
SEE "RØ" ON DATA SHEET FOR ORIFICE DATA.

Inserta Products, Inc. Blue Bell, Pa. 19422	CHECK VALVE 4-BOLT FLANGE TYPE	

*Seal Protector must be retained by the mating standard SAE Face Seal groove's inner support area.

**See Page 17 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

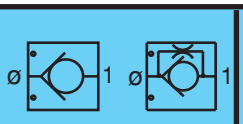
MOUNTING PATTERN–SIZE	NOMINAL SIZE	NOM. FLOW RATE (GPM)	W	H	L	O-RING SIZE NO.	THREAD-IN CHECK VALVE PART NO.
6108	1/2	12	1.37	1.00	2.12	210	ICT–B–08–***
6112	3/4	25	1.75	1.25	2.50	214	ICT–B–12–***
6116	1	35	2.00	1.50	2.75	219	ICT–B–16–***
6120	1 1/4	63	2.25	2.00	3.00	222	ICT–B–20–***
6124	1 1/2	80	2.75	2.25	3.75	225	ICT–B–24–***
6132 (24)	2	80	3.00	2.00	4.00	228	ICT–B–24–***
6132	2	135	3.25	3.50	4.00	228	ICT–B–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.	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–***
6220	1 1/4	63	2.50	2.00	3.50	222	ICT–B–20–***
6224	1 1/2	80	3.00	2.25	4.25	225	ICT–B–24–***
6232 (24)	2	80	3.50	2.00	5.00	228	ICT–B–24–***
6232	2	135	4.00	3.50	5.00	228	ICT–B–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–***

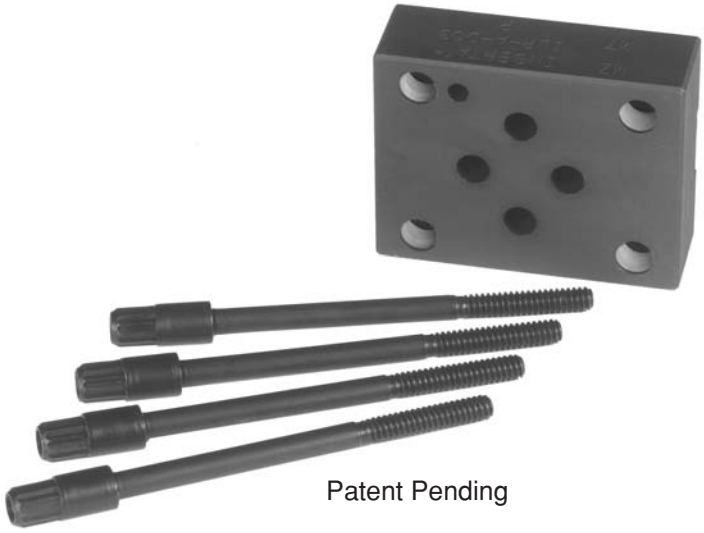
REFERENCE DATA
NOMINAL FLOW RATINGS ARE WITH A Δ P OF 30 TO 40 PSI. In applications where the valve is subject to sudden shock opening or closing (e.g. Accumulator System), the nominal rated flow must not be exceeded and a minimum cracking pressure of 15 PSI is required. THE PRESSURE RATING OF THESE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

Inserta Products, Inc. Blue Bell, Pa. 19422	CHECK VALVE 4-BOLT FLANGE TYPE	

Inserta Products, Inc.

LOCKSTACK™ D03 RETAINING SYSTEM



Patent Pending

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

SEAL COMPOUND
N = BUNA N
V = VITON

FASTENER NOMINAL LENGTH "L" (INCHES)

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® LOCKSTACK™ RETAINING SYSTEM

DESIGN CODE

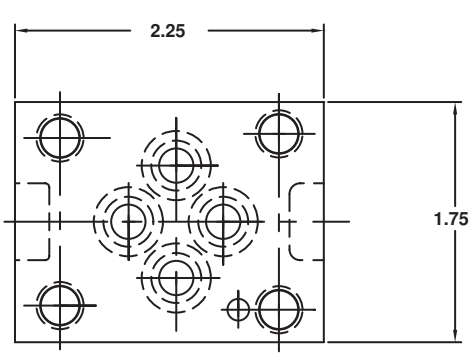
RETAINER NFPA PATTERN

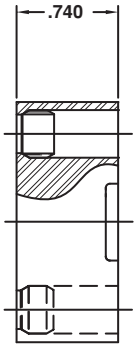
FASTENER THREAD
#10-24

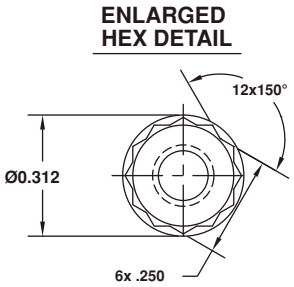
RETAINER MATERIAL
S-STEEL

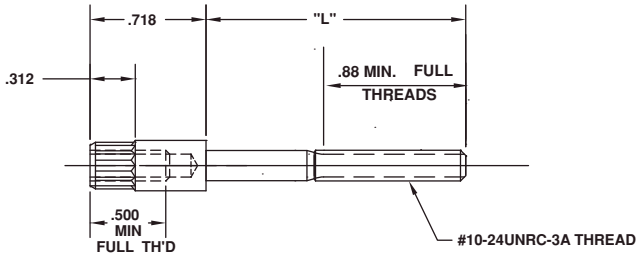
FASTENER QUANTITY

Inserta Products, Inc. **Blue Bell, Pa. 19422**	**LOCKSTACK™ D03 RETAINING SYSTEM**		

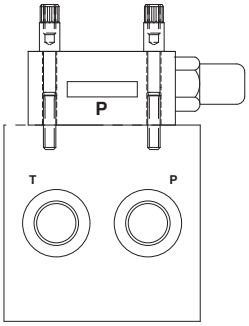




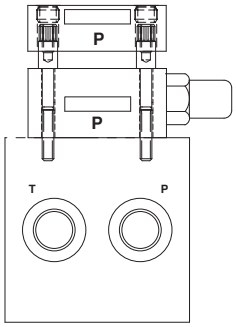




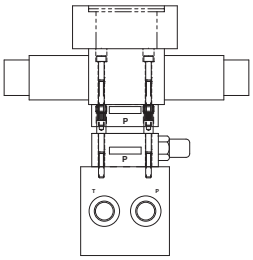
To Assemble:



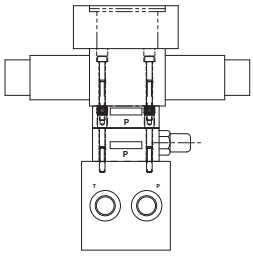
Step 1: Use **INSERTA® Lockstack™** Fasteners to secure sandwich component(s).



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.



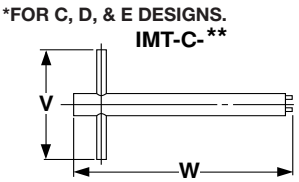
Step 4: Partially tighten the screws in a sequential pattern until the bottom of the Isolation Retainer is flush with the top of the superior sandwich component. Fully torque the screws.

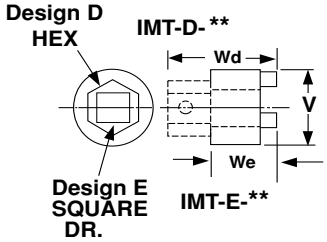
Inserta Products, Inc. **Blue Bell, Pa. 19422**	**LOCKSTACK™ D03 RETAINING SYSTEM**		

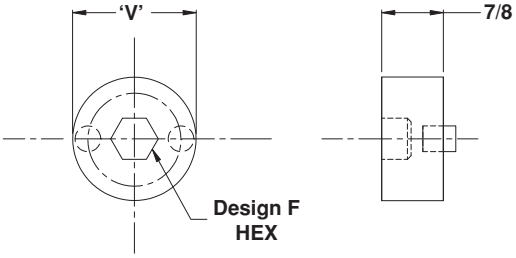
Inserta Products, Inc.

CHECK VALVE TOOL

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







ORDERING INFORMATION

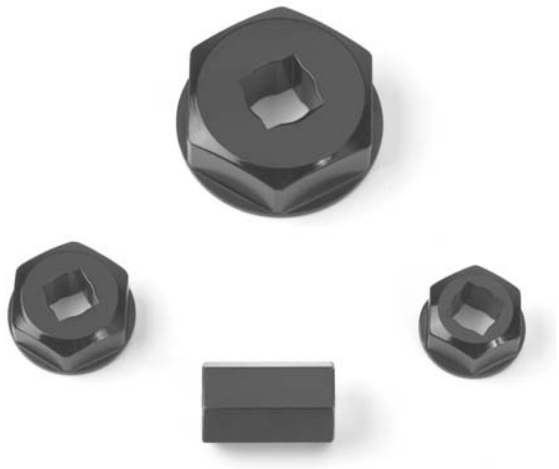
IMT - F - 02

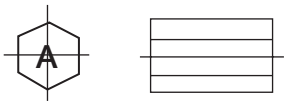
- IMT — INSERTA®
- F — CHECK VALVE TOOL
- F — DESIGN CODE
- 02 — SIZE #02, 03, 04, 06, 08, 10

ADACONN®

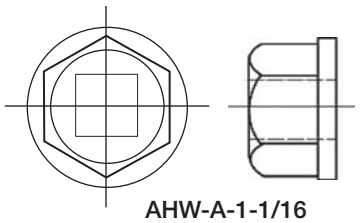
ADAFLANGE® ADAPTERS WRENCH/BIT TOOLS

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.
6126 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-2-3/16	3/4 Sqr.





AHB-A-7/8
BIT



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

TOOLS

ORDERING INFORMATION

AHB - A - 7/16

- AHB — ADACONN®
- A — DESIGN CODE
- 7/16 — DRIVE SIZE

ADAPTER TOOL
HB = BIT
HW = WRENCH (PATENTED)

ADACONN® INSERTA®

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	
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		
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

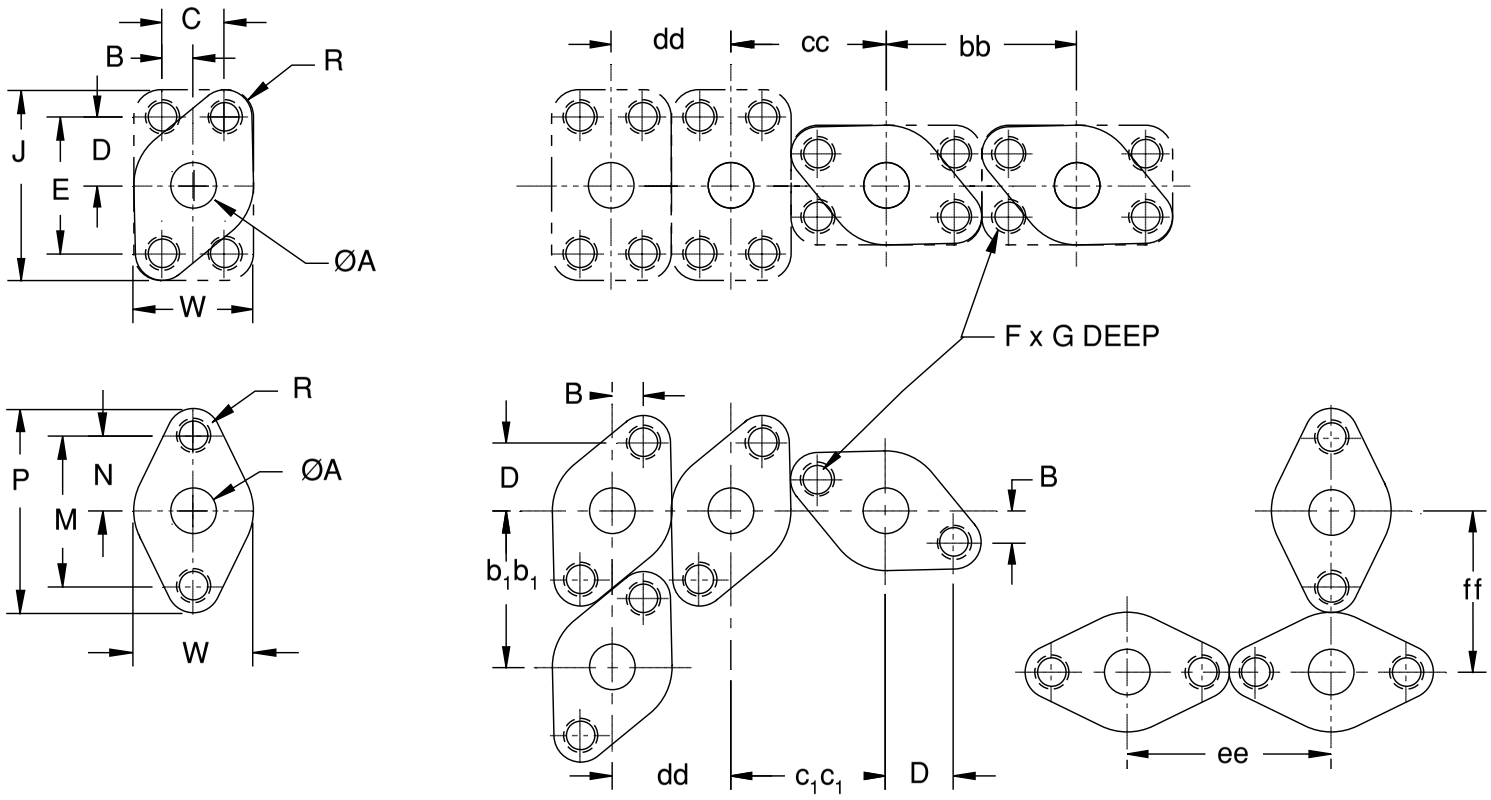
BOLTS PER BOLT KIT
4 = 4 BOLTS PER BOLT KIT
2 = 2 BOLTS PER BOLT KIT

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



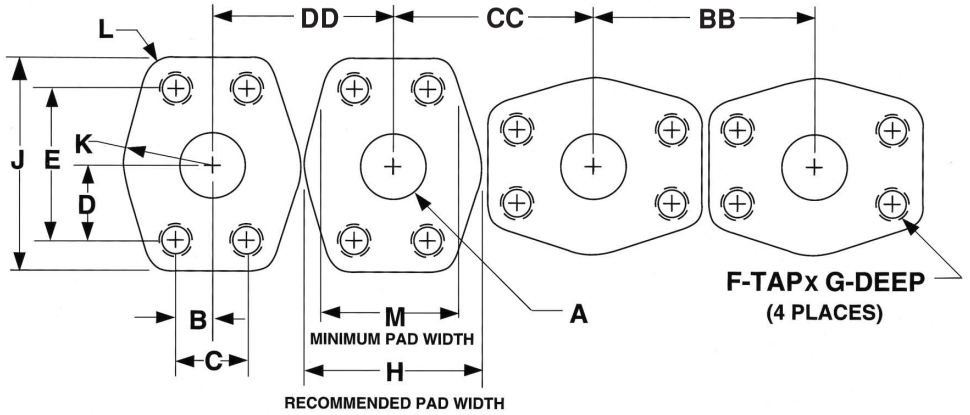
UNIFIED CODE U61 PORT DIMENSIONS

SIZE CODE	MAX 4-BOLT	PRESS 2-BOLT	A DIA. $^{+.00}_{-.06}$	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_1b_1 MIN	cc MIN	c_1c_1 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°.

INDEX

SAE 4 BOLT FLANGE PORT DIMENSIONS



CODE 61

SIZE CODE	MAX PRESS	A DIA. MAX	B ±.01	C ±.01	D ±.01	E ±.01	F UNC-2B	G MIN	H ±.01	J ±.03	K RAD	L RAD	M MIN	DD MIN	CC MIN	BB MIN
08	5000	.50	.344	.688	.750	1.500	5/16-18	.94	1.81	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

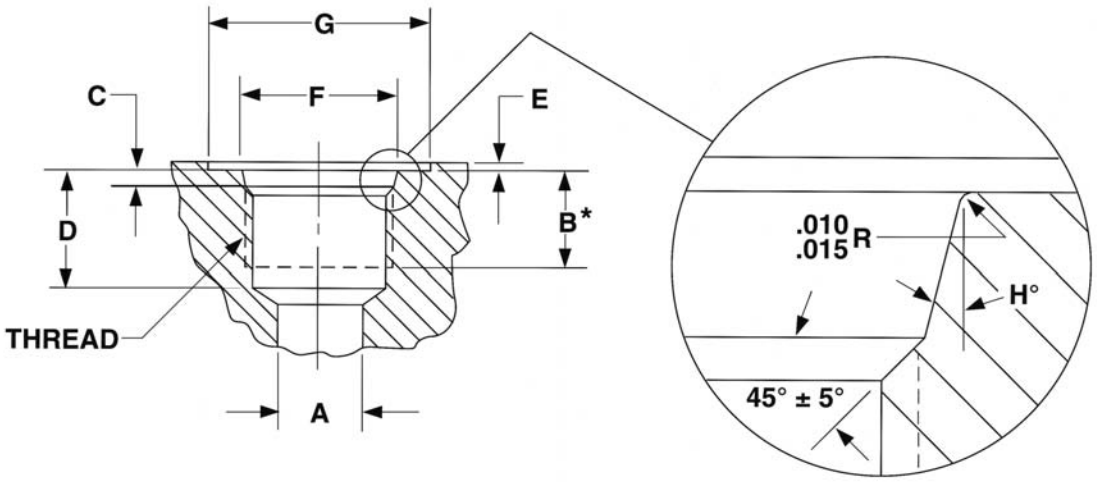
***INDUSTRY STANDARD, NOT AN SAE STANDARD**

INDEX

ADACONN® INSERTA®

SAE STRAIGHT THREAD PORT DIMENSIONS

SAE information is provided as an aid to designers. For complete specifications refer to SAE Standards J1926 for straight thread ports and J518 JUN93 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®

FLUID POWER FORMULAE

CYLINDERS

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

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

HYDRAULIC MOTORS

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

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

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

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

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

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

FLUID PIPING

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

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_o = ORIFICE COEFFICIENT (0.61 – 0.98; 0.65 for thin, sharp edge orifice)
A = ORIFICE AREA
ΔP = PRESSURE DROP
ρ = FLUID DENSITY

HORSE POWER

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

ADACONN® INSERTA®

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_2O	PSI	0.03613	PSI	In H_20	0.03613

ADACONN® INSERTA®

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.

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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®
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www.adaconn.com
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INSERTA PRODUCTS, INC.
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email: sales@inserta.com

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

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

O-rings in this catalog conform to SAE J120 and SAE J545 standards.

DIMENSION NOTES: All Dimensions in catalog are in inches, unless noted otherwise.
All Dimensions shown without tolerances are nominal.

ADACONN®
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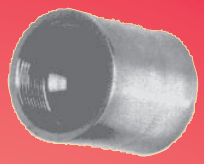
ISP & IBP
SPECIALITY FLANGE PLATES

IBF
BALL VALVE
2 PORT

IBF3D
BALL VALVE
3 PORT DIVERTER

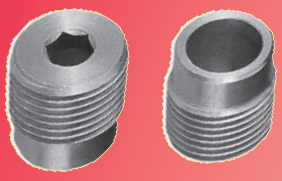


APC
PORT CONNECTOR

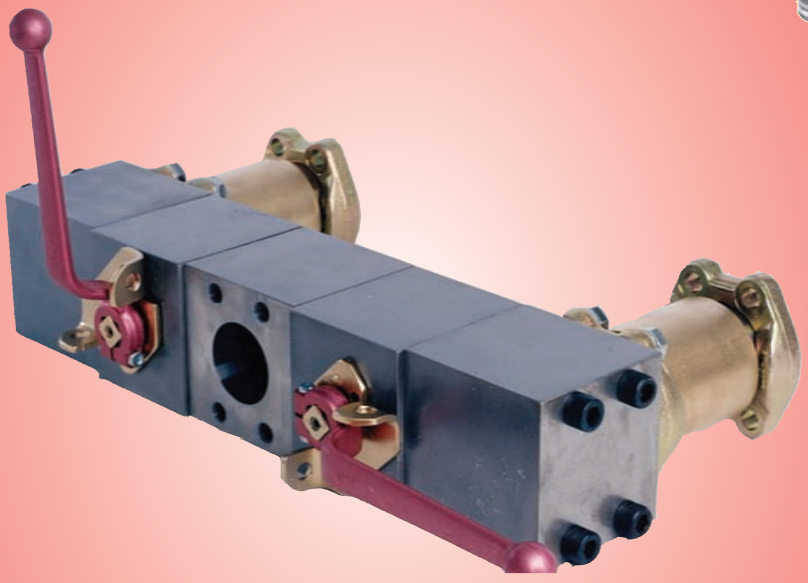
ILR
LOCKSTACK DØ3
RETAINING SYSTEM

ICD
DØ3 CHECK VALVE
MODULE

ICX MODULAR
CONNECTOR



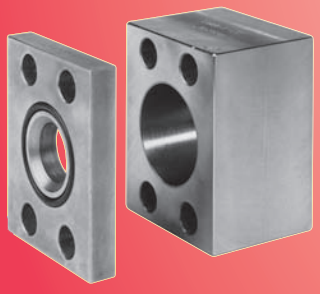
ICC CHECK CARRIER



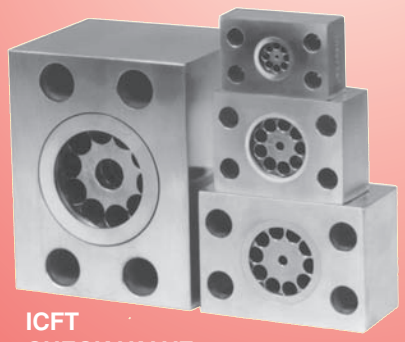
ICF
CHECK VALVE
BODY

IFRA
ROTATIONAL
RETAINING
ADAPTER

IFRC ROTATIONAL
CONNECTORS



ICFS
CHECK VALVE BODY
WITH SUPPORT MEMBER



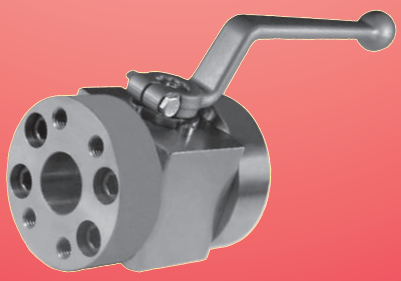
ICFT
CHECK VALVE
4-BOLT

AFO
ADAFLANGE™
ADAPTER

AFO
ADAFLANGE™ ADAPTER
UNIFIED 2-BOLT

ICS CHECK VALVE
SLIP-IN

ICT CHECK VALVE
THREAD-IN



IBFP BALL VALVE
FLANGE PORTED

AFO
ADAFLANGE™ ADAPTER
UNIFIED 4-BOLT