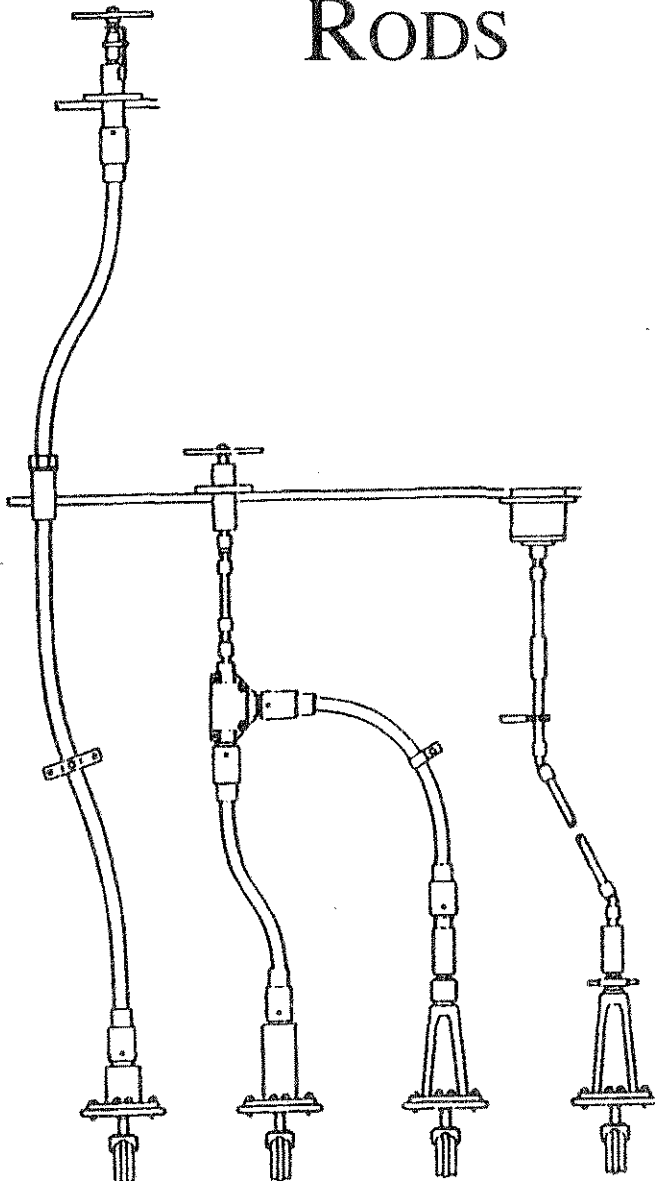


SOUTHLAND

REACH

RODS



REACH RODS

Hard To Reach Valves - Remote Valve operators "Reach Rods" are available for the remote control of valves away from the valve site. This Rigid and Flexible Reach Rods are designed to operate valves from 3/4" to 16" in diameter.

Safety - Reach Rods are safe. After installation there will be no need to send personnel into dangerous, unsafe areas. Valves located into hazardous or inaccessible areas can be controlled manually from a convenient, safe distance. In an emergency, Reach Rods allow valves to be closed or opened quickly and conveniently, again with no danger to the operator.

Economy - Flexible Reach Rods are extremely cost efficient. They are inexpensive to purchase and can be installed for a fraction of the cost of their rigid counterparts because they require no sophisticated, specialized installation equipment. Adaptors are available for attachment to any size valve. Maintenance is minimal and inexpensive.

Flexibility And Ease Of Installation

Flexible Reach Rods can be routed through limited space, inaccessible or unsafe areas. They are ideal for extremely complicated transmission routing paths. Multiple bends are easily handled. Flexible Reach Rods are quickly and simple to install and can be installed with standard hand tools. It's recommended that all the Flexible Reach Rods be supported by a simple pipe bracket every four running feet and before and after each bend.

Less Maintenance

A periodic inspection is all that is necessary. A quick visual check of the casing, ferrules or adaptors along with an occasional turning the valve handle to insure the valve works freely is all that is needed.

Reliable Operation

Fewer working parts mean increased reliability. Flexible Reach Rods have no geared joints, swivels, universal joints, gearboxes, and hinged joints to wear, stick, rust or bind. And they are far less prone to damage from shock, vibration or physical abuse because the Flexible Reach Rod absorbs shock.

TECHNICAL INFORMATION

U.S. and Canadian Coast Guard, American Bureau of Shipping, and Lloyds Register accept the Flexible Reach Rod concept for marine use.

PERFORMANCE:

Flexible Reach Rod systems performance depends on four basic considerations:

- 1) Size and type of valve
- 2) Product which flows thru valve
- 3) The length of the run
- 4) The amount of effort that one person is able to exert on a hand wheel

PRELIMINARY CONSIDERATION:

Torque loads required to operate valves vary widely between different manufacturers. To specify a given operating torque for all valves of one size and type would not indicate with sufficient accuracy the actual torque to be considered when designing a flexible reach rod control system for a particular valve.

However, it is possible by assuming that a valve hand wheel is large enough for one man to operate, to base the design of a remote system on the size of the valve hand wheel and the "normal" effort which the average person is able to exert on a hand wheel rim. This information will follow in table #1 and is self-explanatory. One Man can apply a "normal" effort to the hand wheel of a valve provided the hand wheel is located lower than the persons head so that they can apply both hands, without difficulty, to the hand wheel rim. Under these conditions it has been found that his effort will vary from 35 lbs. Of pull per hand on a 4" hand wheel to 66 lbs. Of pull per hand on a 24" hand wheel.

It is an approved practice to support the flexible reach rod using various types of brackets every 36 to 48 inches. It is realized that this is not practical in every instance but it should be the installer's objective at all times. However, it is important that the flexible reach rod be supported at both ends of each bend.

Formulas are available to allow the engineer to designate a particular flexible reach rod based on valve size, types, its working pressure and the distance from the operator to the valve: This information is available on request. However, the technical information furnished in this bulletin should be sufficient for normal decision making regarding which reach rod is necessary for a particular application.

TORSIONAL DEFLECTION:

Remember that the torsional deflection or the angular difference in twist is between input and output ends of a flexible reach rod system are directly proportional to its overall length. It is recommended that the total deflection caused by using a maximum input load be maintained at no greater than an accumulative 180° (degrees). (See Table #2). by using this as a guide, it will assist the engineer to correctly recommend the flexible reach rod to be used for a particular valve.

MINIMUM OPERATING RADIUS:

Always keep in mind that the bends in a flexible reach rod should be as generous as possible and should not be fetched up tighter than those indicate below:

<u>Description</u>	<u>Size</u>	<u>Minimum Operating Radius</u>
Flexible Reach Rod - Small Valve	Type 1	8"
Flexible Reach Rod - Medium Valve	Type 2	12"
Flexible Reach Rod - Large Valve	Type 3	18"

LUBRICATION:

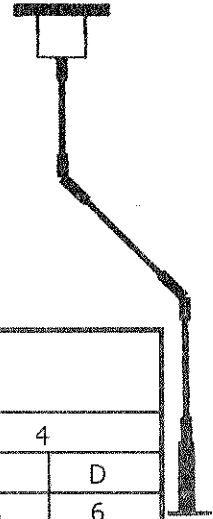
The flexible reach rod as assembled is lubricated, and under normal circumstances, should not require re-lubrication for up to three years. However, there are grease-fitting plugs in the lower and upper ferrules that can be removed and replaced with a zerk fitting. In cases of extreme temperature conditions, special lubricants are recommended that would insure efficient operation.

Lubrication of the flexible reach rod is accomplished by first removing both grease fitting plugs and installing a zerk fitting at the upper station. Manually pump the lubricant into the reach rod until grease flows from bottom plug hole. Reinsert grease plug at both ends and test the system. It is advisable to rotate the core at the same time that pressure is applied. This will insure uniform distribution of the lubricant throughout the entire system.

Selection Of Rigid Rod Components for Valve Remote Operators

Rigid Rod components can be assembled into a valve remote control design for manual or power drive operation where use is intermittent or slow speed, and it may be operated in either direction of rotation.

The following Rigid Rod Guide Selection Chart will be useful guides in the Design of a valve remote operator. The selection chart has been organized around four design factors, involving varying numbers of components, and tabulates the normal (one man operation) output torques obtainable with various handwheel and rigid rod diameters.



SUGGESTED RIGID ROD GUIDE SELECTION CHART

Valve Handwheel (in.)	Valve Operating Torque (in.)	DESIGN FACTORS							
		1		2		3		4	
		d	D	d	D	d	D	d	D
3	10	5/8	4	5/8	4	5/8	5	5/8	6
4	13	5/8	4	5/8	5	5/8	6	5/8	7
5	17	5/8	6	5/8	6	5/8	7	5/8	9
6	20	5/8	6	5/8	7	5/8	9	3/4	11
7	26	5/8	8	5/8	9	3/4	11	3/4	12
8	30	5/8	9	3/4	10	3/4	11	3/4	12
9	34	3/4	10	3/4	11	3/4	12	3/4	14
10	40	3/4	11	3/4	12	3/4	14	3/4	14
11	46	3/4	12	3/4	12	3/4	14	3/4	16
12	50	3/4	14	3/4	14	3/4	16	1	18
14	70	1	16	1	18	1	21	1	21
16	80	1	18	1	18	1	21	1	24
18	90	1	21	1	21	1	24	1	24
21	122	1	24	1	24	1	27	1 1/4	27
24	140	1 1/4	24	1 1/4	27	1 1/4	27	1 1/4	30
27	158	1 1/4	27	1 1/4	30	1 1/4	30	1 1/4	36
30	175	1 1/4	30	1 1/4	30	1 1/4	36	1 1/4	36
36	210	1 1/4	36						

Note: d = Rod Diameter
D = Remote Handwheel Diameter (in.)

Design Factors (Typical systems, consisting of the following components)
 1) Remote Operating Station (1) : Universal Joints (2)
 2) Remote Operating Station (1) : Gear Box (1); Universal Joints (4)
 3) Remote Operating Station (1) ; Geat Box (2); Universal Joints (6)
 4) Remote Operating Station (1) ; Intermediate Connection (1); Gear Boxes (3); Universal Joints (10)

MOUNTING SUPPORT:

The Flexible reach rod must be supported every 3-4 feet. This is necessary to prevent curling and kinking when a high torque is applied and to insure that the ferrules do not support all the weight of the reach rod.

MAINTENANCE:

Flexible Reach Rods are often used in instances where they are only operated after long intervals of time. It is recommended that the flexible reach rod system be operated at least once a month.

In many instances where valves have not been operated for long periods of time, foreign material may collect on the valve disc and it will require high than normal torque to operate the valve. Application of force greater than one man's effort at the remote station can cause failure in the flexible shaft system or valve thus requiring repair or replacement of one or both.

It is recommended that periodic inspection covering the entire length of the flexible reach rod should be performed. This includes a visual inspection for damage to casing, ferrules or the adapter, once again, common sense is the criteria for this product.

TABLE # 1

FLEXIBLE REACH ROD APPLICATION CHART								
Valve Diameter vs. Reach Rod Size								
Types 1, 2, 3 Reach Rods								
Valve Diameter (Inches)	Valve Hand-Wheel Diameter (Inches)	Valve Operating Torque*(ft.-lbs.)	5'	10'	15'	20'	25'	30'
1/2	3	10	1	1	1	2	2	2
1	4	13	1	1	1	2	2	2
1-1/2	5	17	1	1	2	2	2	2
2	6	20	2	2	2	2	2	2
2-1/2	7	26	2	2	2	2	2	2
3	8	30	2	2	2	2	2	2
4	9	34	2	2	2	3	3	3
5	11	46	2	3	3	3	3	3
6	12	52	3	3	3	3	3	3
7	14	70	3	3	3	3	3	3
8	16	80	3	3	3	3	3	3
10	18	90	3	3	3	3	3	3
13	21	122	3	3	3	3		
15	24	140	3	3	3			
16	27	158	3	3				

* Valve operating torques per Mil-S-16059 B (Ships) and Navsea 9048-LP-022-7010 (formerly Navships250)

WARNING:

Failure to follow guidelines could cause serious damage to the Flexible Reach Rod

TABLE # 2

PHYSICAL CHARACTERISTICS OF SOUTHLAND FLEXIBLE REACH RODS			
	Type 1	Type 2	Type 3
Maximum Operating Load	20 ft.-lbs	75 ft.-lbs	250 ft.-lbs
Maximum Non-Damaging Load	25 ft.-lbs	100 ft.-lbs	375 ft.-lbs
Minimum Damaging Load	30 ft.-lbs	120 ft.-lbs	420 ft.-lbs
Torsional Deflection (Max)	1.2° / ft / ft.-lbs	0.12° / ft / ft.-lbs	0.04° / ft / ft.-lbs
Input Max. Operating Load	20 ft.-lbs	40 ft.-lbs	80 ft.-lbs
180° Deflection	8 ft	38 ft	56 ft
Efficiency Output = 80% Min. Input	Input 20 ft.-lbs 80% Efficiency 20 ft Output 16 ft.-lbs	Input 40 ft.-lbs 80% Efficiency 20 ft Output 32 ft.-lbs	Input 80 ft.-lbs 80% Efficiency 20 ft Output 64 ft.-lbs
Minimum Operating Radius	10"	12"	18"

NOTE: All torque loads shown are measured at input.

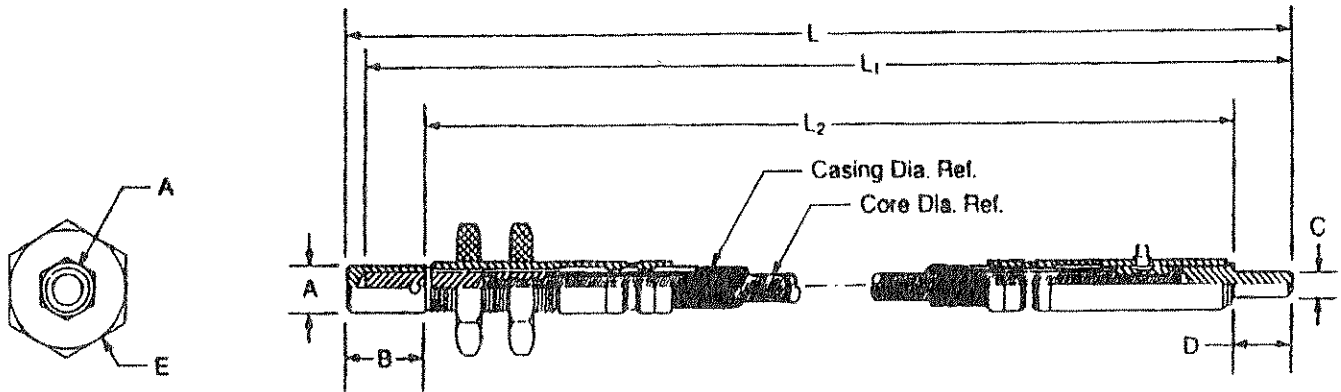
Flexible Reach Rods

Flexible Reach Rods Offer a low-cost, simple solution to valve control. In applications such as the offshore workboat industry where indication and certified materials may not be required, these flexible reach rods offer the ideal solution.

A hex adapter can be used to provide operation; the operator end of the assembly may be connected by a simple lock nut arrangement. The output end of the assembly can be male or female adapter, which can mate with the valve coupling shown in or manual. The reach rod assembly is available in three different sizes.

To choose the assembly for your application, reference the design section of our manual, or contact SRR sales staff for a complete recommendation or field survey. In Situations where replacement of existing Flexible Reach Rods are required, SRR economy Flexible Reach Rods are interchangeable with most other manufacturers' products presently on the market.

Typical Flexible
Reach Rod Assembly



	Core Dia.	Casing Dia.	A Hex	B Hex Length	C Flex Shaft End Fitting	D	E Nut Size
Type 1	3/8"	21/32"	5/8"	1-1/4"	7/16"	1"	1-1/2"
Type 2	5/8"	1"	1"	1-1/2"	23/32"	1"	2"
Type 3	1"	1-9/16"	1-1/4"	1-3/4"	1"	1-1/8"	3"

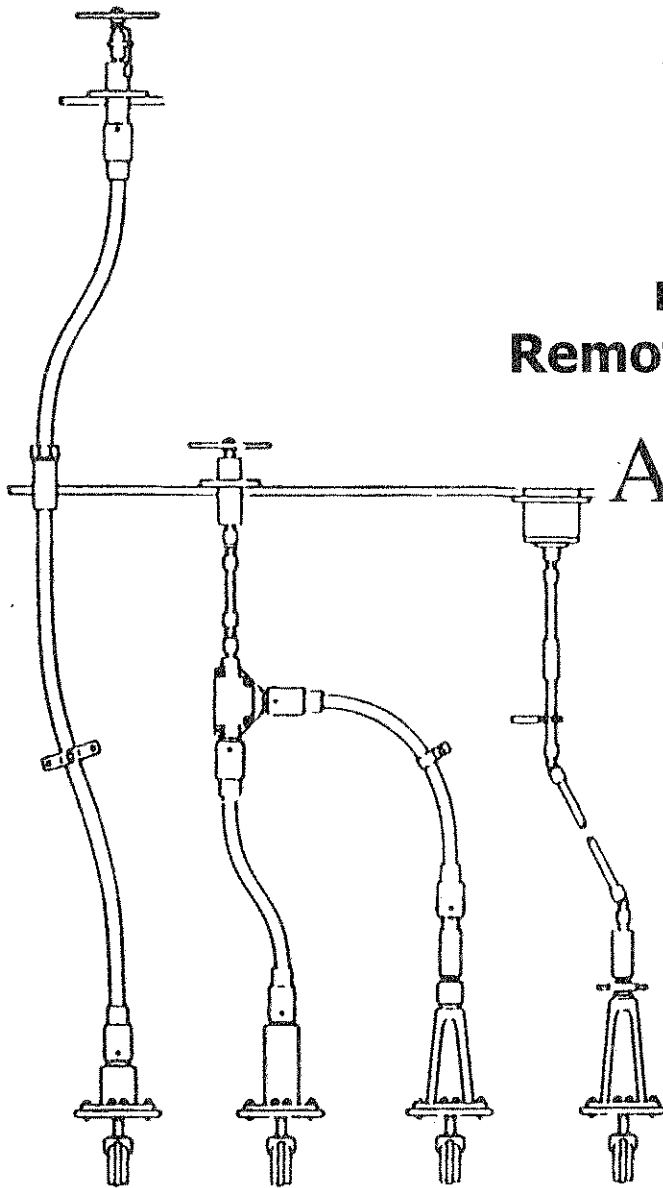
SOUTHLAND

REACH

RODS

Flexible And Rigid
Remote Valve Operators

Accessories



FLEXIBLE SHAFT AND RIGID ROD CONTROLS

Deck Boxes

The deck box is designed for precise remote control during partial or full operation of a remote valve. Its indicator reveals at a glance the exact operating position of the valve. It is recommended for a remote station installation that might need: 1) protection from weather exposure; 2) an installation flush to the deck; 3) a degree of protection against tampering. It can be directly assembled to a flexible shaft or rigid rod system.

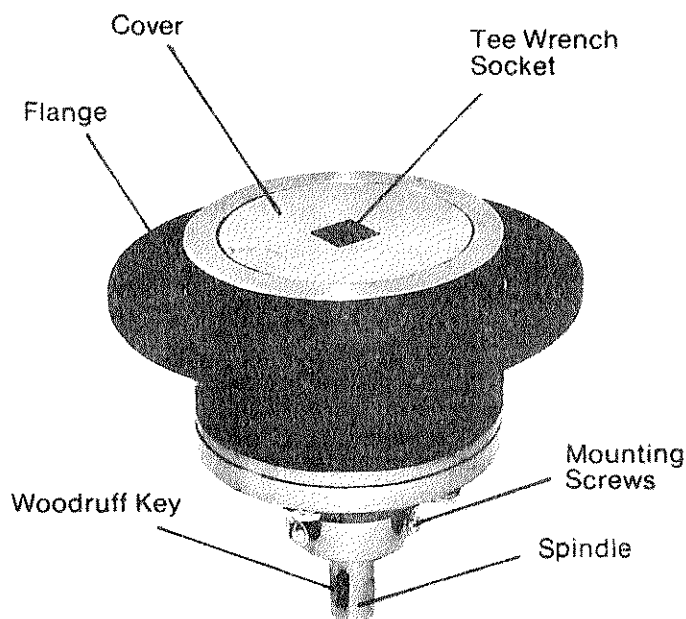
A separate tee wrench is available to remove the deck box cover and to turn the spindle to open or close a valve.

Greater protection against tampering is provided with those deck box models equipped with an internal locking strap that prevents access to the spindle.

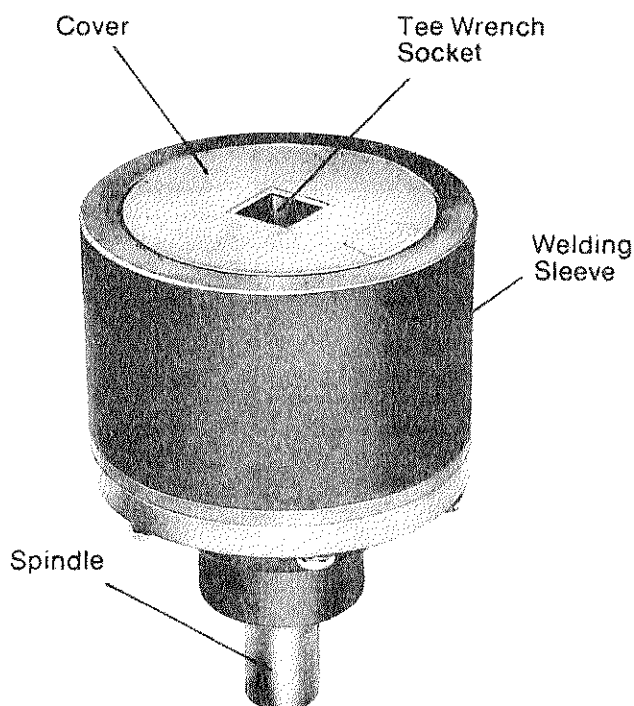
The indicator mechanism shows the exact number of turns (40 turns max.). A 360° indicator model is available for valves requiring one turn or less (butterfly, ball or plug valves).

The deck box can be installed welded flush (steel welding sleeve) or bolted to deck. On bolting flange models, the flange is supplied loose for field welding, allowing compensation for deck thickness.

A non magnetic model is available with an integral bronze bolting flange.



Typical Deck Box
with Bolting Flange



Typical Deck Box
with Welding Sleeve

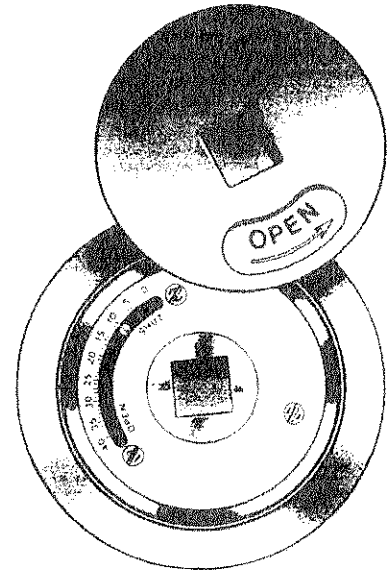
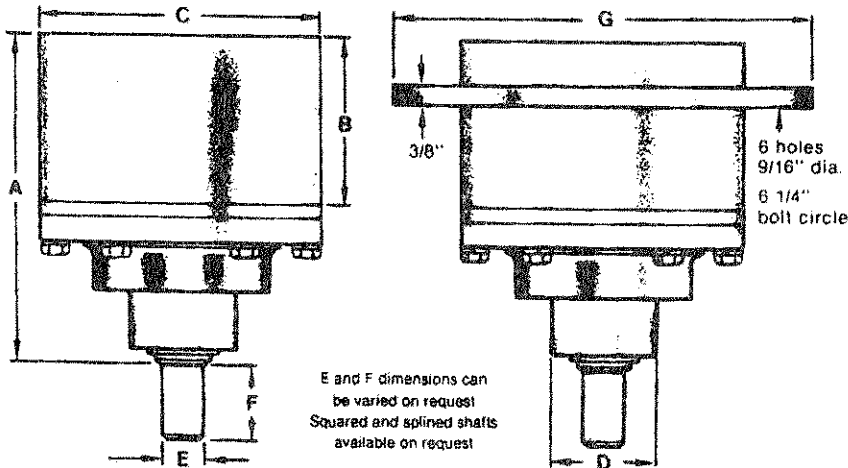
FLEXIBLE SHAFT AND RIGID ROD CONTROLS

Deck Box Operators With Indication

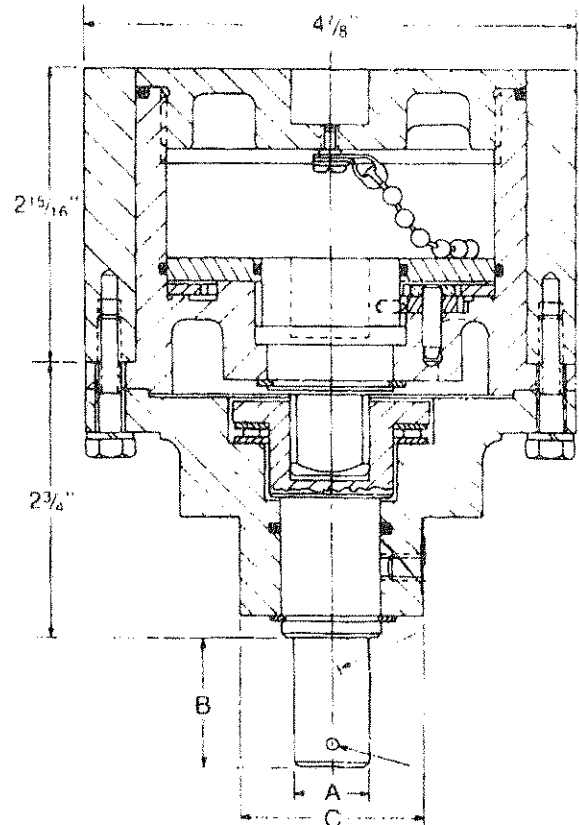
Deck Box is a weather tight operator that has been designed to provide smooth operation of valves through floors, walls, bulkheads and decks. The unique indicator mechanism is constructed of rugged components and is thoroughly protected from the environment even with the cover removed. This provides positive indication of up to 40 turn valves under the worst conditions. For larger valves requiring more turns of indication, a 100 turn unit is available.*

For ball and plug valves, there is a 90° indicator unit.** The cover is removed and the deck box is operated by use of a tee wrench (optional). It can be made tamper proof with the addition of a locking device.

Both welding sleeve and bolting flange models are available for either welding or bolting in place. On the bolting flange model, the flange is supplied unattached so it can be field adjusted to accommodate various installation conditions.

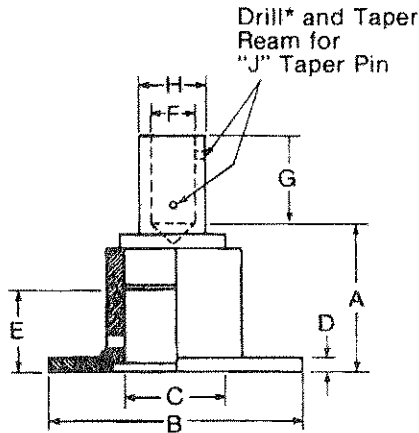


Rod Dia.	Part Number		
	With Turn Indicator †	With Turn Indicator † and Locking Strap	With 360° Indicator
1/2	14757-605	Just add Locking Strap Assembly 25098-501 as separate item	18389-605
5/8	14757-610		18389-610
3/4	14757-612		18389-612
1	14757-616		18389-616
1 1/4	14757-620		18389-620



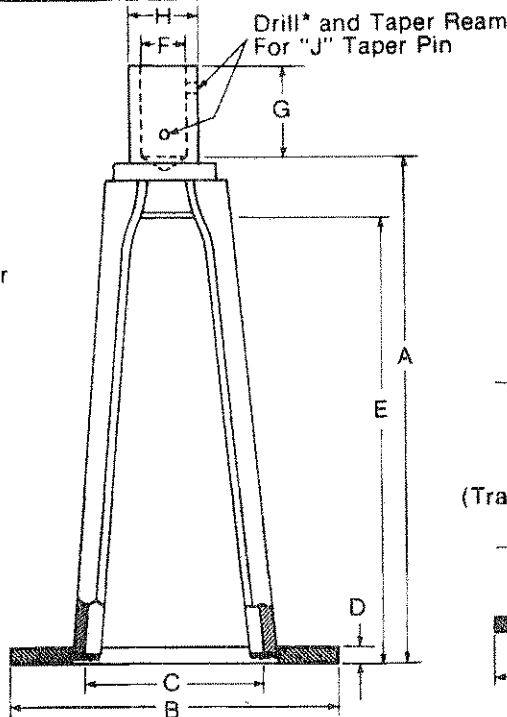
FLEXIBLE SHAFT AND RIGID ROD CONTROLS
Valve Couplings — Female

*Holes to be drilled and pinned to mating part by customer



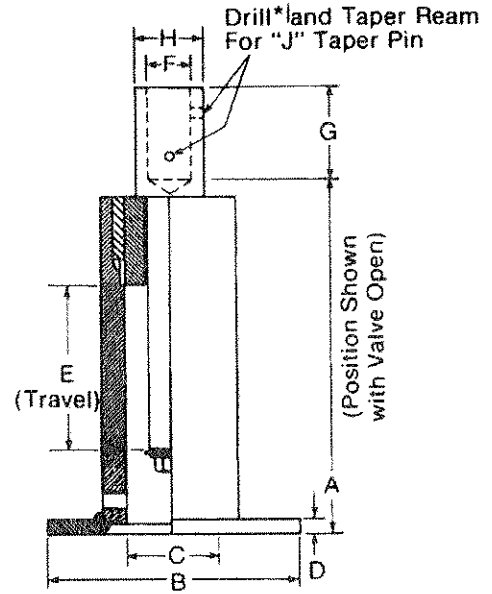
Type VF1

For non-rising handwheel valves



Type VF2

For rising stem valve.



Type VF3

For rising handwheel valve.

TYPE VF1

To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	H	J (Taper Pin)	Reference Model Number
3"-5"	5/8	2 3/8	3 1/4	1 1/4	3/16	1 3/8	5/8	1 1/16	.94	00x1 5/16	9859-VF1-10
6"-9"	3/4	2 1/2	4 1/4	1 5/8	3/16	1 3/8	3/4	1 1/8	1.12	0x1 1/8	9859-VF1-12
10"-12"	1	2 1/2	6 1/2	2	1/4	1 3/8	1	1 1/2	1.50	4x1 1/2	9859-VF1-16
14"-27"	1 1/4	2 15/16	8	2 3/8	5/16	1 9/16	1 1/4	1 7/8	2.00	5x2	9859-VF1-20

TYPE VF2

To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	H	J (Taper Pin)	Reference Model Number
3"-5"	5/8	6	4 3/4	2 3/8	1/4	5	5/8	1 5/16	.94	00x1 5/16	9860-VF2-10
6"-9"	3/4	8 1/2	5 1/2	3	1/4	7 3/8	3/4	1 1/8	1.12	0x1 1/8	9860-VF2-12
10"-12"	1	12 1/2	7	3 7/8	1/4	11 3/8	1	1 1/2	1.50	4x1 1/2	9860-VF2-16
14"-27"	1 1/4	18 5/8	8 3/4	4 7/8	5/16	17 1/4	1 1/4	1 7/8	2.00	5x2	9860-VF2-20

TYPE VF3

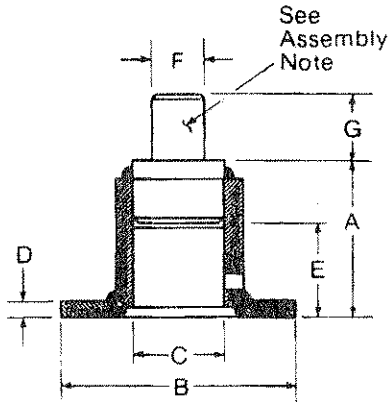
To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	H	J (Taper Pin)	Reference Model Number
3"-5"	5/8	4 3/16	3 1/4	1 1/4	3/16	1 1/2	5/8	1 5/16	.94	00x1 5/16	9861-VF3-10
6"-9"	3/4	5 13/16	4 1/4	1 5/8	3/16	2 3/4	3/4	1 1/8	1.12	0x1 1/8	9861-VF3-12
10"-12"	1	7 1 1/16	6 1/2	2	1/4	4 1/4	1	1 1/2	1.50	4x1 1/2	9861-VF3-16
14"-27"	1 1/4	10 9/16	8	2 3/8	5/16	6	1 1/4	1 7/8	2.00	5x2	9861-VF3-20

Bill of Materials

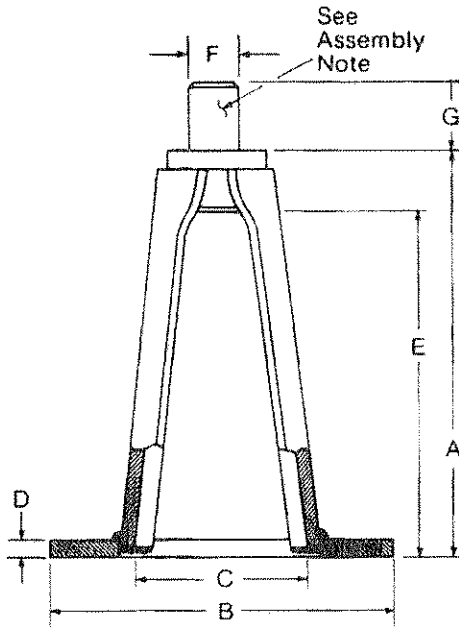
Description	Material	VF1	VF2	VF3
Handwheel Adap. (flange and risers)	Steel Mn. Br.	•	•	•
Taper Pins (Qty-2)	Steel	•	•	•
Female Adapter	Steel	•	•	•
Square Adapter	Steel			•
Flanged Sleeve	Steel			•
Cap Scr.	Steel			•
Washer	Steel			•
Lock Washer	Steel			•

FLEXIBLE SHAFT AND RIGID ROD CONTROLS
Valve Couplings — Male

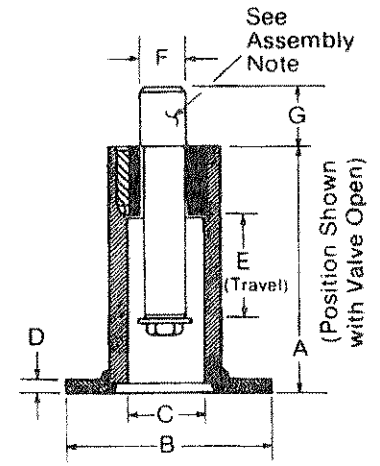
Assembly Note: Mating parts to be pinned or welded by customer.



Type VM1
 For non-rising handwheel valve.



Type VM2
 For rising stem valve.



Type VM3
 For rising handwheel valve.

TYPE VM1

To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	Number
3"-5"	5/8	2 1/4	3 1/4	1 1/4	3/16	1 1/8	5/8	1 5/16	9787-VM1-10
6"-9"	3/4	2 1/4	4 1/4	1 5/8	3/16	1 3/8	3/4	1 1/8	9787-VM1-12
10"-12"	1	2 1/4	6 1/2	2	1/4	1 3/8	1	1 1/2	9787-VM1-16
14"-27"	1 1/4	2 9/16	8	2 3/8	5/16	1 9/16	1 1/4	1 7/8	9787-VM1-20

Bill of Materials

Description	Material	VM1	VM2	VM3
Handwheel Adap. (flange & risers)	Steel, Mn. Br.	•	•	•
Male Adapter	Steel	•	•	
Square Adapter	Steel			•
Cap. Scr.	Steel			•
Washer	Steel			•
Lock Washer	Steel			•

TYPE VM2

To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	Reference Model Number
3"-5"	5/8	5 7/8	4 3/4	2 3/8	1/4	5	5/8	1 5/16	9785-VM2-10
6"-9"	3/4	8 1/4	5 1/2	3	1/4	7 3/8	3/4	1 1/8	9785-VM2-12
10"-12"	1	12 1/4	7	3 7/8	1/4	11 3/8	1	1 1/2	9785-VM2-16
14"-27"	1 1/4	18 1/4	8 3/4	4 7/8	5/16	17 1/4	1 1/4	1 7/8	9785-VM2-20

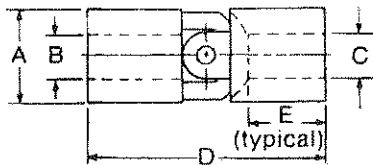
TYPE VM3

To Fit Valve Handwheel Size	Rod Dia.	A	B	C	D	E	F	G	Reference Model Number
3"-5"	5/8	4	3 1/4	1 1/4	3/16	1 1/2	5/8	1 5/16	9786-VM3-10
6"-9"	3/4	5 1/2	4 1/4	1 5/8	3/16	2 3/4	3/4	1 1/8	9786-VM3-12
10"-12"	1	7 3/8	6 1/2	2	1/4	4 1/4	1	1 1/2	9786-VM3-16
14"-27"	1 1/4	9 7/8	8	2 3/8	5/16	6	1 1/4	1 7/8	9786-VM3-20

FLEXIBLE SHAFT AND RIGID ROD CONTROLS

Universal, Joints and Splined Slip Joints

Universal Joints are supplied per MIL-U-20625. They will transmit at least 98% of applied torque at 180° and at least 80% of applied torque at 150°. For angles less than 150° Swivel Geared Joints should be used.

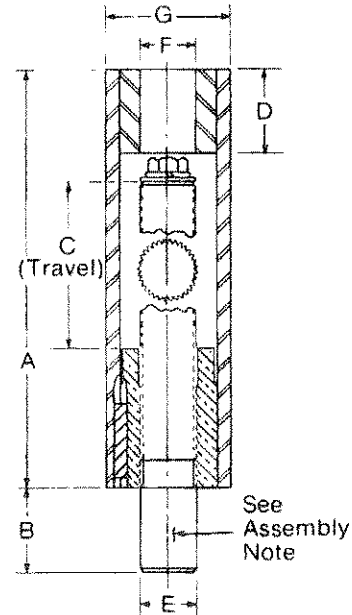
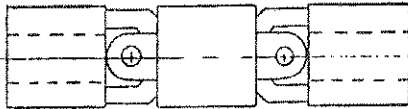


Universal Joint

Universal Joints should always be used in pairs.

When space considerations do not warrant the use of two U-Joints a Double Universal Joint as shown below may be used.

PN 25901



Type SJM

Splined Slip Joint Assembly

UNIVERSAL JOINTS (Part numbers in bold face are standard.)

A (O.D.)	B* (bore)	C* (bore)	D	E (Min.)	Part Number		
					Steel	Bronze	Stainless Steel
1	1/2	1/2	3/8	1 1/16	50053-101	50054-101	50174-101
1 1/8	5/8	5/8	3	7/8	50053-523	50054-119	
1 1/4	3/4	3/4	3 3/4	1 1/8	50053-528		
1 1/4	1/2	1/2	3 3/4	1 1/8	50053-517		
1 1/4	5/8	5/8	3 3/4	1 1/8	50053-504	50054-503	50174-502
1 1/4	3/4	3/4	3 3/4	1 1/8	50053-121	50054-121	50174-121
1 1/4	3/4	5/8	3 3/4	1 1/8	50053-125		
1 1/4	3/4	1/2	3 3/4	1 1/8	50053-501		
1 1/4	5/8	1/2	3 3/4	1 1/8	50053-543	50054-504	
1 1/2	7/8	7/8	4 1/4	1 3/8	50053-503	50054-125	50174-125
1 3/4	3/4	3/4	5	1 1/2	50053-508	50054-509	
1 3/4	7/8	7/8	5	1 1/2	50053-532		
1 3/4	1	1	5	1 1/2	50053-129	50054-129	50174-129
1 3/4	1 1/16	1 1/16	5	1 1/2	50053-512		
1 3/4	1 1/4	1 1/4	5	1 1/2	50053-522		
1 3/4	1	3/4	5	1 1/2	50053-508	50054-501	
2	1 1/4	1 1/4	5 7/16	1 9/32	50053-201	50054-201	50174-201
2 1/2	1 1/4	1 1/4	7	2 1/8	50053-510	50054-512	
2 1/2	1 1/2	1 1/2	7	2 3/8	50053-225	50054-225	50174-225
3	1 3/4	1 3/4	9			50054-301	50174-301
4 3/16	2 1/4	2 1/4	11 1/2	3 5/8	50053-514		
4 3/16	2 1/2	2 1/2	11 1/2	3 5/8	50053-420		

*Other bores on special order.

TYPE SJM

Part Number	A	B	C	D	E	F*	G	Reference Model Number
10808-522	4.00	.94	1.06	.94	5/8	5/8	2.12	10808-SJM-10
10808-523	5.62	1.12	2.12	1.50	3/4	3/4	2.12	10808-SJM-12
10808-526	7.88	1.50	4.25	1.50	1	1	2.12	10808-SJM-16
10808-525	10.25	1.88	5.62	1.88	1 1/4	1 1/4	2.50	10808-SJM-20

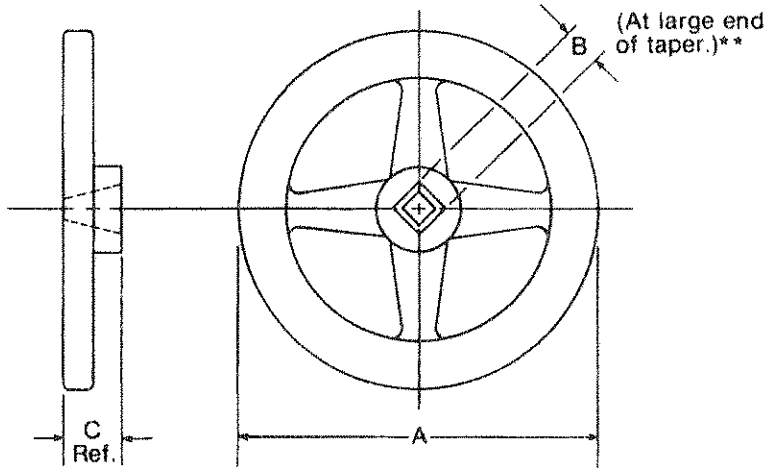
For shock test per MIL-S-901C information consult with Southland.

**Type SJM Slip Joint Assembly
Bill of Materials**

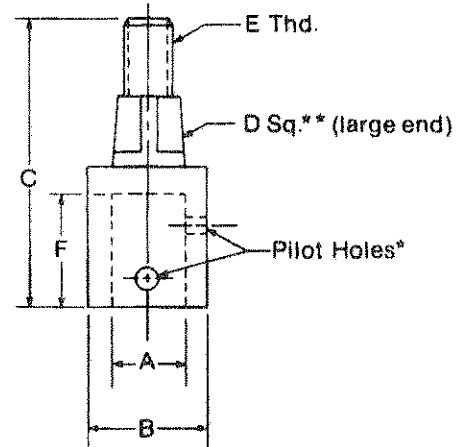
Description	Material
Sleeve	Steel
Bushing	Steel
Cap Screw	Steel
L. Washer	Steel
Washer	Steel
Splined Adapter	Steel
Splined Bushing	MN Bronze

FLEXIBLE SHAFT AND RIGID ROD CONTROLS

Handwheels and Handwheel Adapters



Handwheel



Handwheel Adapter

*To be drilled through for taper pin at assembly by customer.

(Part Nos. in bold face are Standard.)

HANDWHEELS

A (Dia.)	B (Sq.)	C (Ref.)	Part Number		A (Dia.)	B (Sq.)	C (Ref.)	Part Number	
			Aluminum	Bronze				Aluminum	Bronze
3†	5/16	7/16	11359-50	8867-36	10†	3/4	1	11359-6	8867-5
4†	5/16	1/2	11359-26	8867-18	10	1 1/16	1	11359-18	8867-41
4	3/8	1/2	11359-48	8867-39	12†	3/4	1 1/8	11359-7	8867-6
5	5/16	5/8	11359-57		12†	1	1 1/8	11359-20	
5†	3/8	5/8	11359-1	8867-11	12	1 1/16	1 1/8	11359-21	
5	1/2	5/8	11359-61		12	1 3/8	1 1/8	11359-32	8867-24
6	3/8	1 1/16	11359-59		14	3/4	1 5/16	11359-22	8867-42
6†	7/16	1 1/16	11359-28	8867-25	14†	1 1/16	1 5/16	11359-8	8867-7
6	1/2	1 1/16	11359-16		14	1 3/8	1 5/16	11359-23	
6	9/16	1 1/16	11359-2	8867-1	16†	1 3/16	1 7/16	11359-9	8867-8
6	3/4	1 1/16	11359-75		16†	1 3/8	1 7/16	11359-37	8867-17
7	7/16	3/4	11359-60		18†	1 3/16	1 5/8	11359-10	8867-9
7†	1/2	3/4	11359-63		18†	1 3/8	1 5/8	11359-24	
7†	9/16	3/4	11359-3	8867-2	21†	1 3/16	1 7/8	11359-11	8867-10
7	5/8	3/4	11359-70		21†	1 3/8	1 7/8	11359-14	8867-12
8	7/16	7/8	11359-84		24†	1 3/8	2 1/16	11359-12	8867-13
8†	9/16	7/8	11359-4	8867-3	27†	1 3/8	2 1/4	11359-13	8867-14
8	5/8	7/8	11359-71		27	3/4	1 1/4	11359-101	
8	3/4	7/8	11359-41	8867-40					
9†	5/8	1 5/16	11359-45						
9†	3/4	1 5/16	11359-5 †	8867-4					
9	1 1/16	1 5/16	11359-88						

†Bureau of Ships Standards.

HANDWHEEL ADAPTERS

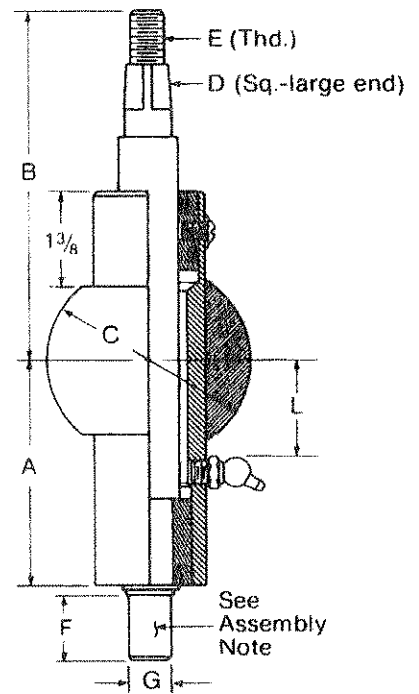
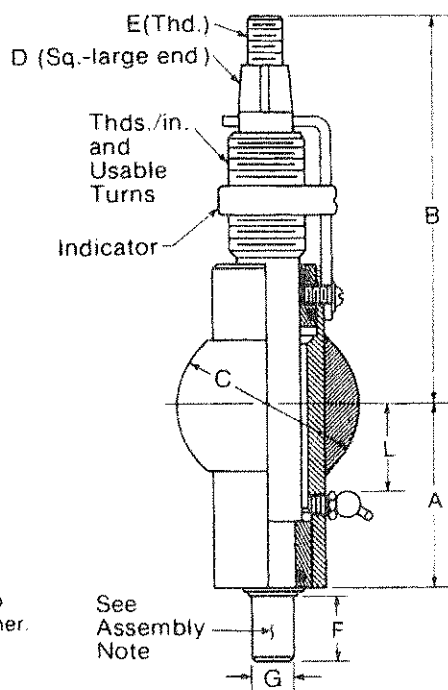
A (Bore)	B (Dia.)	C	D (Sq.)	E (Thd.)	F	Part Number	
						Steel	Stainless
5/8	1	2 3/8	3/8	5/16-18	.94	14212-501	14212-521
5/8	1	2 3/8	7/16	7/8-16	.94	14212-510	14212-539
5/8	1	2 3/16	9/16	1/2-13	.94	14212-502	14212-522
5/8	1	3 1/8	3/4	5/8-11	.94	14212-562	
3/4	1 1/4	3 1/16	9/16	1/2-13	1.12	14212-503	14212-523
3/4	1 1/4	3 3/8	3/8	1/2-13	1.12	14212-560	14212-541
3/4	1 1/4	3 3/8	3/4	5/8-11	1.12	14212-515	14212-535
1	1 1/2	3 3/16	3/4	5/8-11	1.50	14212-504	14212-524
1	1 3/4	5 1/16	1 3/16	1-8	1.50	14212-518	14212-538
1 1/4	2	4 3/8	3/4	5/8-11	2.00	14212-509	14212-529
1 1/4	2	5 5/8	1	1-8	2.00	14212-520	14212-540
1 1/4	2	5 5/8	1 3/16	1-8	2.00	14212-505	14212-525
1 1/4	2	6 1/16	1 3/8	1 1/8-7	2.00	14212-506	14212-526
1 1/2	2	5 5/8	1 3/16	1-8	2.00	14212-508	14212-528
1 1/2	2	6 1/16	1 3/8	1 1/8-7	2.00	14212-507	14212-527
1 3/4	2 1/4	6 3/4	1 3/8	1 1/8-7	2.25	14212-511	14212-531

Other handwheels and adapters are available on request.

Non Magnetic Applications. Bronze handwheels with less than 2.0 permeability are available on special order.

FLEXIBLE SHAFT AND RIGID ROD CONTROLS

Remote Operating Stations



Assembly Note: Mating parts to be pinned or welded by customer.

See Assembly Note

See Assembly Note

Deck or Bulkhead Terminals with welding collar

Bill of Materials

with Indicator Number	Rod Dia.	A	B	C	D†† (Sq.)	E (Thd.)	F	G	L Max. Deck Thick.	Indicator†		Reference Model Number
										Thds./In.	Usable Turns	
9879-501	5/8	3 1/4	6 1/8	2 15/16	9/16	1/2-13	15/16	5/8	1 7/16	8	10	9879RIHM510-10
9879-502										12	15	9879RIHM515-10
9879-503	3/4	3 3/8	7 1/16	3 5/16	3/4	5/8-11	1 1/8	3/4	1 9/16	8	14	9879RIHM514-12
9879-504										12	21	9879RIHM521-12
9879-505	1	3 1/2	8 15/16	3 1 1/16	1 3/16	1-8	1 1/2	1	1 13/16	8	17	9879RIHM517-16
9879-506										16	34	9879RIHM534-16
9879-507										20	42	9879RIHM542-16
9879-511	1 1/4	4 1/4	9 9/16	4 5/16	1 3/8	1 1/8-7	1 7/8	1 1/4	2 1/16	8	17	9879RIHM517-20
9879-512										20	42	9879RIHM542-20

†Specify part number whose usable turns are equal to or greater than number of turns required by valve

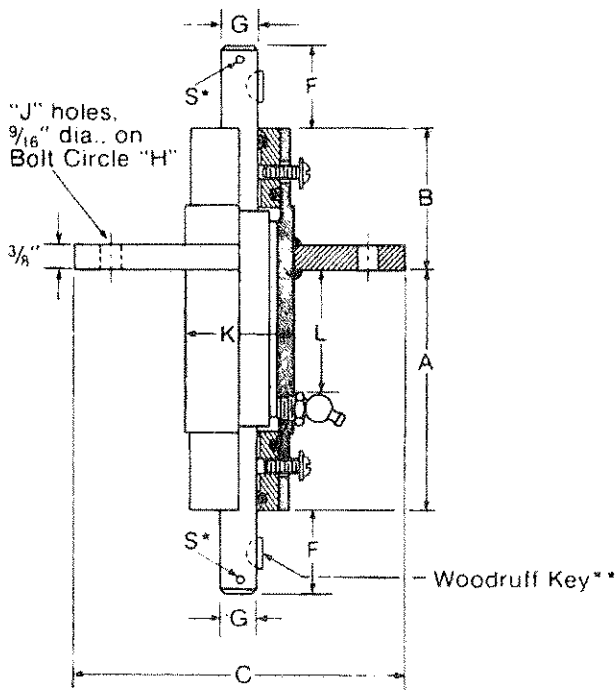
Description	Material	RIHM5	RHM5
Collar	Steel	•	•
Indicator Plate	Brass	•	•
Housing	Steel	•	•
Bushing	Mn. Bronze	•	•
Spindle	Bronze, Alum.	•	•
Indicator Arm	Mn. Bronze	•	•
Screw	Brass	•	•
"O" Ring	Syn. Comp.	•	•

without Indicator Number	Rod Dia.	A	B	C	D†† (Sq.)	E (Thd.)	F	G	L Max. Deck Thick.	Reference Model Number
12583-510	5/8	3 1/4	5	2 15/16	9/16	1/2-13	15/16	5/8	1 7/16	12583RHM5-10
12583-512	3/4	3 3/8	5 5/8	3 5/16	3/4	5/8-11	1 1/8	3/4	1 9/16	12583RHM5-12
12583-516	1	3 1/2	7 3/8	3 1 1/16	1 3/16	1-8	1 1/2	1	1 13/16	12583RHM5-16
12583-520	1 1/4	4 1/4	8 3/8	4 5/16	1 3/8	1 1/8-7	1 7/8	1 1/4	2 1/16	12583RHM5-20

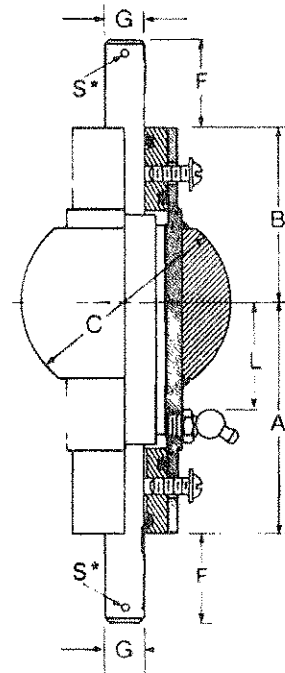
††3/4" per ft. taper

For shock test per MIL-S-9010 information consult with Southland.

FLEXIBLE SHAFT AND RIGID ROD CONTROLS
Intermediate Connections



with bolting flange.



with welding collar.

***S"hole to be drilled and pinned to mating part by customer. (See taper pin table, pg. 50.)

Bill of Materials

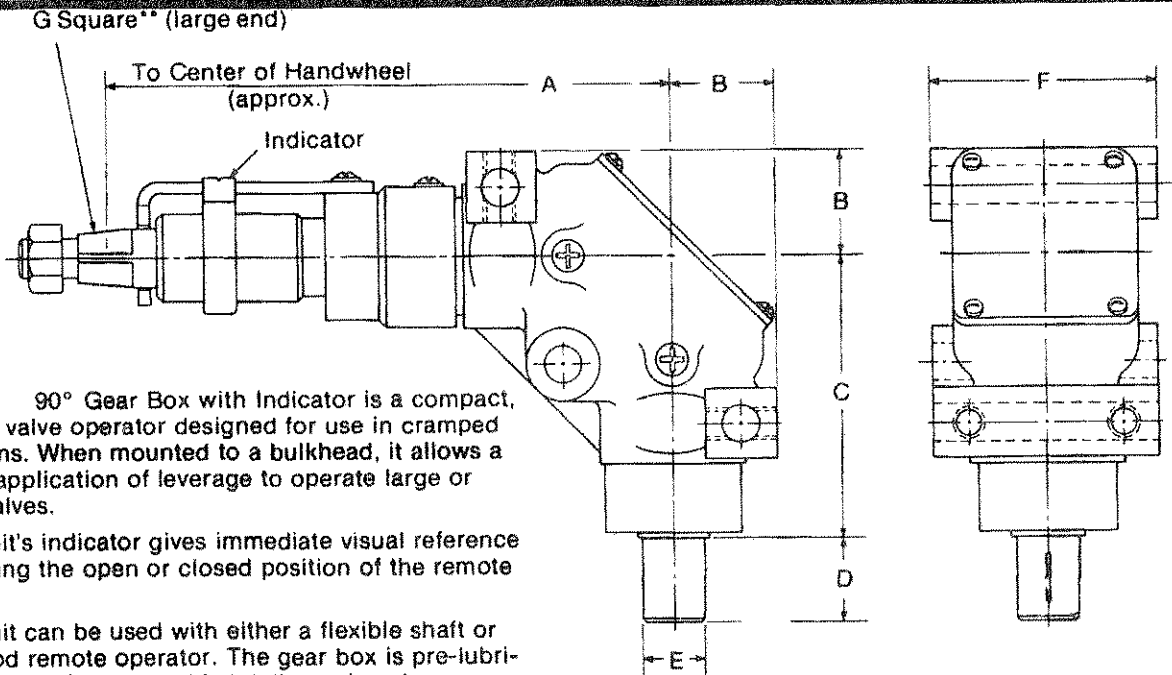
Bolting Flange Number	Shaft Core Dia.	A	B	C (Dia.)	F	G	H (B.C.)	J	K	L Max. Deck Thick.	Reference Model Number	Reference Navy Stock Number
9238-534	1/2	3 1/2	2 1/4	4 1/2	3/4	3/8	3 3/8	4	1 3/8	1 7/16	9238-SM3-4	1H2040-00-388-0865
9238-533	3/4	3 3/8	2 1/4	5 1/16	1 5/16	9/16	3 15/16	6	1 5/8	1 9/16	9238-SM3-3	1H2040-00-388-0864
9238-532	1	3 7/8	2 1/4	5 9/16	1 5/16	3/4	4 7/16	6	2	1 13/16	9238-SM3-2	1H2040-00-388-0863
9238-531	1 1/4	4 1/8	2 1/4	5 9/16	1 9/16	1	4 7/16	6	2 1/4	2 1/16	9238-SM3-1	1H2040-00-388-0862
9238-530	*1 5/8	5	2 7/8	6 1/8	1 15/16	1 1/8	5	6	2 3/4	2 3/8	9238-SM3-0	1H2040-00-388-0861

Description	Material	SM3	SM5
Flange	Steel	*	*
Groove Pin	Steel	*	*
Bushings	Mn. Bronze	*	*
Taper Pins. (Qty.-2)	Steel	*	*
Woodruff Key	Steel	*	*
Housing	Steel	*	*
Spindle	Steel	*	*
"O" Ring	Syn. Comp.	*	*
Screw	Brass	*	*
Collar	Steel	*	*

Welding Collar Number	Shaft Core Dia.	A	B	C	F	G	L Max. Deck Thick.	Reference Model Number	Reference Navy Stock Number
9054-554	1/2	3 9/16	2 9/16	2 11/16	3/4	3/8	1 7/16	9054-SM5-4	1H2040-00-388-0850
9054-553	3/4	3 3/4	2 5/8	2 15/16	1 5/16	9/16	1 9/16	9054-SM5-3	1H2040-00-388-0849
9054-552	1	3 3/8	2 3/4	3 5/16	1 5/16	3/4	1 13/16	9054-SM5-2	1H2040-00-388-0848
9054-551	1 1/4	3 1/2	2 7/8	3 11/16	1 5/16	1	2 1/16	9054-SM5-1	1H2040-00-388-0847
9054-550	*1 5/8	4 1/4	3 3/8	4 5/16	1 15/16	1 1/8	2 3/8	9054-SM5-0	1H2040-00-388-0846

*1 5/8" sizes available only as non-standard.

FLEXIBLE SHAFT AND RIGID ROD CONTROLS
90° Gear Box with Indicator



90° Gear Box with Indicator is a compact, unique valve operator designed for use in cramped locations. When mounted to a bulkhead, it allows a better application of leverage to operate large or tight valves.

The unit's indicator gives immediate visual reference regarding the open or closed position of the remote valve.

The unit can be used with either a flexible shaft or rigid rod remote operator. The gear box is pre-lubricated at the factory and is totally enclosed.

Note: Mounting holes and their dimensions same as 90° Gear Box

Bill of Materials

Size	Rod Dia.	Number	Indicator†		A	B	C	D	E	F	G** (Sq.)
			Thds./In.	Usable Turns							
40	1/2	16607-504	9	11	7 1/8	1 3/16	3 3/8	1 1/16	497	2 1/2	.375
									498		
160	3/4	16638-504	8	14	8 3/4	1 3/8	4 1/4	1 1/2	747	3	750
									748		
	1	16638-505	8	17	9 7/16	1 3/8	4 3/8	1 1/2	.997	3	1.188
									.998		
1	16638-506	16	34	9 7/16	1 3/8	4 3/8	1 1/2	.997	3	1.188	
								.998			
250	1 1/4	19503-503	8	17	10 15/16	1 1 3/16	5 5/16	1 3/8	1,248	3 1/2	1.375
									1,247		
	1 1/4	19503-504	20	42	10 15/16	1 1 3/16	5 5/16	1 3/8	1,248	3 1/2	1.375
									1,247		

Description	Material
Gear Box	Aluminum
Housing	Steel
Spindle	Steel
Gear	Steel
Rollpin	Steel
Seal	Syn. Compound
Bearing	Steel
Cover	Leaded Brass
Pipe Plug	Brass
Gasket	Vellumoid
Rd. Hd. Screw	Brass
Lockwasher	Bronze
Retaining Ring	Steel
Thrust Washers	Steel
Bearing	Steel
Shim	Brass
Terminal	
Indicator Plate	Brass
Indicator Arm	Mn. Bronze
Spindle Adapter	Al. Bronze
Nut	Brass
Washer Hd. Screw	Brass
Woodruff Key	Steel
Roll Pin	Steel

†Specify part number whose usable turns are equal to or greater than number of turns required.

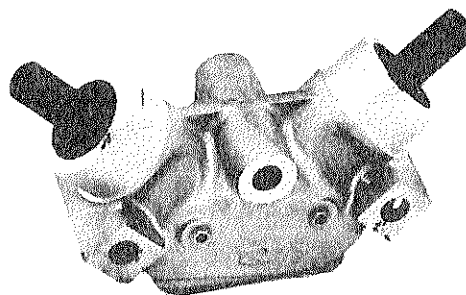
FLEXIBLE SHAFT AND RIGID ROD CONTROLS

90° Gear Box

The 90° gear box can transmit torque through sharp bends in the path of the flexible shaft or rigid rod remote operator for manual or low-speed power drive applications. The short spindle extensions allow the closest possible fit in tight corners. A clockwise input delivers a clockwise output.

Three sizes are available ranging in torque from 500 to 3600 inch pounds, and are approximately 95% efficient. The gear box is pre-lubricated at the factory and is totally enclosed.

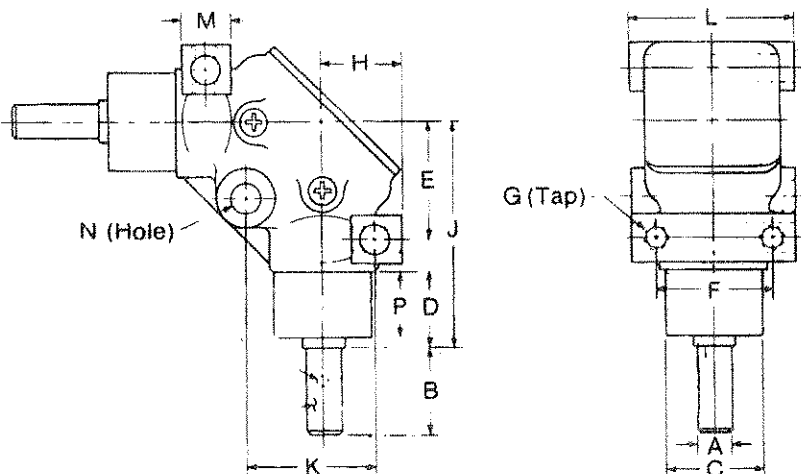
Gear boxes can be furnished for noncorrosive or nonmagnetic applications. The standard housing is available in manganese bronze or aluminum, with bolt hole bosses for face mounting and tapped holes for corner mounting.



90° Gear Box

Bill of Materials

Description	Material
Housing	Mn. Bronze or Aluminum
Spindle	Steel
Gear	Steel
Roll Pin	Steel
Seal	Syn. Compound
Bearing Surface	Mn. Bronze or Alu
Cover	Leaded Brass
Pipe Plug	Brass
Gasket	Vellumoid
Rd. Hd. Screw	Brass
Lockwasher	Bronze
Retaining Ring	Steel
Thrust Washers	Steel
Shim	Brass
Washer Hd. Screw (Qty-6)††	Brass
Taper Pin (Qty-2)††	Steel
Woodruff Key (Qty-2)††	Steel



Assembly Note: Mating parts to be pinned or welded by customer.
 *"S" holes to be drilled and pinned to mating part by customer.

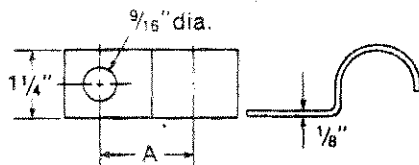
Standard Model*							Premium Model Number
Rod Dia.	Part Number		A†	B†	As Cast C		
	Bronze	Aluminum					
1/2	23422-501	23423-501	.498	1 5/16	1 5/8	13293 BRZ 14591 AL	
			.497				
5/8	23422-502	23423-502	.623	1 1/2	2 1/4	13294 BRZ 14561 AL	
			.622				
3/4	23407-501	23406-501	.748	1 1/2	2 3/4	12649 BRZ 14598 AL	
			.747				
1	23407-502	23406-502	.997	1 7/8	3 1/4		
			.998				
1 1/4	23412-501	23411-501	1.248	1 7/8	3 1/4		
			1.247				

COMMON DIMENSIONS

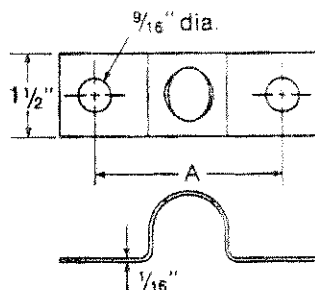
Size	D	E	F	G (Tap Typical)	H	J	K	L	M	N (Hole)	P
40	1 5/32	1 3/4	1 3/4	3/8 - 16	1 3/16	3 3/8	1 15/16	2 1/2	7/8	7/16	1 1/32
160	1 5/32	2 5/8	2	1/2 - 13	1 5/8	4 5/8	2 3/4	3	1 1/8	9/16	1 3/32
250	1 2 1/32	2 1 1/16	2 1/2	5/8 - 11	1 13/16	5 5/16	3 1/16	3 3/4	1 3/8	1 1/16	1 19/32

FLEXIBLE SHAFT CONTROLS

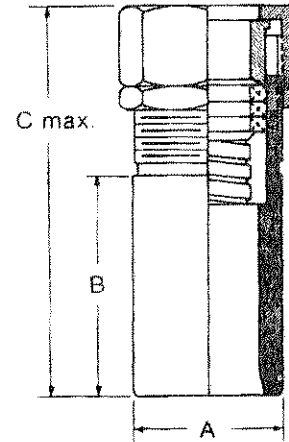
Clamps and Sleeves



Type A Clamp



Type B Clamp



Number 9349
Stuffing box or deck piercing sleeve.

TYPE A CLAMPS

Shaft Core Dia.	A	Part Number	Reference Navy Stock Number
1/2	1 1/16	4706-7	1H5340-00-251-8337
3/4	1 1/16	4706-1	1H5340-00-598-3984
1	1 27/32	4706-2	1H5340-00-251-8342
1 1/4	1 31/32	4706-3	1H5340-00-251-834*
*1 5/8	2 7/32	4706-10	1H5340-00-286-4201

Note: Type A clamps are used for intermediate fastening of shaft to bulkhead. The fastened shaft should be located so that it can pull loose in case of bulkhead damage.

TYPE B CLAMPS

Shaft Core Dia.	A	Part Number	Reference Navy Stock Number
1/2	3	4706-8	1H5340-00-251-8335
3/4	3 1/4	4706-4	1H5340-00-251-8340
1	3 9/16	4706-5	1H5340-00-251-8338
1 1/4	3 13/16	4706-6	1H5340-00-251-8337E
*1 5/8	4 5/16	4706-9	1H5340-00-286-4202

Note: Type B clamps are used to fasten the flexible shaft ends in such a manner as to align the DC terminals with the valve handwheel and the remote operating station terminals.

NUMBER 9349 STUFFING BOX OR DECK PIERCING SLEEVE

Part Number	Shaft Core Dia.	A	B	C (Max.)	Reference Model Number	Reference Navy Stock Number
9349-504	1/2	1 3/4	3 1/2	6 1/2	9349-4	1H2040-00-388-0870
9349-503	3/4	2 1/8	3 1/8	6 1/2	9349-3	1H2040-00-388-0869
9349-502	1	2 1/2	4 3/8	7	9349-2	1H2040-00-388-0868
9349-501	1 1/4	2 3/4	4 1/8	7 3/8	9349-1	1H2040-00-317-3438
*9349-500	1 5/8	3 1/4	6 1/8	9 3/8	9349-0	1H2040-00-388-0866

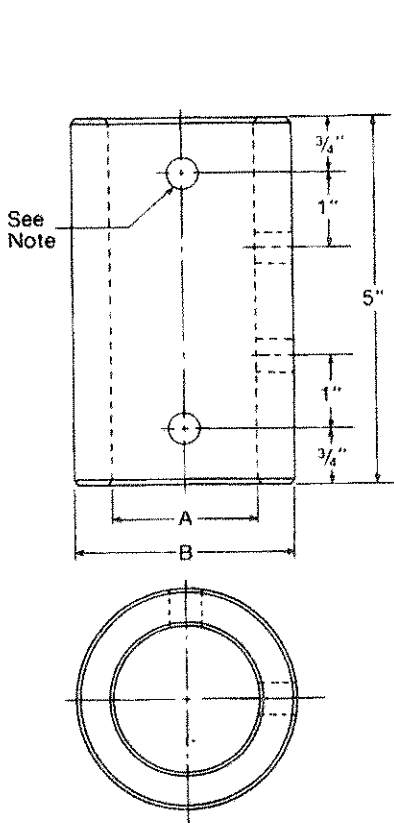
9349 Piercing Sleeve

Bill of Materials

Description	Material
Body	Steel
Split Follower	Mn. Bronze
Retainer Ring	Mn. Bronze
Lock Nut	Mn. Bronze
Nut	Mn. Bronze

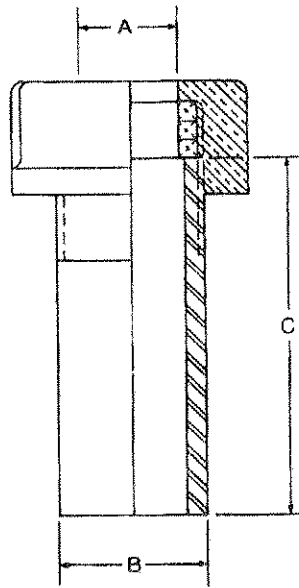
RIGID ROD CONTROLS

Couplings and Stuffing Boxes

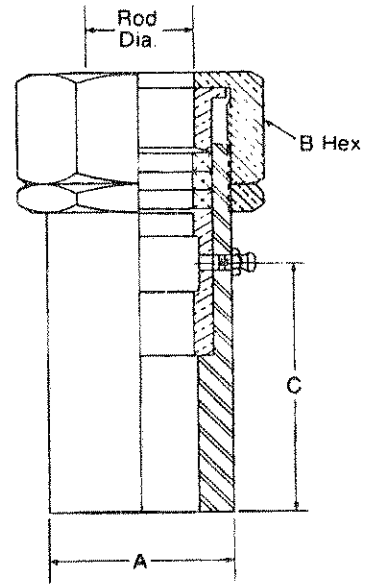


Type PC
Steel Coupling
for Pinned Assembly

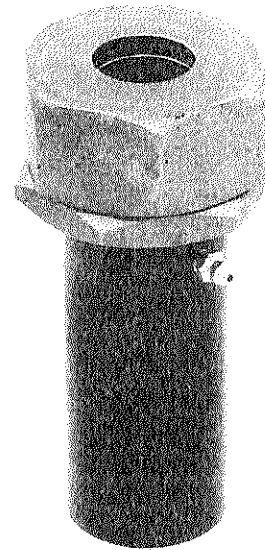
Note: four holes to be drilled by customer.



Stuffing Box



Lubricated Stuffing Box



TYPE PC

Rod Dia.	Number	A	B	Roll Pin Size
1/2	50061-508	.500/.503	1	3/32X1
3/4	50061-512	.750/.753	1 1/4	3/16X1 1/4
1	50061-516	1.000/1.003	1 5/8	3/16X1 3/4
1 1/4	50061-520	1.250/1.253	1 7/8	1/4X2
1 1/2	50061-524	1.500/1.503	2 3/8	3/8X2 1/2
1 3/4	50061-528	1.750/1.753	2 3/4	7/16X3
2	50061-532	2.000/2.003	3	7/16X3

STUFFING BOX

Number	"A" Dia. Fits Pipe Size	B	C
50136-508	3/8	1.05	2 1/2
50136-508	1/2	1.31	2 15/16
50136-512	3/4	1.66	2 15/16
50136-516	1	1.66	3 1/2
50136-520	1 1/4	2.37	3 1/2
50136-524	1 1/2	2.37	4
50136-532	2	2.87	4

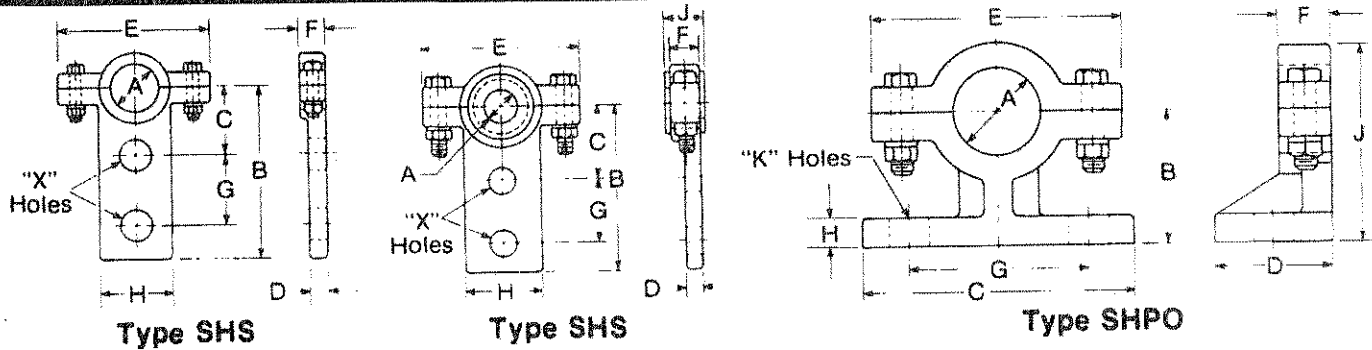
LUBRICATED STUFFING BOX

Number	Rod Dia.	A	B (Hex)	C
50063-508	1/2	1 1/8	1 3/4	3 3/8
50063-512	3/4	1 1/2	2 1/8	3 3/8
50063-516	1	1 3/4	2 3/8	3 3/8
50063-520	1 1/4	2	2 3/8	3 3/8
50063-524	1 1/2	2 1/2	2 7/8	3 3/8

**Stuffing Box
Bill of Materials**

Description	Material	Lube.	Non-Lube.
Body	C. R. Steel	•	•
Packing Nut	Bronze	•	•
Gland	Bronze	•	
Bushing	Bronze	•	
Packing	Furnished by Customer		

RIGID ROD CONTROLS
Shaft Hangers



TYPE SHS

Type SHS with Nylon Bushing

Type SHPO

Rod Dia.	Number	A	B	C	D	E	F	G	H	X Holes	Reference Part Number
1/2	50135-508	.505	3 1/8	1 1/4	3/8	2 5/8	9/16	1 3/8	1 11/32	1/2	SHS-1A
5/8	50135-510	.630	3 3/4	1 1/2	3/8	3 1/4	9/16	1 1/2	1 9/16	1/2	SHS-2A
3/4	50135-512	.755	3 3/4	1 1/2	3/8	3 3/4	9/16	1 1/2	1 9/16	1/2	SHS-3A
1	50135-516	1.005	4	1 3/4	3/8	3 3/4	11/16	1 1/2	1 13/16	11/16	SHS-4A
1 1/4	50135-520	1.255	4	1 5/8	3/8	4 1/4	13/16	1 1/2	1 13/16	11/16	SHS-5A
1 1/2	50135-524	1.505	4 1/8	1 7/8	1/2	4 1/2	13/8	1 1/2	1 13/16	11/16	SHS-6A
1 3/4	50135-528	1.755	4 1/8	1 7/8	1/2	4 3/4	1 11/16	1 1/2	1 13/16	11/16	SHS-7A
2	50135-532	2.005	5 1/2	2 5/8	5/8	6 1/4	2	2	2 9/16	11/16	

Type SHS with Nylon Bushing

Rod Dia.	Number		A	B	C	D	E	F	G	H	J	X Holes
	Malleable Iron	Aluminum Bronze										
1/2		15902-613	.505 .515	3 1/8	1 1/4	3/8	2 5/8	9/16	1 3/8	1 11/32	.97	
			.755 .765									
3/4	15902-601	15902-605	.755 .765	4	1 3/4	3/8	3 3/4	11/16	1 1/2	1 3/4	.97	
1	15902-602	15902-606	1.005 1.015	4	1 3/4	3/8	3 3/4	11/16	1 1/2	1 3/4	.97	
1 1/4	15902-603	15902-607	1.255 1.265	4 1/8	1 7/8	1/2	4 1/2	13/8	1 1/2	1 13/16	1.66	
1 1/2	15902-604	15902-608	1.505 1.515	4 1/8	1 7/8	1/2	4 1/2	13/8	1 1/2	1 13/16	1.66	
1 1/2	15902-610	15902-612	1.505 1.515	4 1/8	1 7/8	1/2	4 3/4	1 11/16	1 1/2	1 13/16	1.97	

TYPE SHPO

Rod Dia.	Number	A	B	C	D	E	F	G	H	J	K Holes	Reference Part Number
1/2	50128-508	.505	1 13/16	3 3/8	1 1/2	2 5/8	3/4	2 1/2	5/16	2 1/2	7/16	SHPO-1A
3/4	50128-512	.755	1 7/8	4	1 1/2	3 1/4	5/8	2 5/8	7/16	2 11/16	11/16	SHPO-2A
1	50128-516	1.005	2 5/16	4 1/4	1 3/4	3 7/8	11/16	2 7/8	1/2	3 3/8	11/16	SHPO-3A
1 1/4	50128-520	1.255	2 1/4	4 1/2	2	4 5/16	13/16	3 1/16	1/2	3 1/2	11/16	SHPO-4A
1 1/2	50128-524	1.505	2 9/16	5 1/16	2	4 9/16	1 5/16	3 1/2	1/2	3 3/4	11/16	SHPO-5A
1 3/4	50128-528	1.755	2 15/16	5 1/8	2	4 7/8	1 45/64	3 1/2	7/16	4 3/8	11/16	SHPO-6A

Bill Of Materials

Description	Material	Type SHS	Type SHPO
Hanger	Alum. Bronze	•	•
Cap	Alum. Bronze	•	•
Screws*	Steel	•	•
Washers*	Steel	•	•
Nuts*	Steel	•	•

*Same for Type SHS with Nylon Bushing.

Flexible Shaft Assembly

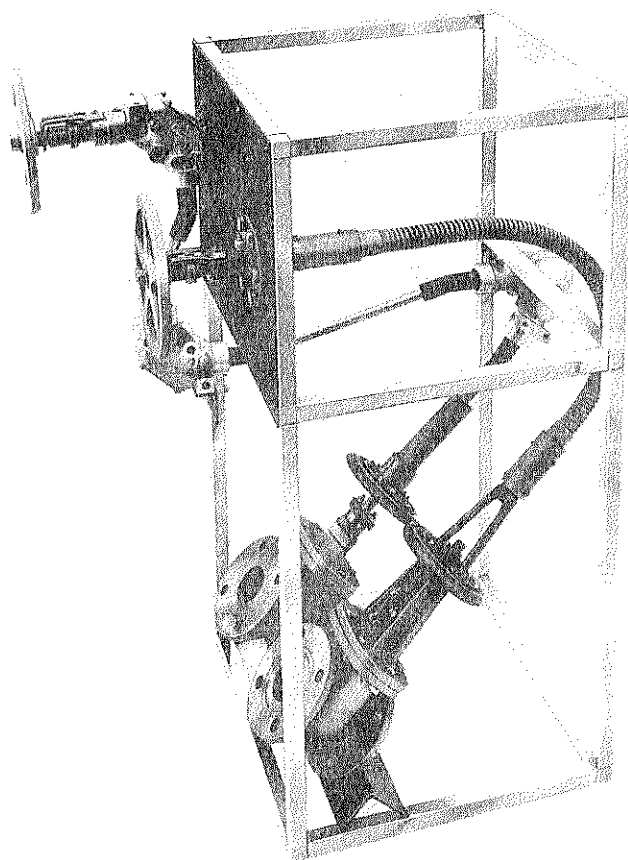
FLEXIBLE SHAFTING for remote control is designed for manual operation or power drive operation where use is intermittent or slow speed. It is designed for low torsional deflection; and it may be operated in either direction of rotation.

The flexible shaft can be interconnected to a variety of control components, i.e.: deck boxes or deck or bulkhead terminals (remote operating station); deck or bulkhead piercing connections; valve couplings; gear boxes; rigid rod and valve stem yokes (via SM or SF type couplings).

Two types of flexible shaft holding clamps are available. Type A is used in intermediate shaft holding positions. Type B is used on either end of shaft mounting near each DC terminal.

REMOTE OPERATING STATIONS. Terminals with or without indicators, deck boxes and deck stands usually deck or bulkhead mounted for valve actuation from the remote station.

INTERMEDIATE CONNECTIONS AND SLEEVES are available for welding to deck or bulkhead. Water-tight piercing sleeves are used where continuous flexible shafting can pass through deck or bulkhead. Water-tight and air-tight piercing connections are available with bolting flange, or ball for welding to deck or bulkhead, when flexible shaft system must be sectionalized to pass from one compartment or deck to another.

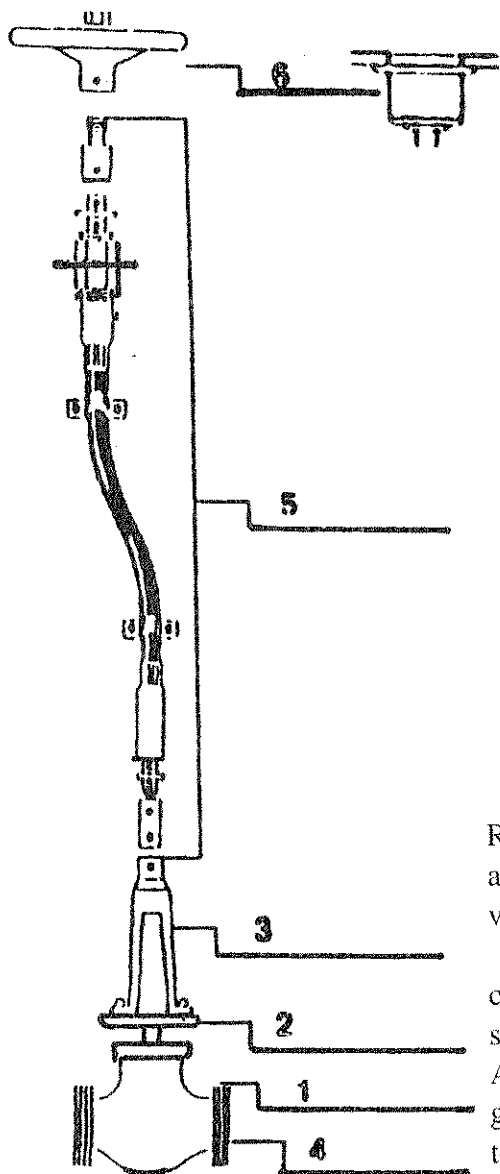


Valve Remote Operators

How To Measure Flexible Reach Rods (Remote Valve Operators)

The Following Is An easy Way To Measure Flexible Reach Rods

- 1) What is the size and type of the valve?
- 2) What is the Diameter of the hand wheel?
- 3) Does the valve have a Rising Stem, Non-Rising Stem or Rising Hand Wheel? If a Rising Stem or Hand Wheel, what is the length of stem when valve is in the open position?
- 4) What product is flowing through the valve? There are some applications where a Torque Booster or Knocker Plate would be required.
- 5) Approximate length of Reach Rod?
- 6) What operator is needed: Deck box, Hand Wheel, or other remote operator?



The above questions help us to determine what size Reach Rod, and what type of Hand Wheel adapter is needed to operate the valve.

An easy method of measuring a Reach Rod is by using a common garden hose. Fasten to the valve you need to operate, securing every 4' to where you need to operate the valve from. Always make sure you maintain the minimum radius bend as suggested on the Reach Rod Data Sheet. By measuring the hose afterwards, you may determine the correct footage of the Reach Rod.

Design Guide

