



VALVES

for **S**hipbuilding & **D**iesel **E**ngine

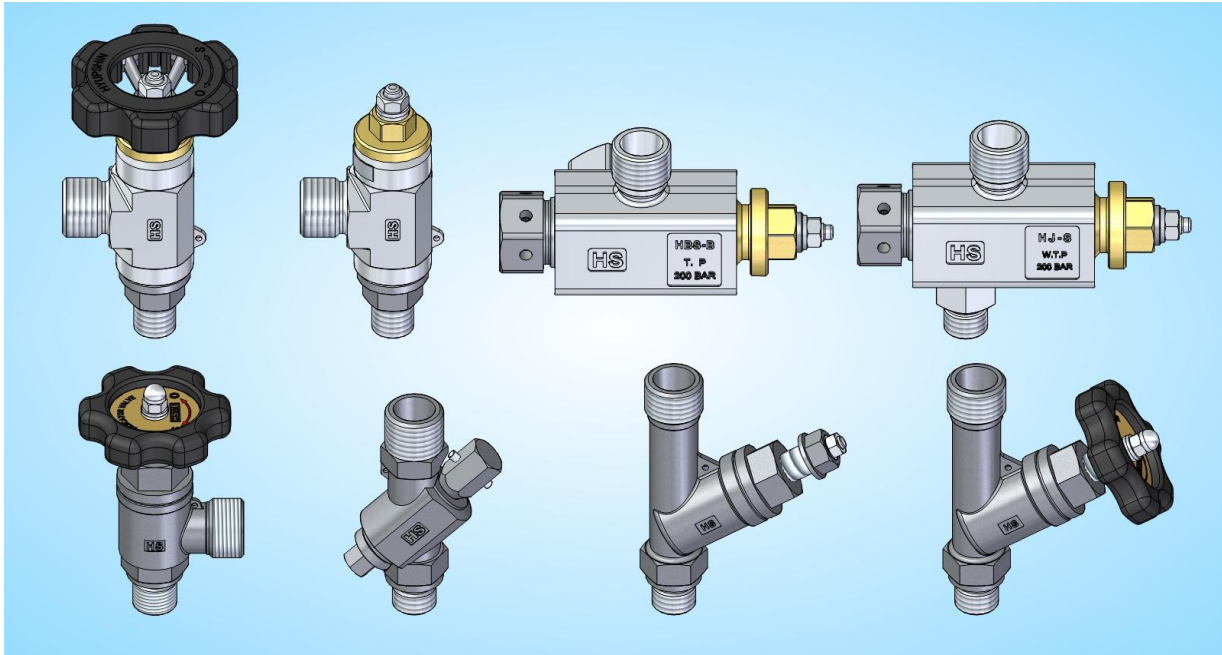


HSME[®]
Valves & Fittings

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Indicator Valves

Marine Propulsion and Power Generation Diesel Engine



Indicator Valves measure and monitor the cylinder pressure of diesel engine while the engine is running. This is to analyze the condition and effectiveness of the engine.



Valve is mounted over the each cylinder head of diesel engine. Through a bore the indicator valve is connected to combustion chamber (cylinder).

A pressure gauge is connected to indicator port of the valve.

The indicator port is, if required, connected to a measuring instrument in order to read the cylinder's condition and effect.

Indicator valve is the major tool in working out horsepower rating. Also useful diagnostic tool to identify problem of injection valve and piston ring leakage. They work on P_{max} and P_{com} pressure against piston movement, and the resulting trace is marked onto a piece of treated paper for a record.

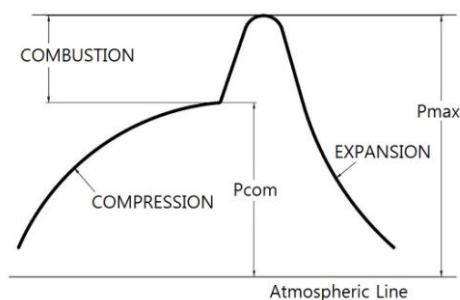
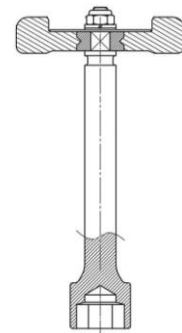
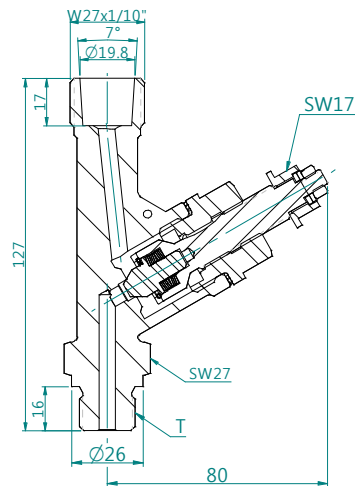
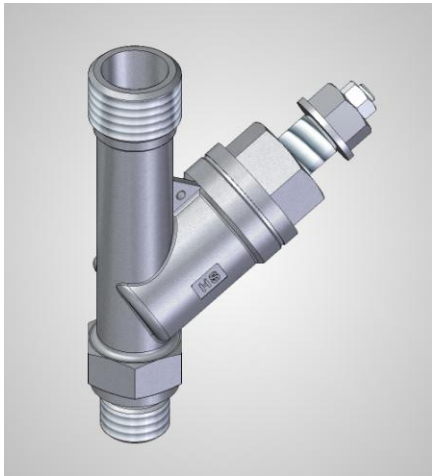


Diagram shown:
Cylinder maximum pressure P_{max}
Cylinder compression pressure P_{com}

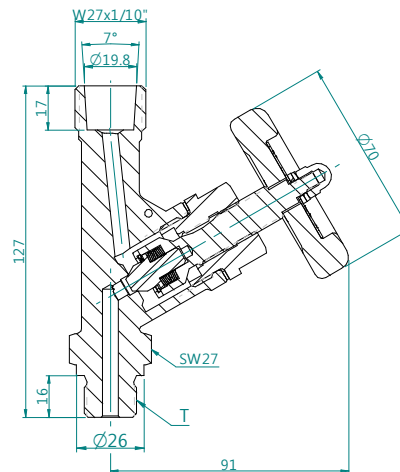
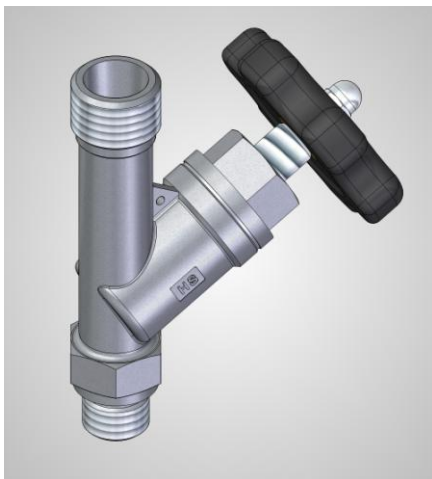
VI-Y indicator valve for medium speed engines



Long Neck

Wrench Handle

VI-YW indicator valve for medium speed engines

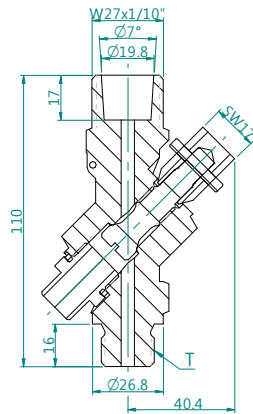
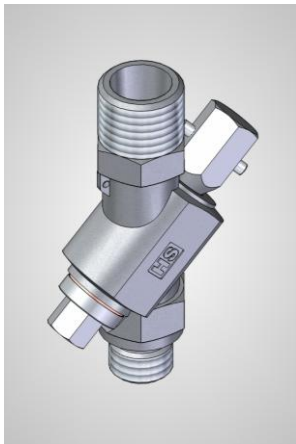


Features of VI-Y and VI-YW indicator valve

Construction Materials	<ul style="list-style-type: none"> ● Body - Forged Carbon steel and Stellite welded seat ● Disc cone – SS304 + Stellite welded ● Stem – SS420J2 ● Disc spring – Inconel 718
Operating Temperature	Max. 550 °C (1,022 °F)
Operating Pressure	Max. 300 bar (4,351 psig)
Ordering Part no. & End Connections (T)	VIY-M20P2-W27-C : M20 x 2 VIY-M20P25-W27-C : M20 x 2.5 VIYW-M20P2-W27-C : M20 x 2 VIYW-M20P15-W27-C : M20 x 1.5

- Inconel 718 disc-spring loaded axially moving valve cone ensures excellent sealing on hot and cold engine vibration.
- Hard-facing sealing cone and seat ensures extended cycle life.
- VI-Y valve has separated wrench handle to reduce turning diameter for installation.
- Indicator port suitable for mechanical and digital indicator with standardized thread W27 x 1/10 in.

VI-H indicator valve for medium speed engines

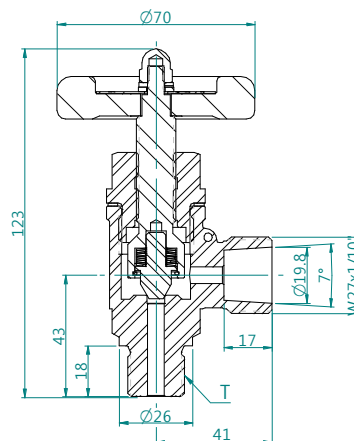


Features of VI-H indicator valve

Construction Materials	<ul style="list-style-type: none"> ● Body - Forged Carbon steel ● Stem - Nimonic 80A
Operating Temperature	Max. 550 °C (1,022 °F)
Operating Pressure	Max. 300 bar (4,351 psig)
Ordering Part no. & End Connections (T)	VIH-M20P2-W27-C : M20 x 2

- Compact type and has minimum rotating radius.
- Valves are designed with back-seat sealing

VI-L indicator valve for low speed engines

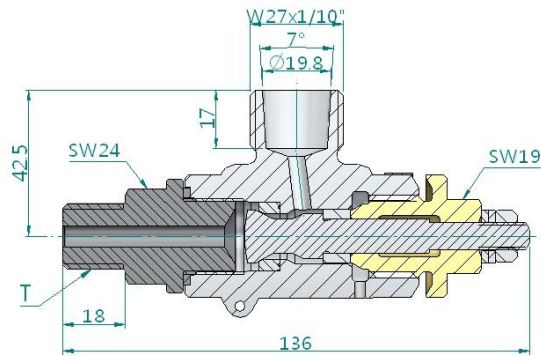
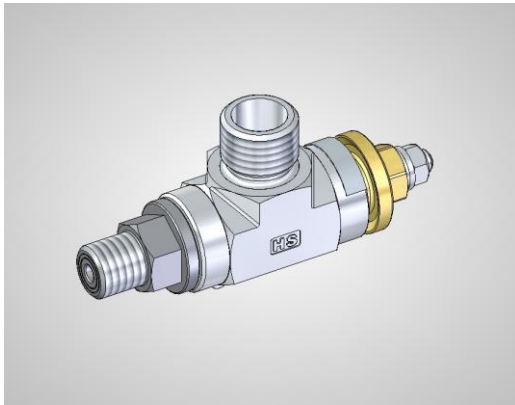


Features of VI-L indicator valve

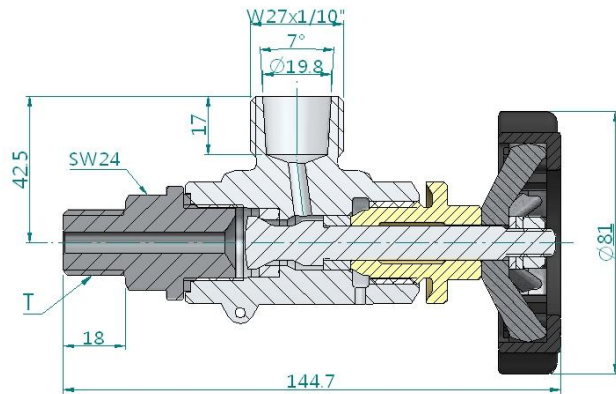
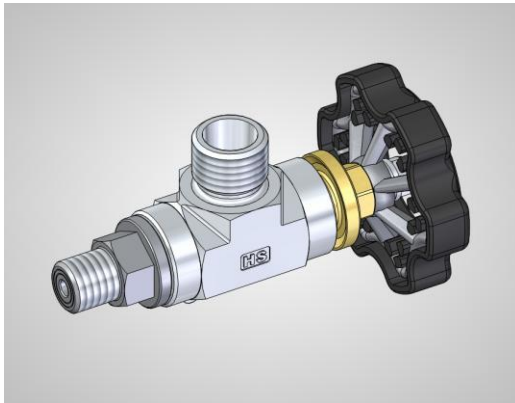
Construction Materials	<ul style="list-style-type: none"> ● Body - Forged Carbon steel and Stellite welded seat ● Disc cone - SS304 + Stellite welded ● Stem - SS420J2 ● Disc spring - Inconel 718
Operating Temperature	Max. 400 °C (752 °F)
Operating Pressure	Max. 300 bar (4,351 psig)
Ordering Part no. & End Connections (T)	VIL-W19-W27-C : W3/4" VIL-M20P15-W27-C : M20 x 1.5

- Inconel 718 disc-spring loaded axially moving valve cone ensures excellent sealing on hot and cold engine vibration.
- Hard-facing sealing cone and seat ensures extended cycle life.
- Indicator port suitable for mechanical and digital indicator with standardized thread W27 x 1/10 in.

VI-HB indicator valve for low speed engines



VI-HBW indicator valve for low speed engines



Features of VI-HB and VI-HBW indicator valve

Construction Materials	<ul style="list-style-type: none"> ● Body – Ni-Cr-Mo alloy steel + Stainless steel ● Seat – Nimonic 80A ● Stem – Nimonic 80A ● Stem guide – High strength brass ● Hand wheel – Carbon steel + high performance polyamide resin cover
Operating Temperature	Max. 400 °C (752 °F)
Operating Pressure	Max. 300 bar (4,351 psig)
Ordering Part no. & End Connections (T)	VIHB-W19-W27-C : W3/4"-10 VIHBW-W19-W27-C : W3/4"-10

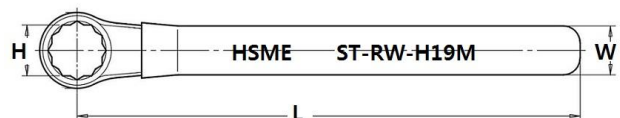
- Valves are designed with back-seat sealing.
- Hard-facing sealing cone and seat ensures extended cycle life.
- Excellent creep-resistant Alloy 80A /ASTM B637 on seat and stem.
- Valves open and close in all temperature, using either a built-in heat-protected wheel handle or a separated long wrench handle.

Wrench handle with red vinyl sleeve

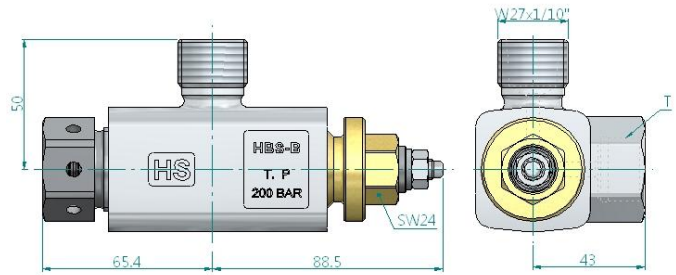
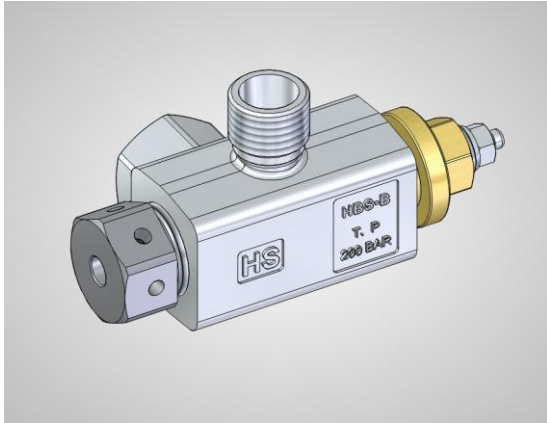
For Hex Head 19mm actuation.

Unit: mm

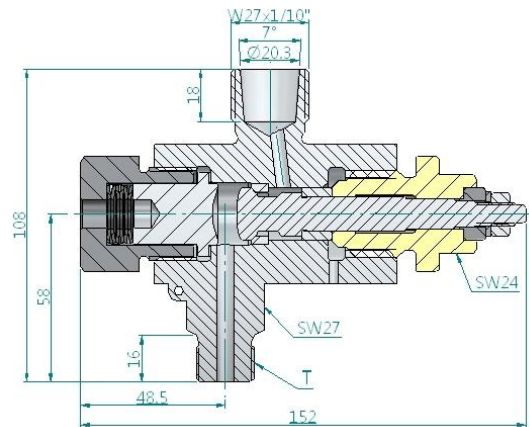
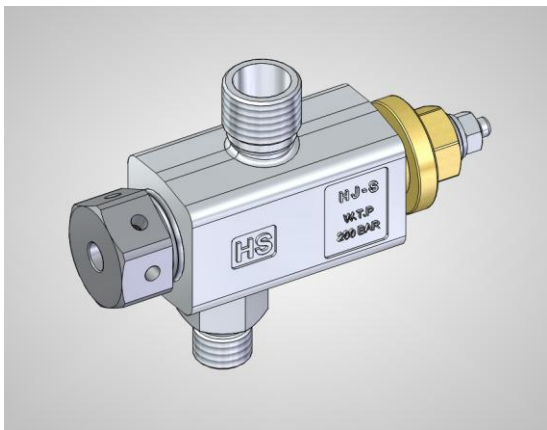
Part Number	H	L	W	Weight
ST-RW-H19M	19	170	20	180 g



VI-HBS indicator valve for low speed engines



VI-HJS indicator valve for low speed engines



Features of VI-HBS and VI-HJS indicator valve

Construction Materials	<ul style="list-style-type: none"> ● Body – Stainless steel ● Seat – Nimonic 80A ● Stem – Nimonic 80A ● Stem guide – High strength brass ● Wrench handle – Tool alloy with vinyl sleeve
Operating Temperature	Max. 400 °C (752 °F)
Operating Pressure	Max. 300 bar (4,351 psig)
Ordering Part no. & End Connections (T)	VIHBS-FM24P15-W27-S4 : Female M24 x 1.5 VIHJS-M20P15-W27-S4 : M20 x 1.5

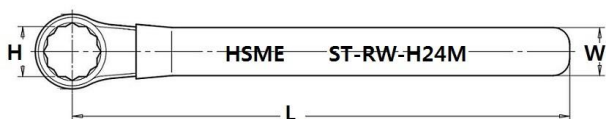
- Valves are designed with back-seat sealing.
- Hard-facing sealing cone and seat ensures extended cycle life.
- Excellent creep-resistant Alloy 80A /ASTM B637 on seat and stem.
- Valves open and close in all temperature, using either a built-in heat-protected wheel handle or a separated long wrench handle.

Wrench handle with red vinyl sleeve

For Hex Head 24mm actuation.

Unit: mm

Part Number	H	L	W	Weight
ST-RW-H24M	24	240	23	380 g



VS Series Safety Valves



Picture Shown:
VSS Series Valve

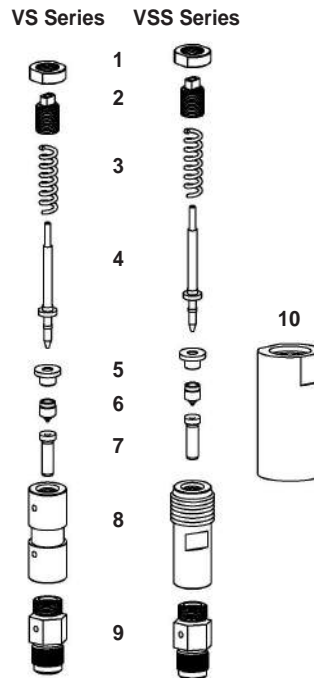
VS Series Safety Valves have been supplied globally and gained excellent reputation by its superb performance on marine propulsion and power generation diesel engines since 1976.

Features

- High temperature application: up to 600 °C (1112 °F)
- Working pressure: up to 413 bar (6000 psig)
- Valve provides metal to metal sealing for high temperature application.
- Sealing cone and bush seat are constructed out of excellent creep-resistant exotic alloy.
- When system pressure overcomes the set pressure, the valve opens to relieve the system pressure to atmosphere so as to prevent excess pressure in the system.
- Repeatability of set pressure is not more than 5% above or below of each valve after initial cracking at room temperature.
- VSS Series is provided for extra safety with the deflector cap.

Technical Information

- Working Pressure: 413 bar (6000 psig)
- Temperature Rating: -60 to 600 °C (-76 to 1112 °F)



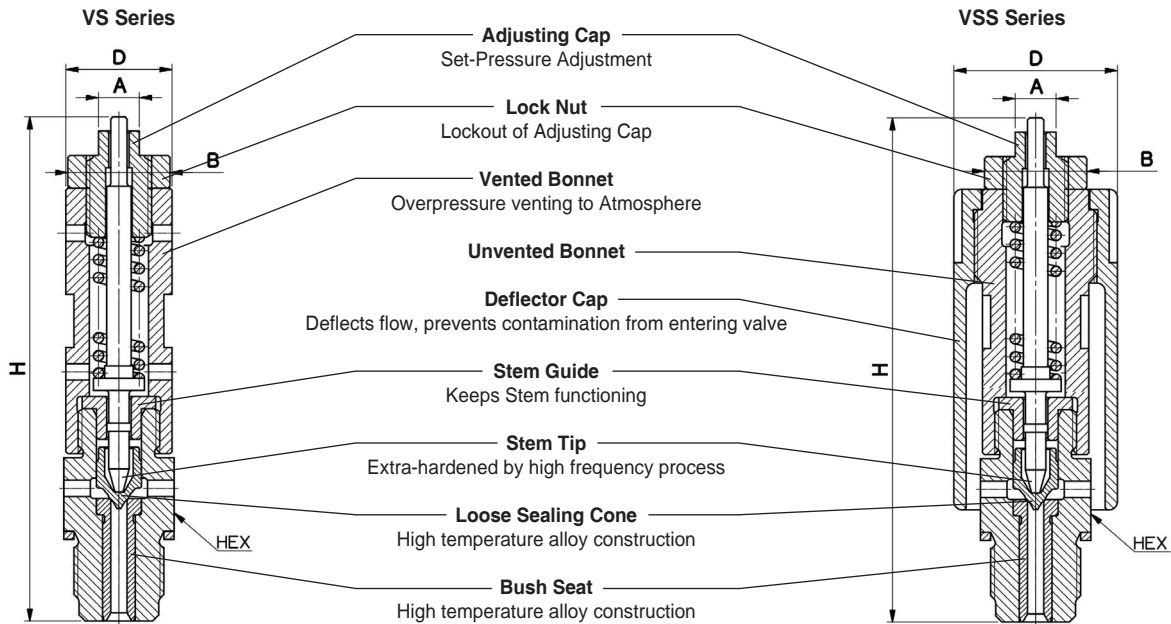
Materials of Construction

Components		Valve Body Material			
		SS304		SS316	
		VS Series	VSS Series	VS Series	VSS Series
		Material Grade /JIS, ASTM Standard			
1	Lock Nut	Black Phosphate coated Steel S45C-N/JIS G4051		SS316/ASTM A276, A479	
2	Adjusting Cap				
3	Spring	SWOSC-V/JIS G3561		SS17700 Type 631/ASTM A313	
4	Stem	SCM415/JIS G4053		SS316/ASTM A276, A479	
5	Stem Guide	SS304/A276, A479			
6	Sealing Cone	Alloy 80A UNS N07080/ASTM B637			
7	Bush Seat				
8	Bonnet	VS Series: Vented Bonnet VSS Series: Unvented Bonnet			
		SS304/A276, A479		SS316/ASTM A276, A479	
9	Vented Body	SS304/A276, A479		SS316/ASTM A276, A479	
10	Deflector Cap		Black Phosphate coated Steel S20C/JIS G4051		SS316/ASTM A276, A479

VS Series Safety Valves

Set Pressure Range

Spring Designator	Set Pressure Range	
	bar	psig
160	160 to 200	2320 to 2900
200	200 to 240	2900 to 3480
240	240 to 280	3480 to 4060



Ordering Information and Dimensions

Basic Ordering Number		End Connections Inlet	Orifice, mm (in.)	Dimensions, mm (in.)			Wrench Flat, mm (in.)		Net Weight, gram	
				H	D	Hex	A	B		
VS-	M22P15-	M22 x 1.5 Metric	4.0 (0.16)	123.20 (4.85)	25.0 (0.98)	27.0 (1 1/16)	10.0 (0.39)	22.0 (0.87)	388	
	M8N-	1/2 in. Male NPT			40.0 (1.57)					
VSS-	M22P15-	M22 x 1.5 Metric		1040	123.20 (4.85)	40.0 (1.57)	27.0 (1 1/16)	10.0 (0.39)		22.0 (0.87)
	M8N-	1/2 in. Male NPT								

Ordering Steps

Step 1. Select basic ordering number. i.e., VS-M8N-

Step 2. Insert the spring designator to the basic ordering number. VS-M-M8N-200-

Step 3. Select valve body material designator. SS304: **S4**, SS316: **SS** i.e., VS-M-M8N-200-**S4**

Factory Test

Every valve is factory-tested for cracking and resealing performance.

Dimensions

- All dimensions in this catalog are reference only and are subject to change.
- Dimensions with M Tube Fitting nuts are finger-tight position.

Product Cleaning

Valves are cleaned and packaged in accordance with HSME cleaning standard CS-01

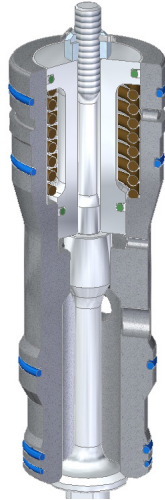
Safe Valve Selection

The selection of a valve for any application or system must be considered to ensure safe performance. Valve rating, valve function, material compatibility, proper installation, operation and maintenance remain the sole responsibility of the system designer and the user. HSME Corporation accepts no liability for any improper selection, compatibility, installation, operation or maintenance.

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		For Local Customers T 051-264-7700 – 4 F 051-264-7705 E sales@hsmecorp.com	For Overseas Customers T +82 70 4346 6211 / 6326 F +82 70 8282 5112 E hsme@hsmecorp.com

Air Start Valve

Air Start Valve is inserted into each cylinder head of diesel engine and supplies about 30 bar air into engine cylinder. The air actuates the piston before fuel runs the engine.



The air start valves shown above & below are for Hyundai "Himsen" four-stroke diesel engines.



OPERATION

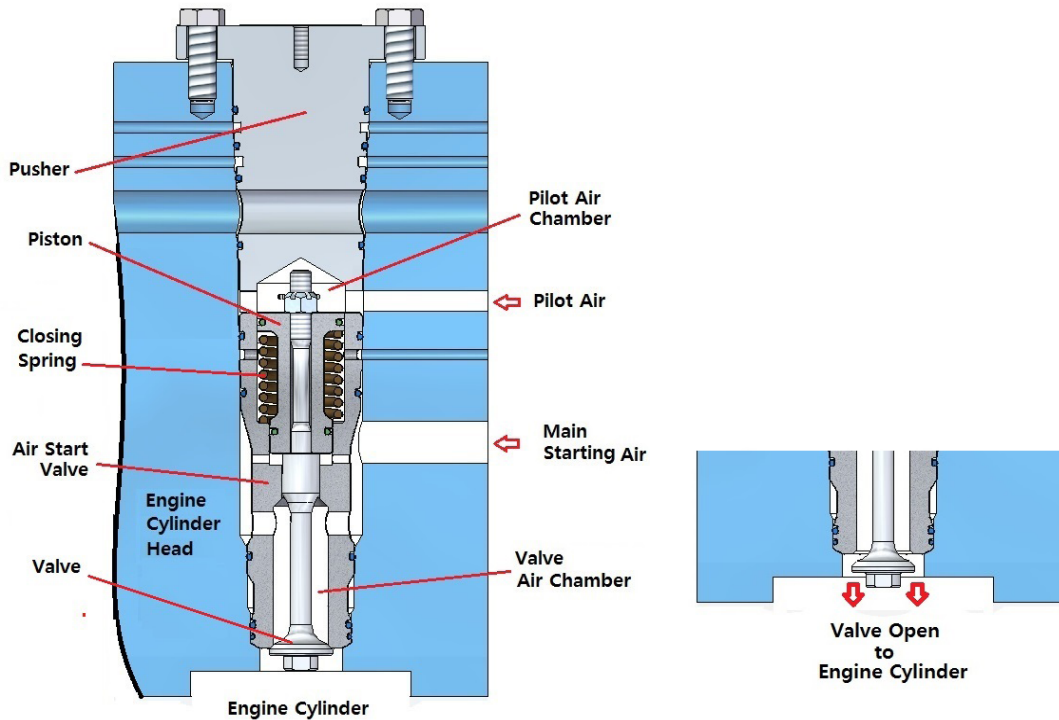


Diagram Shown

A set of air start valve and pusher installed in diesel engine



Photo Shown:

Before pusher is inserted into cylinder head



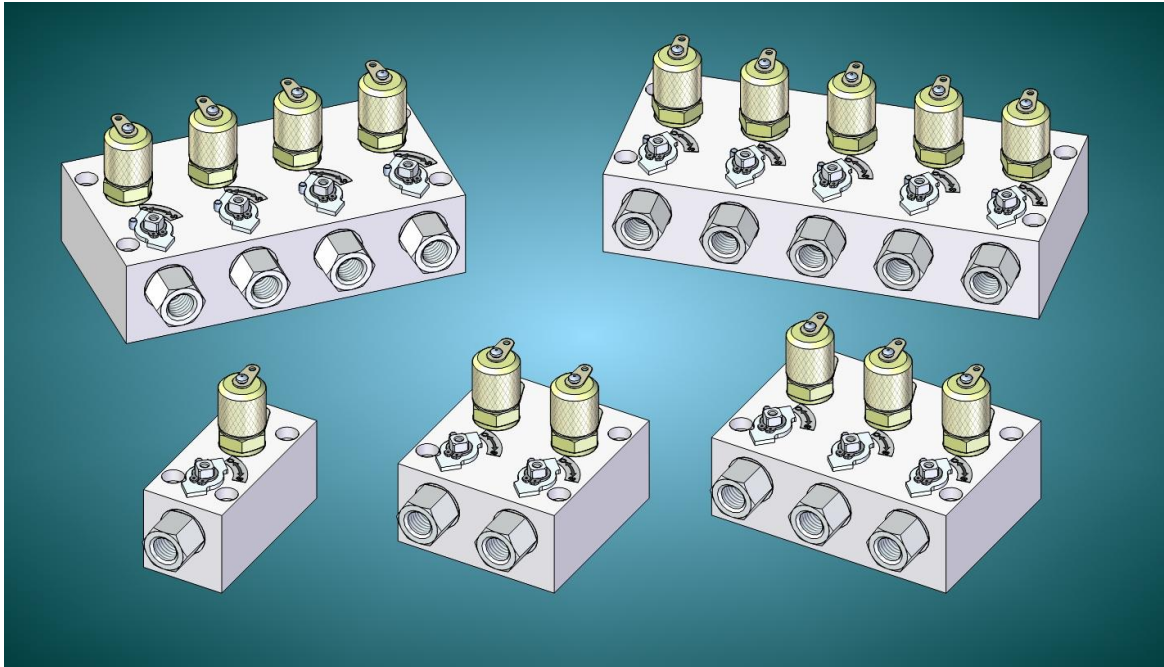
Photo Shown:

After pusher is inserted into cylinder head

Main starting air 30bar from the manifold enters the Valve Air Chamber via the circumferential ports in the valve body. The air pressure in valve chamber will not open the valve because a closing spring holds the valve shut.

To open valve, pilot air from the air start distributor enters the Pilot Air Chamber on the top of the valve and acts on a piston to compress the spring downwards. When the pilot air signal from the air start distributor is vented, the spring closes the valve.

VTA Test Valve Block (Diagnostic Valve Block)



VTA Series Test valve block is designed to service with pressure measuring sensor and pressure gauge on

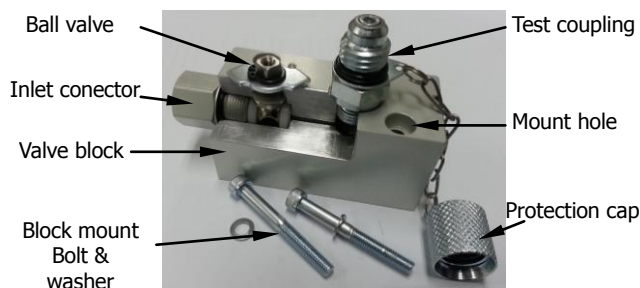


Photo Shown:
Pressure sensors installed on a test valve block for service of a marine propulsion engine.



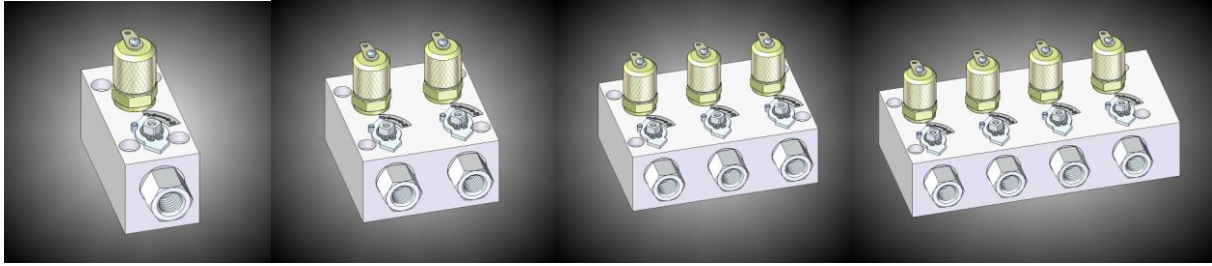
Features

Construction Materials	<ul style="list-style-type: none"> ● Valve block – Aluminium A6061BD, colorless anodized ● Inlet connector – Aluminium A6061BD, colorless anodized ● Ball valve ball, stem – Stainless steel SS304, SS316L(optional) ● Ball valve seating – POM ● O-ring – FPM(Viton) ● Test coupling, Bolt & Washer : Carbon steel, electric galvanized
Operating Temperature	-20 °C to +120 °C (- 4 °F to 248 °F)
Pressure	Operating : -0.8 to 100 bar (3,526 psig) Overload : 150 bar Bursting : 250 bar
Applicable Medium	Lube oil, Water, Air
Leakage test	Tested with air at 100 bar pressure, leakage < 3.5 mbar/s

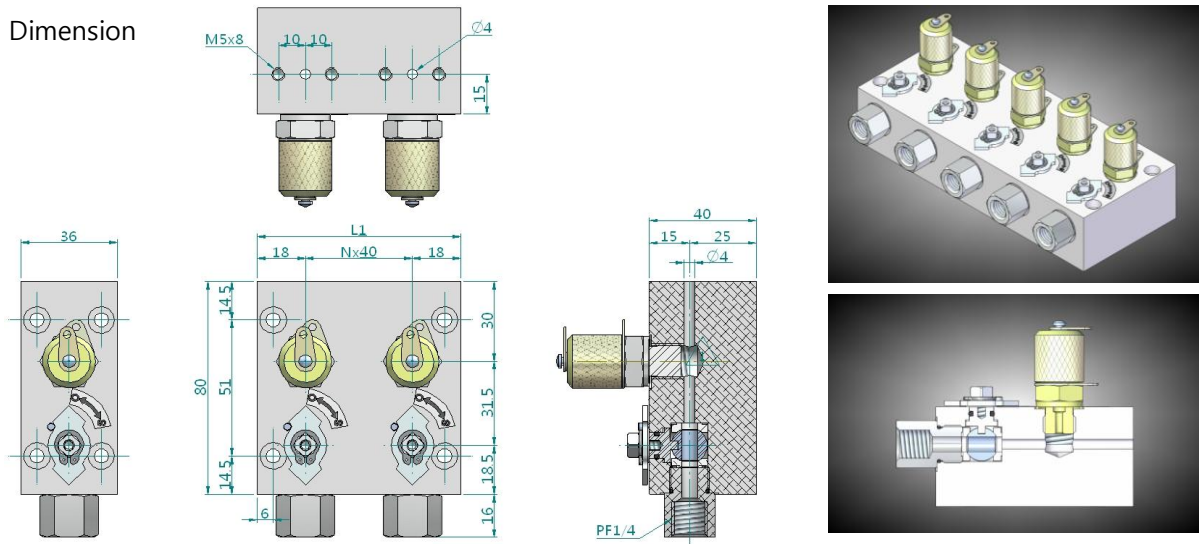


- Rugged & compact block design
- Improved vibration resistance
- Vertical or horizontal mounting

VTA Straight path test valve block



● Dimension



Ordering Part no.	Pitch	Flowing dwg.	Input & output No.	Pitch no. N	Length, L	Weight Kg.	Connection part
VTA-11-A6	-		1	0	36	0.4	Inlet : PF1/4 Outlet: Flange / M5x8L Test Coupling: M16x1.5
VTA-22-C40-A6	40		2	1	76	0.8	
VTA-33-C40-A6			3	2	116	1.2	
VTA-44-C40-A6			4	3	156	1.6	
VTA-55-C40-A6			5	4	196	2.0	
VTA-22-C38-A6			38		2	1	
VTA-33-C38-A6	3	2			114	1.2	
VTA-44-C38-A6	4	3			152	1.6	
VTA-55-C38-A6	5	4			190	2.0	
VTA-12-C40-A6	40		1 - 2	1	76	0.8	
VTA-13-C40-A6			1 - 3	2	116	1.2	
VTA-14-C40-A6			1 - 4	3	156	1.6	
VTA-15-C40-A6			1 - 5	4	196	2.0	

Ball valve actuation handle

To open or shut-off the ball valve on the valve block, the optional lever handle may be required.

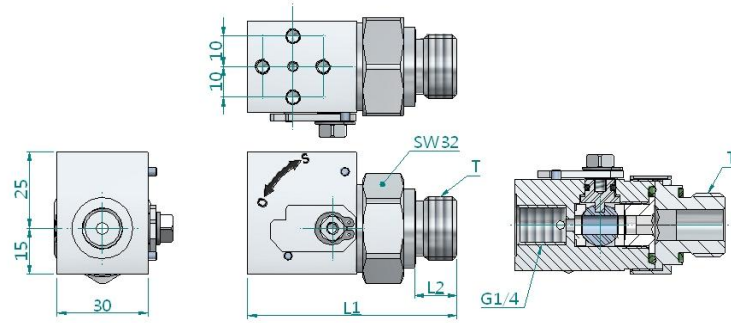
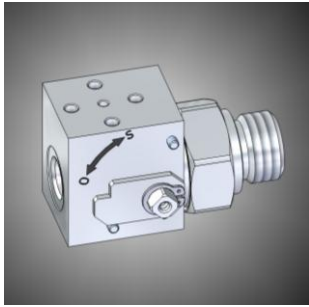
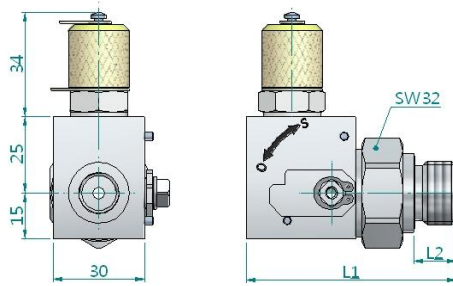
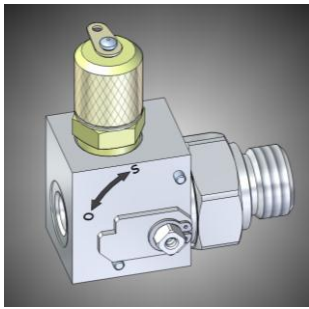
Ordering number: **9VLH-S795-C**

Handle Description

7mm Square actuation
95mm Length
Yellow-zinc plated Steel



VTA1T Tee path test valve



Ordering Part no.	Conn. type	T	L1	L2	Construction Materials
VTA1T-02GE02G-A6	Test coupling	G1/4	67	12	<ul style="list-style-type: none"> Valve block – Aluminium A6061BD, colorless anodized Ball valve, Conn.plug – Stainless steel SS304 Test coupling – Carbon steel, electric galvanized O-ring,ED-ring – FPM(Viton)
VTA1T-04GE02G-A6	M16x1.5	G1/2	69	14	
VTA1T-02GE03-A6	Flange	G1/4	67	12	
VTA1T-04GE03-A6	M5x8L	G1/2	69	14	

Ordering Information

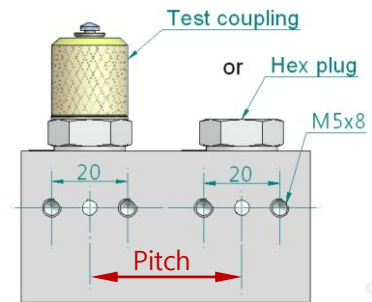
Example

VTA 11 - C 40 - A6

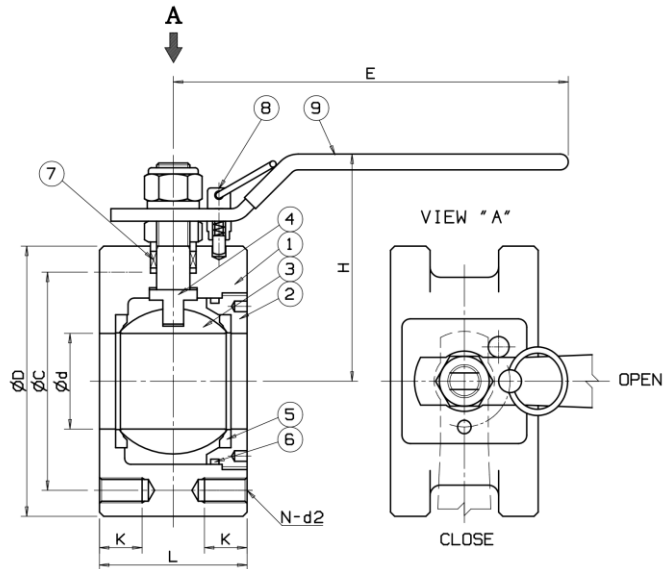
(1) (2) (3) (4) (5)

- No. (1) **VTA, VTA1T** : The designator of Test Valve Block
- No. (2) Numbers of **input** & **output** ports and various flow paths
Custom input and output port combination is available.
- No. (3) **C**: Push-Open check valve in the test coupling
P: Plug 1/4 in. PF
- No. (4) **38, 40** : The pitch between each path
- No. (5) Valve Block Material

A6	Aluminum alloy A6061BD
CNP	Steel nickel plated
BCP	Brass C3604BD with chrome plated



VBCP Compact Ball Valve



● Dimension

Unit: mm

Pressure	Ordering Part no.	ϕd	L	E	H	FLANGE			
						ϕD	ϕC	K	N-d2
JIS - 5K	VBCP-5K20A-C	20	38	150	69	85	65	12	4-M10
	VBCP-5K25A-FCD	25	42	150	85	95	75	12	4-M10
	VBCP-5K32A-FCD	32	50	170	100	115	90	15	4-M12
	VBCP-5K40A-FCD	39	60	170	105	120	95	15	4-M12
	VBCP-5K50A-FCD	46	70	190	110	130	105	20	4-M12
	VBCP-5K65A-FCD	62	95	210	122	155	130	20	4-M12
	VBCP-5K80A-FCD	72	110	230	140	180	145	25	4-M16
	VBCP-5K100A-FCD	85	132	380	142	200	165	30	4-M16
JIS - 20K	VBCP-20K20A-C	20	38	150	80	100	75	12	4-M12
	VBCP-20K25A-FCD	25	42	150	100	125	90	15	4-M16
	VBCP-20K32A-FCD	32	50	170	110	135	100	15	4-M16
	VBCP-20K40A-FCD	39	60	170	115	140	105	20	4-M16
	VBCP-20K50A-FCD	46	70	190	123	155	120	25	8-M16
	VBCP-20K65A-FCD	62	95	210	132	175	140	30	8-M16
	VBCP-20K80A-FCD	72	110	230	150	200	160	35	8-M20
	VBCP-20K100A-FCD	85	130	380	160	225	185	35	8-M20

● Construction Materials

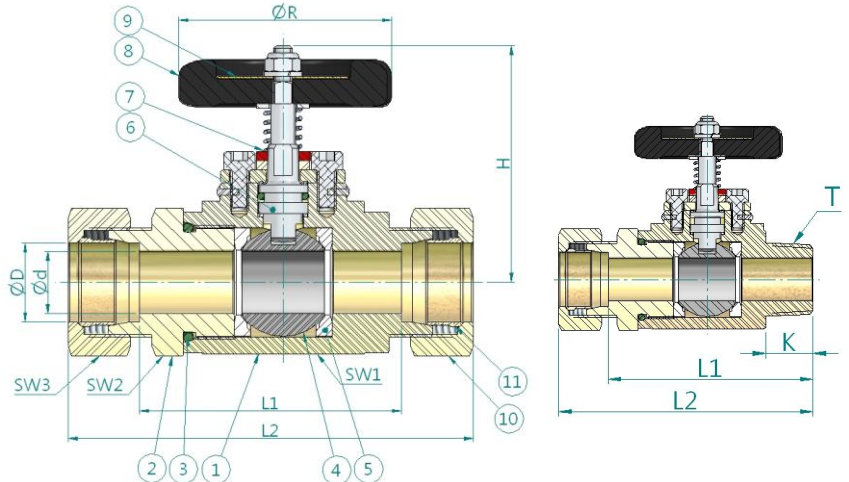
No.	Part Name	Material Spec.	
1	Body	FCD 450	SCS 13
2	Cover	SS 400	SUS 304
3	Ball	SCS 13	
4	Stem	SUS 304	
5	Seat Ring	PTFE + Glass	
6	O-Ring	VITON	
7	V-Packing	PTFE	
8	Locking Device	SUS 304	
9	Handle	SS 400	

The end letter of part no. shows body material ;
C – Carbon Steel
FCD – Ductile cast iron FCD450
S4 – Stainless Steel casting SCS13

● Features

Specification	JIS - 5K Flange	JIS - 20K Flange
Working Pressure	5 Kgf/cm ²	20 Kgf/cm ²
Leakage Test (Hyd.oil, 5 min.)	Seat : 6 Kgf/cm ² Body : 8 Kgf/cm ²	Seat : 25 Kgf/cm ² Body : 30 Kgf/cm ²
Working Temperature	-20 °C to +150 °C (- 4 °F to 302 °F)	
Applicable Medium	Fuel Oil, Lub. Oil, Fresh Water, Steam, Sea Water, Compressed Air.	

VBW Wheel Handle Ball Valve



● Dimension

Unit: mm

Ordering Part no.	ØD	T	Ød	K	L1	L2	SW1	SW2	SW3	H	R
VBW-B-10-C	10	-	13	-	65	103	36	30	19	69	70
VBW-B-12-C	12	-	13	-	65	103	36	30	22	69	
VBW-B-15-C	15	-	13	-	67	107	36	30	27	69	
VBW-B-16-C	16	-	13	-	67	107	36	30	30	69	
VBW-B-18-C	18	-	13	-	67	108	36	30	32	69	
VBW-B-20-C	20	-	17	-	79	121	41	36	36	72	
VBW-B-22-C	22	-	17	-	78	122	41	36	36	72	
VBW-B-25-C	25	-	20	-	84	131	46	41	41	76	
VBW-B-28-C	28	-	20	-	84	132	46	41	46	76	
VBW-B-8A-C	13.8	-	13	-	67	106	36	30	24	69	70
VBW-B-10A-C	17.3	-	13	-	67	108	36	30	32	69	
VBW-B-15A-C	21.7	-	17	-	78	122	41	36	36	72	
VBW-B-20A-C	27.2	-	20	-	84	132	46	41	46	76	
VBW-B-25A-C	34.0	-	20	-	104	139	46	46	55	76	
VBW-MB-03R10A-C	17.3	R3/8	13	15	82	95	36	30	32	69	70
VBW-FB-04R10A-C	17.3	R1/2	13	15	82	95	36	30	32	69	
VBW-MB-04G10A-C	17.3	G1/2	13	14	67	108	36	30	32	69	
VBW-MB-06R25-C	25	R3/4	20	20	93	117	46	41	41	76	
VBW-MB-08R25-C	25	R1	20	22	95	117	46	41	41	76	

● Construction Materials

No.	Part Name	Material Spec.		
		Steel	Brass	SS304
1	Body	Steel	C3771	SS304
2	Connector	Steel	C3604	SS304
3	O-Ring	Steel	C3604	SS304
4	Ball	SS304		
5	Seat Ring	PTFE		
6	Stem	SS304		
7	Locking Device	Steel, Red painted		
8	Wheel handle	Nylon glass		
9	Name plate	C2801P		
10	Nut	Steel	C3604	SS304
11	Sleeve	Steel	C3604	SS304

● Features

- This ball valve has wheel handle instead of lever handle and it prevent unexpected operating by touch handle.
- Name plate shows flow direction and system.
- Operating procedure of locking device
 - 1) Lift up and turn 45° locking device
 - 2) Operate handle 90°
 - 3) Turn locking device until push down to holding position

● Specification

Working Pressure	40 Kg/cm ²
Leakage Test (Air, 5 min.)	Seat : 45 Kg/cm ² , Body : 60 Kg/cm ²
Working Temperature	- 20 °C to + 150 °C (- 4 °F to 302 °F)
Applicable Medium	Fuel Oil, Lub. Oil, Fresh Water, Steam, Compressed Air.

● Ordering Information

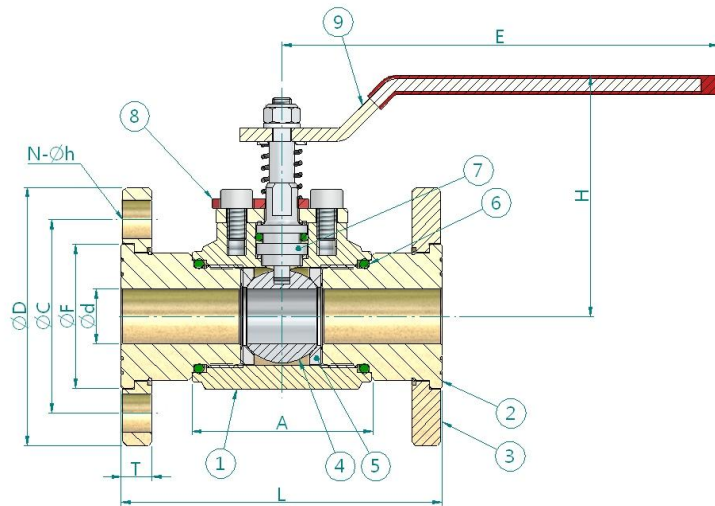
Example

VBW - B - 20 - C

(1) (2) (3) (4)

- No. (1) **VBW** : The designator of ball valve
 No. (2) **B**-Bite type, **M**-Male thread, **F**-Female thread
 No. (3) **10~28, 8A~25A** : Tube size and Pipe nominal size
03R~08R, G1/2 : Straight pipe thread and Pararrel pipe thread
 No. (4) Valve body material as shown
C – Carbon Steel, **B** – Brass, **S4** – SS304

VBWF Swivel flange Ball Valve



● Dimension

Unit: mm

Ordering Part no.	Ød	L	A	E	F	H	Body Hex.	FLANGE			
								ØD	φC	T	N-Øh
VBWF-5K15A-C	17	100	56	130	44.6	77	41	80	60	10.0	4-Ø12
VBWF-5K20A-C	20	110	64	130	49.0	80	46	85	65	10.5	4-Ø12
VBWF-5K25A-C	20	120	64	130	49.0	80	46	95	75	10.5	4-Ø12

● Construction Materials

No.	Part Name	Material Spec.		
		Steel	Brass	SS304
1	Body	SS400	C3771	SS304
2	Connector	SS400	C3604	SS304
3	Flange	SS400	C3604	SS304
4	Ball	SUS 304		
5	Seat Ring	PTFE		
6	O-Ring	VITON		
7	Stem	SUS 304		
8	Locking Device	SS 400	Red painted	
9	Handle	SS 400		

● Features

Specification	JIS - 5K Flange
Working Pressure	5 Kgf/cm ²
Leakage Test (Hyd.oil, 5 min.)	Seat : 6 Kgf/cm ² Body : 8 Kgf/cm ²
Working Temperature	-20 °C to +150 °C (- 4 °F to 302 °F)
Applicable Medium	Fuel Oil, Lub. Oil, Fresh Water, Steam, Compressed Air.

- This valve has swivel flanges and it helps fabrication work with easy connection to other flange.
- And could be used instead of many bronze casted valves in ship and ship engine system.

● Ordering Information

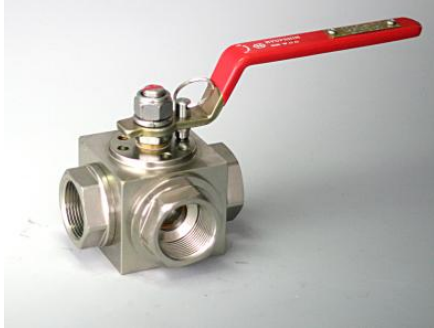
Example

VBWF - 5K 15A - C
(1) (2) (3) (4)

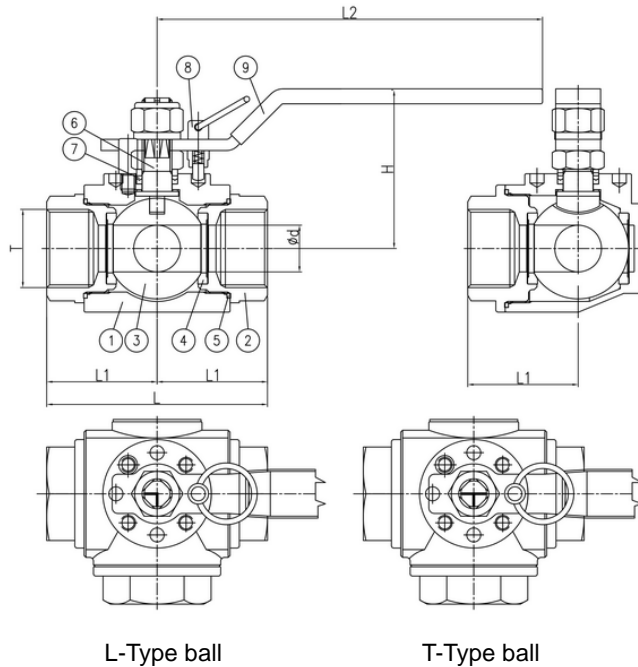
- No. (1) **VBWF** : The designator of ball valve
- No. (2) **5K** : JIS Flange pressure
- No. (3) **15A, 20A & 25A** : JIS Flange size
- No. (4) Valve body material as shown
C - Carbon Steel, yellow zinc galvanized
B - Brass C3771 or C3604
S4 - SS304

VBT 3-Way Ball Valve Female

Bar stock Body



Forged Body



● Features

Specification	Bar stock Body	Forged Body
Max. Working Pressure	30 bar	20 bar
Leakage Test (Hyd.oil, 5 min.)	Seat : 36 bar Body : 45 bar	Seat : 24 bar Body : 30 bar
Working Temperature	-20 °C to +150 °C (- 4 °F to 302 °F)	
Applicable Medium	Fuel Oil, Lub. Oil, Fresh Water, Steam, Compressed Air.	

● Construction Materials

No.	Part Name	Material Spec.		
		STEEL	S. Steel	BRASS
1	Body	S20C	SUS304	C3771
2	Side Connector	S45C	SUS304	C3604
3	Ball	SUS304		
4	Seat Ring	PTFE + Glass 15%		
5	O-Ring	VITON		
6	Stem	SUS304		
7	Packing	PTFE		
8	Locking Device	SUS304		
9	Lever Handle	SS400		

● Bar stock Body

Ordering Part no.	Ød	T (PF)	L	L1	L2	H	Body Material		
							S20C	SUS304	C3771
VBT15-04G-238-C	15	1/2"	90	45	150	63	●	●	●
VBT15-06G-238-C	15	3/4"	92	46	190	63	●	●	●
VBT20-08G-238-C	20	1"	108	54	190	85	●	●	●
VBT25-10G-238-C	25	1-1/4"	118	59	205	85	●	●	●
VBT32-12G-238-C	32	1-1/2"	140	70	205	95	●	●	●

● Forged Body

Ordering Part no.	Ød	T (PF)	L	L1	L2	H	Body Material		
							S20C	SUS304	C3771
VBT25-10G-238-CF	25	1-1/4"	118	59	205	85	●	-	●
VBT32-12G-238-CF	32	1-1/2"	140	70	205	95	●	-	●

● Ordering Information

Example

VBT 20 – 08G – 238 - C

(1) (2) (3) (4) (5)

- No. (1) **VBT** : The designator of ball valve
- No. (2) **20** : 3-Way ball orifice
- No. (3) **08G** : Pipe thread size and thread kind (**G**: parallel, **R**: taped)

Symbol	04G	06G	08G	10G	12G
Thread Size	1/2"	3/4"	1"	1-1/4"	1-1/2"

No. (4) **238** : Ass'y location of **Body**, **Ball** and **Handle** in sequence
See the below table [Flow direction of no. (4)]

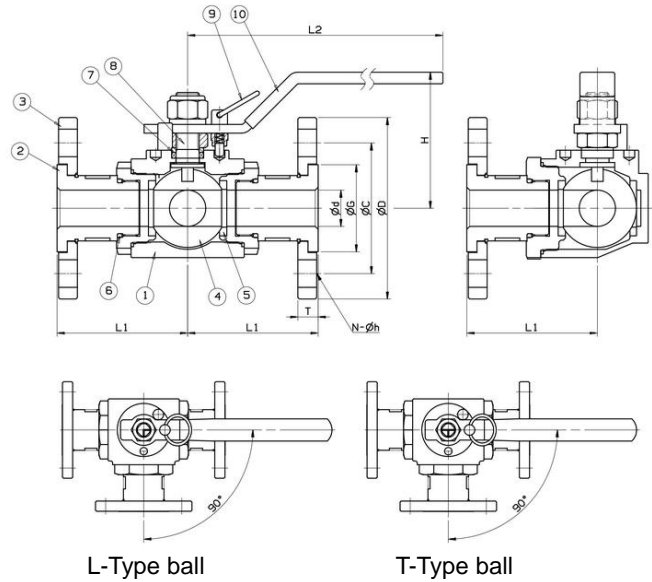
- No. (5) Valve body material as shown
- C** – Carbon Steel, yellow zinc galvanized
- B** – Brass C3771 or C3604
- S4** – SS304

● Flow direction of no. (4)

234	238	298																						
224	268	248																						
268	248																							
<p>Ass'y dwg.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> </div> <p>Body no. : 2 8 2</p> <p>Handle no. : 4 8 8</p>		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Digit</th> <th>Direction</th> <th>Shape</th> <th>Grant Number</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td rowspan="2">BODY</td> <td></td> <td>7 8 9</td> </tr> <tr> <td></td> <td>4 5 6</td> </tr> <tr> <td rowspan="2">2</td> <td rowspan="2">BALL</td> <td></td> <td>1 2 3</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td rowspan="2">3</td> <td rowspan="2">HANDLE</td> <td></td> <td>7 8</td> </tr> <tr> <td></td> <td>4 6</td> </tr> </tbody> </table>	Digit	Direction	Shape	Grant Number	1	BODY		7 8 9		4 5 6	2	BALL		1 2 3			3	HANDLE		7 8		4 6
Digit	Direction	Shape	Grant Number																					
1	BODY		7 8 9																					
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3	HANDLE		7 8																					
			4 6																					

VBT 3-Way Ball Valve

JIS Flange type 3-Way Ball Valve



● Features

Specification	JIS - 5K Flange	JIS - 10K Flange
Max. Working Pressure	10 Kgf/cm ²	16 Kgf/cm ²
Leakage Test (Hyd.oil, 5 min.)	Seat : 11 Kgf/cm ² Body : 15 Kgf/cm ²	Seat : 18 Kgf/cm ² Body : 24 Kgf/cm ²
Working Temperature	-20 °C to +150 °C (- 4 °F to 302 °F)	
Applicable Medium	Fuel Oil, Lub. Oil, Fresh Water, Steam, Compressed Air.	

- valve has swivel flanges and it helps fabrication work with easy connection to other flange.

● Construction Materials

No.	Part Name	Material Spec.		
		STEEL	S. Steel	BRASS
1	Body	S20C	SUS304	C3771
2	Flange Connector	S45C	SUS304	C3604
3	Flange	SS400	SUS304	C3604
4	Ball	SUS304		
5	Seat Ring	PTFE + Glass 15%		
6	O-Ring	VITON		
7	Packing	PTFE		
8	Stem	SUS304		
9	Locking Device	SUS304		
10	Lever Handle	SS400		

● JIS – 5K Flange

Ordering Part no.	Ød	H	L1	L2	FLANGE				
					ØD	ØC	ØG	T	N-Øh
VBT20-5K25A-238-C	20	85	80	190	95	75	50	10	4-Ø12
VBT32-5K32A-238-C	32	95	90	205	115	90	70	12	4-Ø15
VBT32-5K40A-238-C	32	95	90	205	120	95	74.5	12.	4-Ø15

● JIS – 10K Flange

Ordering Part no.	Ød	H	L1	L2	FLANGE				
					ØD	ØC	ØG	T	N-Øh
VBT25-10K25A-238-C	25	86	90	205	125	90	60	13	4- Ø19
VBT32-10K32A-238-C	32	95	90	205	135	100	75	14	4- Ø19
VBT32-10K40A-238-C	32	95	90	205	140	105	75	14	4- Ø19

● Ordering Information

Example

VBT 20 - 5K 25A - 238 - C

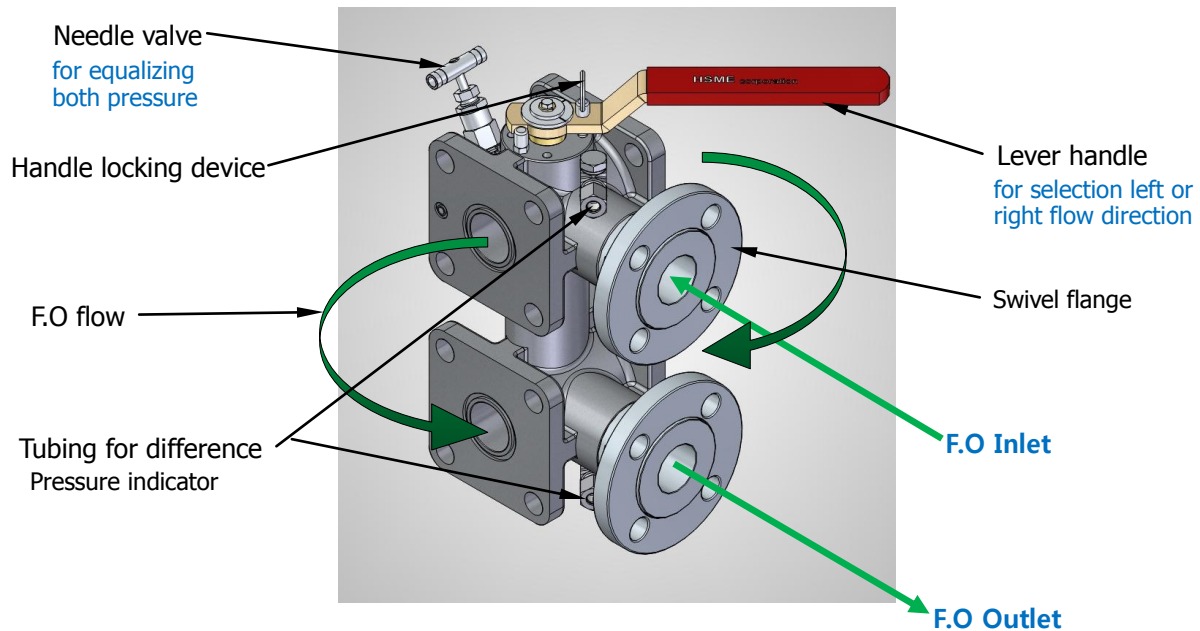
(1) (2) (3) (4) (5) (6)

- No. (1) **VBT** : The designator of ball valve
- No. (2) **20** : 3-Way ball orifice
- No. (3) **5K** : JIS Flange pressure
- No. (4) **25A, 32A & 40A** : JIS Flange size
- No. (5) **238** : Ass'y location of **Body, Ball** and **Handle** in sequence
See the below table [Flow direction of no. (5)]
- No. (6) Valve body material as shown
 - C** - Carbon Steel, yellow zinc galvanized
 - B** - Brass C3771 or C3604
 - S4** - SS304

● Flow direction of no. (5)

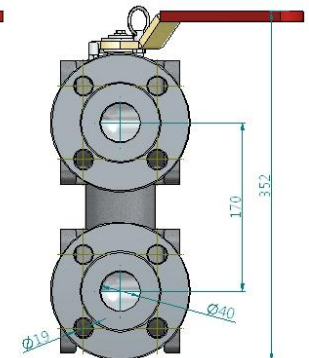
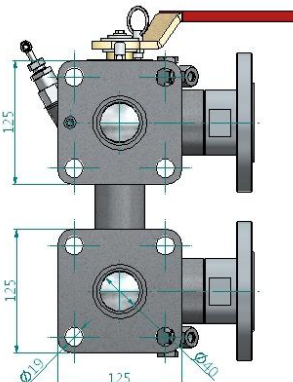
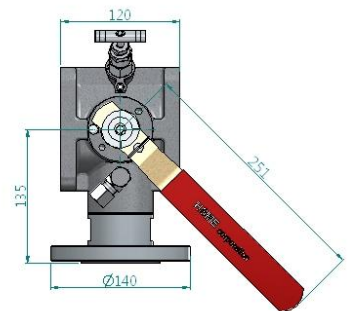
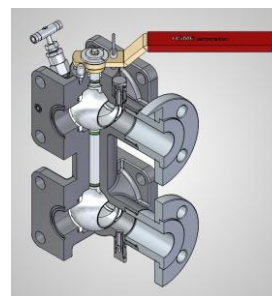
<p>234</p>	<p>238</p>	<p>298</p>																								
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			4 6																							
<p>Ass'y dwg.</p>																										
<p>Body no. : 2</p>	<p>8</p>	<p>2</p>																								
<p>Handle no. : 4</p>	<p>8</p>	<p>8</p>																								

VBFD 3-Way Double Ball Valve for fuel oil filter



● Features

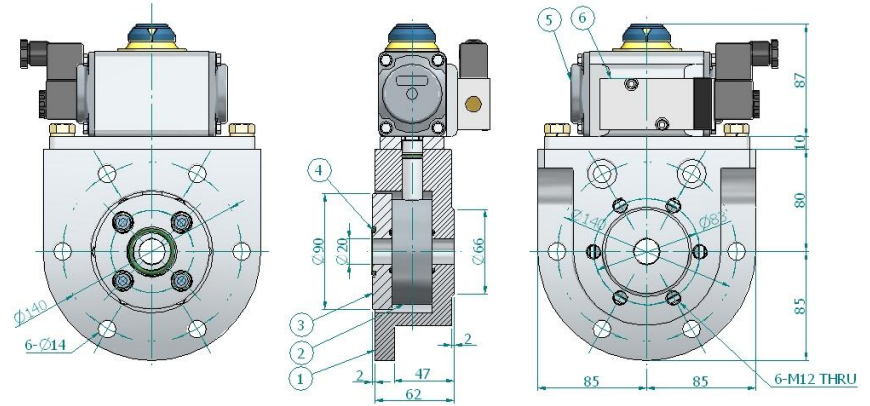
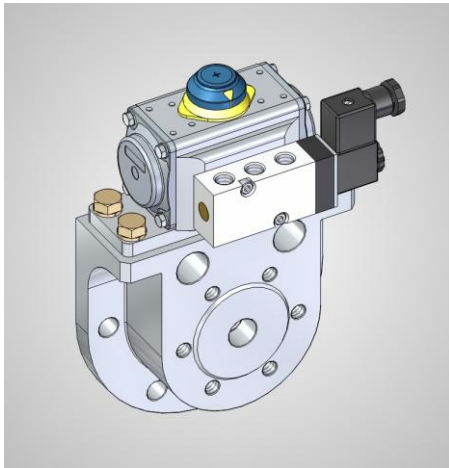
Ordering Part no.	VBFD-20K40A-FCD
Specification	Inlet,Outlet flange : JIS 20K-40A Side square flange : Designed flange
Working Pressure	20 Kgf/cm ²
Leakage Test (Hyd.oil, 5 min.)	Seat : 24 Kgf/cm ² Body : 30 Kgf/cm ²
Working Temperature	-20 °C to +150 °C (- 4 °F to 302 °F)
Applicable Medium	Fuel Oil, Lub. Oil



● Construction Materials

Part Name	Material
Valve housing	FCD450
Ball L-type	SS304
Stem	SS304
Flange	Steel
Needle Valve	SS304
Handle	Steel
O-ring	FPM
Seat ring	PTFE

VBG Gas Venting Ball Valve (10K-20A, Steel)



● Features

- Designed to use medium gas engine natural gas system
- Suitable for hard vibration environment
- Actuator installed on body directly
- NAMUR Solenoid valve operated for single acting
- Normal close (on current failure)
- Hard cr-plated ball

● Actuator

- Maker : Air Torque S.p.A.
- Model no.: AT 045 U S3-3
- Operating type : Spring return
- Output torque, Nm

Air pressure	6 bar		7 bar		8 bar		Spring stroke	
Rotation	0°	90°	0°	90°	0°	90°	0°	90°
Torque	9.4	11.8	4.8	7.2	14.1	9.5	9.6	5.0

● Construction Materials

No.	Part Name	Material Spec.
1	Valve housing	Carbon steel
2	Valve complete	-
	Ball	SS304
	Seat ring	PTFE
	Stem	SS304
3	Conn.plate	Carbon steel
4	O-Ring	FPM70SHA
5	Actuator	Aluminium
6	Solenoid valve	Aluminium

● Solenoid Valve

- Maker : HAFNER (German)
- Model no.: MNH 510 701
- Voltage : DC24V
- Temp. range: -10 °C to +70 °C
- 5/2-way diagram



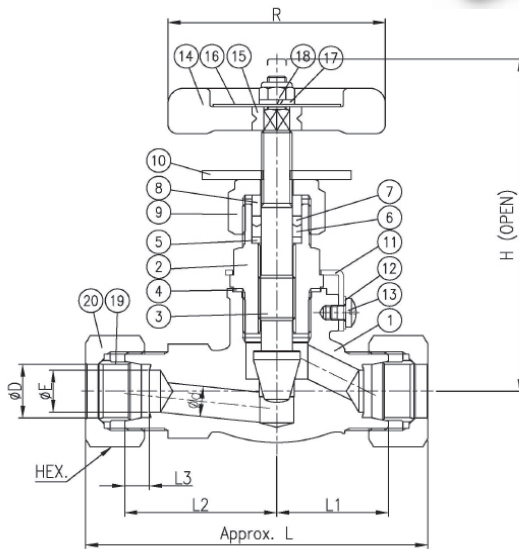
● Application & Test

Working Pressure	10 bar
Hydro Test	15 bar (30 min.)
Leakage Test	11 bar (Nitrogen, 30 min.)
Working Temperature	0 °C to +50 °C (- 32 °F to 122 °F)
Applicable Medium	Natural gas

GLOBE VALVE - VG Series

VG

Globe Valve



No.	Part Name	Material Spec.	
1	Body	S20C	C3771
2	Bonnet	S20C	C3604
3	Stem	SUS 304	SUS 304
4	Bonnet Packing	C1100	C1100
5	Bonnet Support	C3604	C3604
6	Lower Packing	PTFE	PTFE
7	Upper Packing	PTFE	PTFE
8	Gland	C3604	C3604
9	Cap Nut	S20C	C3604
10	Locking Plate	SS 400	SS 400
11	Bonnet Holder	S20C	S20C
12	Tooth Washer	SK5M	SK5M
13	Plus Head Screw	SUS 304	SUS 304
14	Wheel Handle	Nylon + Glass	
15	Handle Insert	C3604	C3604
16	Name Plate	C2801P	C3801P
17	Spring Washer	SUS 304	SUS 304
18	Nylon Nut	SUS 304	SUS 304
19	Sleeve	STEEL	C3604
20	Nut	S45C	C3604

■ REFERENCE DIMENSIONS

Unit :mm

Nominal Size	cd	øD	cE	L (Approx)	L1	L2	L3	H (Open)	T (Thread)	R	HEX.
VG-B-15-C	10.0	15.0	12.0	110.0	36.0	49.0	7.5	110.0	-	70.0	27.0
VG-MB-M24P215-C	9.0	15.0	12.0	99.6	36.0	51.0	14.0	110.0	M24*2.0	70.0	27.0
VG-B-16-C	10.0	16.0	13.0	100.0	36.0	49.0	7.5	110.0	-	70.0	30.0
VG-MB-06G16-C	10.0	16.0	13.0	100.0	36.0	51.0	16.0	110.0	3/4"PF	70.0	30.0
VG-MB-06R16-C	10.0	16.0	13.0	100.0	36.0	51.0	20.0	110.0	3/4"PT	70.0	30.0
VG-B-20-C	12.0	20.0	16.0	110.0	36.0	49.0	8.0	110.0	-	70.0	36.0
VG-MB-02R20-C	6.0	20.0	16.0	94.0	36.0	45.0	14.0	110.0	1/4"PT	70.0	36.0
VG-MB-03R20-C	10.5	20.0	16.0	97.0	36.0	47.0	16.0	110.0	3/8"PT	70.0	36.0
VG-MB-04R20-C	10.5	20.0	16.0	97.0	36.0	48.0	17.0	110.0	1/2"PT	70.0	36.0
VG-MB-06R20-C	12.0	20.0	16.0	100.0	36.0	51.0	20.0	110.0	3/4"PT	70.0	36.0
VG-B-MB-08R20-C	12.0	20.0	16.0	96.0	42.0	45.0	22.0	100.0	1" PT	70.0	36.0
VG-B-25-C	12.0	25.0	20.0	103.5	38.0	38.0	10.0	113.0	-	70.0	41.0
VG-B-8A-C	9.0	13.8	11.0	109.0	36.0	49.0	7.5	110.0	-	70.0	24.0
VG-B-10A-C	10.0	17.3	14.0	110.0	36.0	49.0	8.0	110.0	-	70.0	32.0
VG-MB-03R10A-C	8.0	17.3	14.0	97.0	36.0	48.0	16.0	110.0	3/8"PT	70.0	32.0

GLOBE VALVE - VG Series

Nominal Size	cd	øD	øE	L (Approx)	L1	L2	L3	H (Open)	T (Thread)	R	HEX.
VG-MB-04R10A-C	10.0	17.3	14.0	97.0	36.0	48.0	17.0	110.0	1/2"PT	70.0	32.0
VG-MB-06G10A-C	10.0	17.3	14.0	100.0	36.0	51.0	16.0	110.0	3/4"PF	70.0	32.0
VG-B-15A-C	12.0	21.7	18.0	110.0	37.0	46.0	9.0	110.0	-	70.0	36.0
VG-MB-03R15A-C	8.0	21.7	18.0	97.5	37.0	47.0	16.0	110.0	3/8"PT	70.0	36.0
VG-MB-04R15A-C	10.5	21.7	18.0	97.5	37.0	48.0	17.0	110.0	1/2"PT	70.0	36.0
VG-MB-06R15A-C	12.0	21.7	18.0	97.5	37.0	51.0	20.0	110.0	3/4"PT	70.0	36.0
VG-MB-08R15A-C	12.0	21.7	18.0	97.5	42.0	45.0	22.0	113.0	1" PT	70.0	36.0

■ Specification

- Nominal Pressure : 40 kgf/Cm2
- Shell Test : 80 kgf/Cm2
- Maximum Working Temperature : 160°C
- Application system : Fuel Oil, Lub Oil, Fresh Water, Steam

■ Ordering Information

Example :

VG - MB - 03R10 - C

① ② ③ ④

- ① : Valve Series
- ② : End Connections.(In/Outlet), B: Bite Type / BM: Bite * Male Thread
/ FB: Female Thread*Bite Type / F: Female
- ③ : Size PT3/8"***10mm Tube O.D

* ISO/BSP

Thread	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Designator	01R (G)	02R (G)	03R (G)	04R (G)	06R (G)	08R (G)

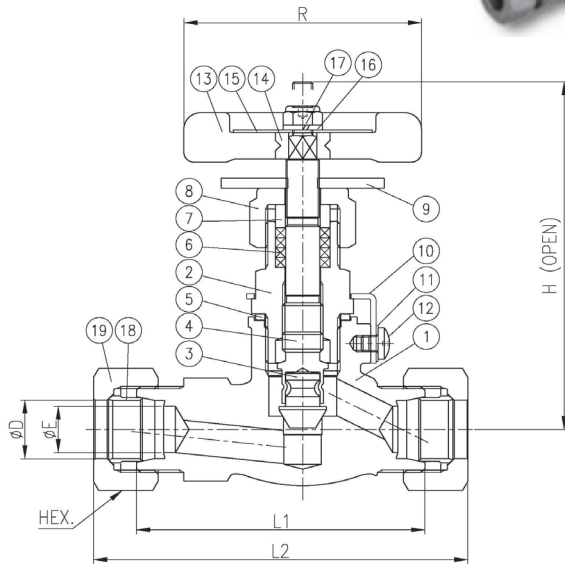
*Tube

Inch Pipe (JIS)	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Designator	6A	8A	10A	15A	20A	25A
Metric Tube	6	8	10	12	15	20
Designator	06	08	10	12	15	20

④ : Material

C : Carbon Steel B : Brass S4 : Stainless Steel 304

VG-XC Series Globe Valve (Xylan Coated)



No.	Part Name	Material Spec.	
1	Body	S20C	Xylan Coating
2	Bonnet	S20C	Xylan Coating
3	Stem	SUS 304	
4	Stem-Cone	SUS 316	
5	Bonnet Packing	SPCC	
6	Packing	Graphite	
7	Gland	S45C	
8	Cap Nut	S20C	Xylan Coating
9	Locking Plate	SS 400	Xylan Coating
10	Bonnet Holder	S20C	Xylan Coating
11	Tooth Washer	SK5M	
12	Plus Head Screw	SUS 304	
13	Wheel Handle	Nylon + Glass	
14	Handle Insert	C3604	
15	Name Plate	C2801P	
16	Spring Washer	SUS 304	
17	Nylon Nut	SUS 304	
18	Sleeve	STEEL	
19	Nut	S45C	

■ REFERENCE DIMENSIONS

Unit :mm

Nominal Size	ød	øD	øE	L (Approx)	L1	L2	L3	H (Open)	R	HEX.
VG-B-8A-XC	9.0	13.8	11.0	109.0	36.0	49.0	7.5	110.0	70.0	24.0
VG-B-10A-XC	10.0	17.3	14.0	110.0	36.0	49.0	8.0	110.0	70.0	32.0

■ Specification

- Nominal Pressure : 40 kgf/Cm2
Test Pressure Body : 80 kgf/Cm2
- General information of Xylan Coating.:
Dry Film Thickness : 15~25µ
Other: Use Temperature: 180°C Continuous; 232°C Intermittent.
- Applicable system : Heavy Fuel Oil

■ Ordering Information

Example :

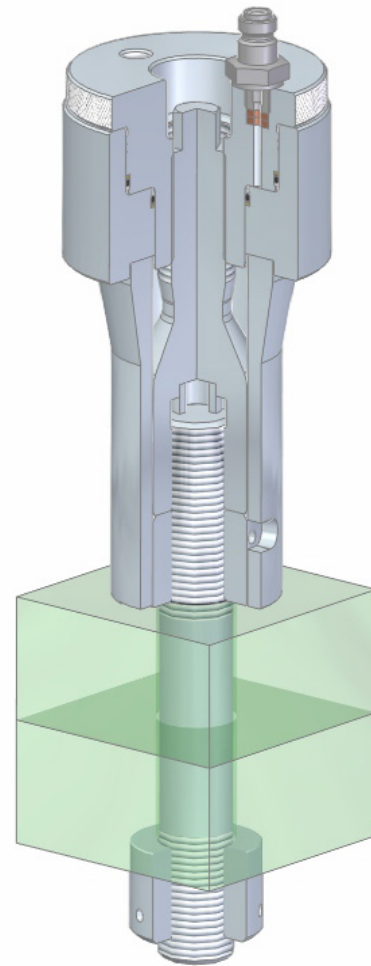
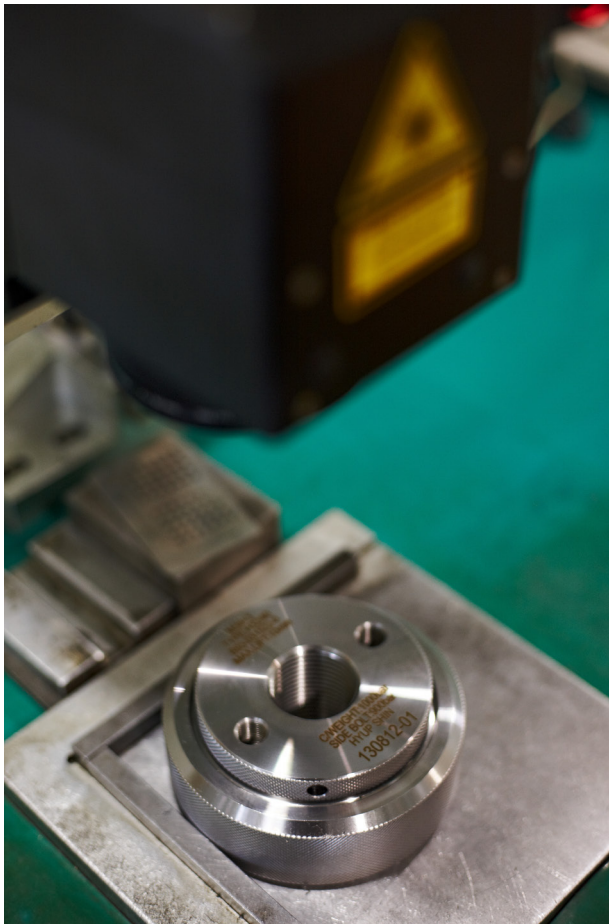
VG - M B - 03R10 - C

① ② ③ ④

- ① : Valve Series
- ② : End Connections.(In/Outlet), B: Bite Type / BM: Bite * Male Thread
/ FB: Female Thread*Bite Type / F: Female
- ③ : Size 8A Pipe O.D
- ④ : Material
XC : Xylan Coating Carbon Steel

Hydraulic Jack Up Unit

Ultra High Working Pressure Design: Up to 1300 bar



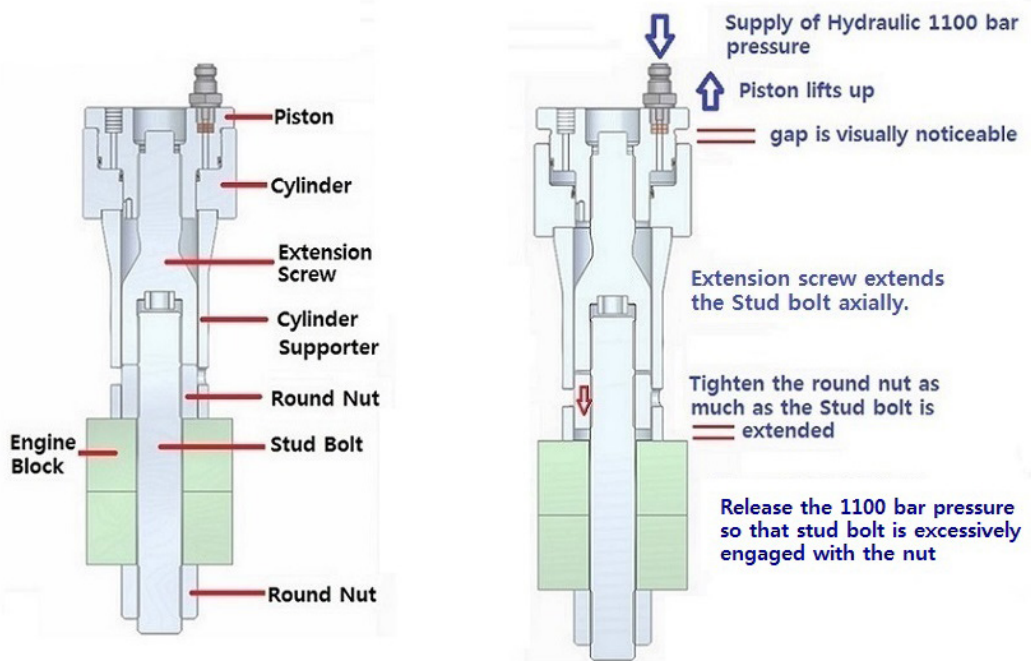
HSME is the leading supplier of Hydraulic Powered JACK UP UNITS. HSME provides the complete bolting solution for heavy industries including diesel engine fabrication where long stub bolts need to be tightened enough to hold up massive weight of engine sectional blocks or parts in place

HSME supplies wide range of Hydraulic Jack Up Units that handle bolts up to M90 metric thread.

Materials of Construction

All parts of Jack Up Unit are constructed out of high tensile material exceeding 150ksi

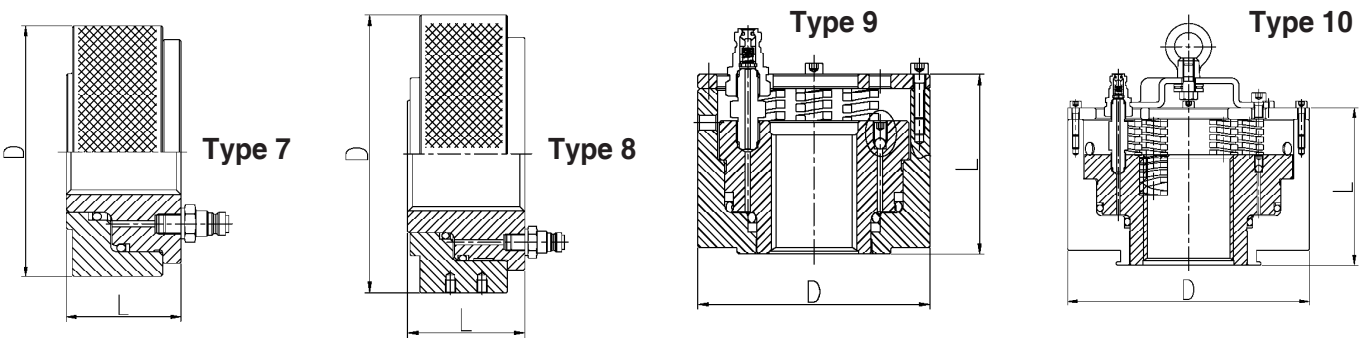
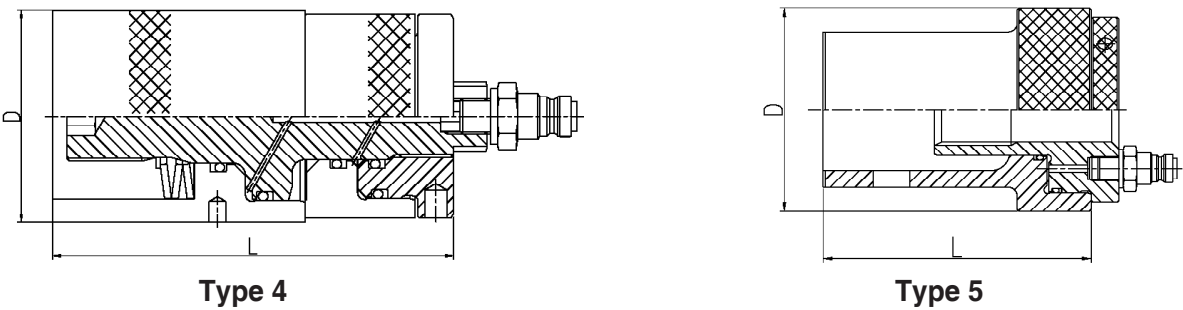
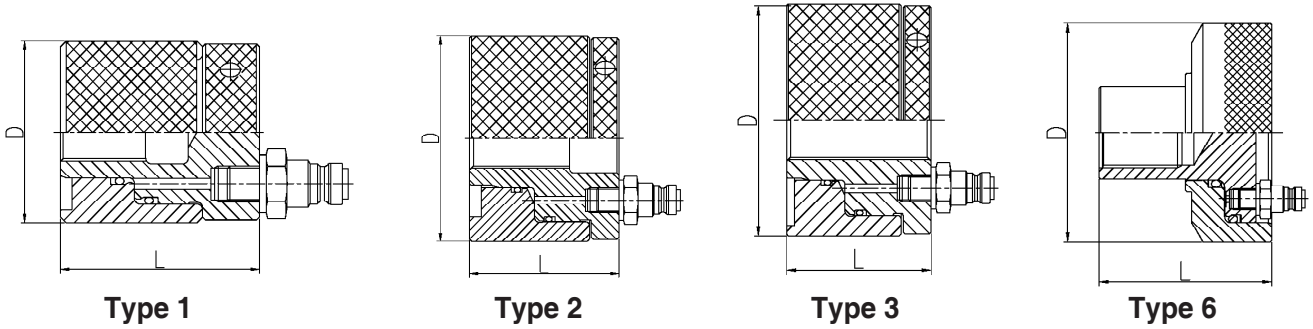
Operation



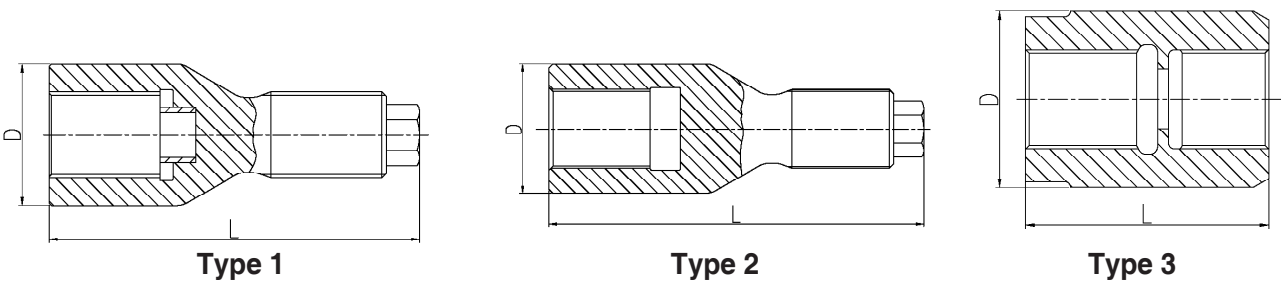
Picture Shown:
Numbers of stud bolts are jacked up and tightened using jack up units at heat exchanger fabrication site.

Hydraulic Jack-THS

■ Assembly



■ Extension~

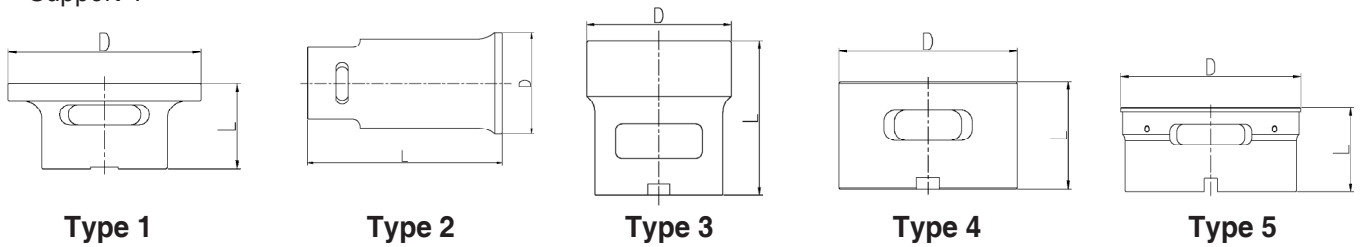


Hydraulic Jack-THS

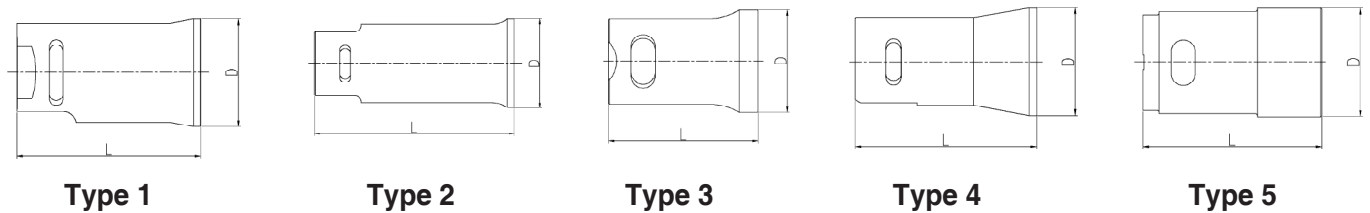
■ Reference Dimensions. (Hyd.Jack Parts)

Assembly Code	SIZE	Hydraulic Jack			MAT'L	Extension			MAT'L
		D	L	TYPE		D	L	TYPE	
THS-H1728-M24-10	M24*2	83	69	3	SNCM439	-	-	-	-
THS-H1728-M27-10	M27*2	83	69	3	SNCM439	-	-	-	-
THS-H1728-M30-10	M30*2	98	76	3	SNCM439	52	140	2	SNCM439
THS-H2132-M20-10	M20*1.5	64	76	1	SNCM439	32	114	1	SNCM439
THS-H2132-M30-10	M30*2	103	76	2	SNCM439	52	160	1	SNCM439
THS-H2132-M39-10	M39*2	113	72	3	SNCM439	64	185	2	SNCM439
THS-H2533-M22-11	M22*1.5	73	66	2	SNCM439	34	96	1	SNCM439
THS-H2533-M36-22	M36*2	107	71	3	SNCM439	-	-	-	-
THS-H2533-M39-22	M39*3	128	71	3	SNCM439	64	167	1	SNCM439
THS-H3240-M33-33	M33*2	77	146	4	SNCM439	59	81	3	SNCM439
THS-H3240-M36-12	M36*2	107	71	3	SNCM439	-	-	-	-
THS-H3240-M39-22	M39*3	128	71	3	SNCM439	64	167	1	SNCM439
THS-H3240-M48-22	M48*3	145	71	3	SNCM439	82	300	2	SNCM439
THS-L2330-M33-10	M33*2	111	61	7	SNCM439	-	-	-	-
THS-L2330-M39-10	M39*4	110	160	5	SCM440	-	-	-	-
THS-L2330-M45-10	M45*3	126	54	7	SCM440	-	-	-	-
THS-L2832-M39-23	M39*3	135	59	7	SCM440H	-	-	-	-
THS-H4660-M45-11	M45*3	140	110	6	SCM435	-	-	-	-
THS-H4660-M56-11	M56*5.5	165	75	7	SCM440	-	-	-	-
THS-H4660-M72-10	M72*6	210	77	6	SCM440	-	-	-	-
THS-H4660-M90-11	M90*6	260	91	8	SCM440	-	-	-	-
THS-L70ME-M80-10	M80*6	215	140	10	SCM440	-	-	-	-
THS-G50ME-M48-12	M48*5	130	101	9	SCM440	-	-	-	-

■ Support-1



■ Support-2



■ Reference Dimensions. (Support Parts)

Assembly Code	SIZE	Support-1			MAT'L	Support-2			MAT'L
		D	L	TYPE		D	L	TYPE	
THS-H1728-M24-10	M24*2	67	34	1	SNCM439	-	-	-	-
THS-H1728-M27-10	M27*2	67	43	1	SNCM439	-	-	-	-
THS-H1728-M30-10	M30*2	79	41	1	SNCM439	79	135	1	SNCM439
THS-H2132-M20-10	M20*1.5	-	-	-	-	54	100	2	SNCM439
THS-H2132-M30-10	M30*2	79	43	1	SNCM439	79	143	3	SNCM439
THS-H2132-M39-10	M39*2	104	51	1	SNCM439	104	175	4	SNCM439
THS-H2533-M22-11	M22*1.5	-	-	-	-	55	80	3	SNCM439
THS-H2533-M36-22	M36*2	85	51	4	SNCM439	85	140	2	SNCM439
THS-H2533-M39-22	M39*2	100	67	4	SNCM439	100	164	2	SNCM439
THS-H3240-M33-33	M33*2	74	87	4	SNCM439	-	-	-	-
THS-H3240-M36-12	M36*2	85	51	4	SNCM439	-	-	-	-
THS-H3240-M39-22	M39*3	101	55	4	SNCM439	-	-	-	-
THS-H3240-M48-22	M48*3	125	68	1	SNCM439	125	285	2	SNCM439
THS-L2330-M33-10	M33*2	105	47	1	SNCM439				
THS-L2330-M39-10	M39*4	-	-	-	-	-	-	-	-
THS-L2330-M45-10	M45*3	105	112	3	SNCM439	-	-	-	-
THS-L2832-M39-23	M39*3	125	53	2	SCM440H	-	-	-	-
THS-H4660-M45-11	M45*3	105	112	4	SNCM439	-	-	-	-
THS-H4660-M56-11	M56*5.5	165	63	4	SCM440	-	-	-	-
THS-H4660-M72-10	M72*6	190	79	4	SNCM439	-	-	-	-
THS-H4660-M90-11	M90*6	220	103	5	SCM440	-	-	-	-
THS-L70ME-M80-10	M80*6	205	105	4	SCM440	-	-	-	-
THS-G50ME-M48-12	M48*5	125	75	4	SCM440	-	-	-	-

Hydraulic Jack - THS Series

■ Technical Datas.

Assembly Code	SIZE	TYPE (Engine)	TEST PRESSURE (bar)	MAX.LIFT (mm)	Applications	REMARK
THS-H1728-M24-10	M24*2	H17/28 H17/28E(U)	1300	10	H17/28 ■ M.B.C SIDE STUD : 900bar ■ CON-ROD BIG-END STUD:900bar H17/28E(U) ■ CYL.HEAD STUD:900bar	
THS-H1728-M27-10	M27*2	H17/28 H17/28E(U)	1300	10	H17/28 ■ FLYWHEEL STUD : 1100bar H17/28E(U) ■ M.B.C STUD:1100bar	
THS-H1728-M30-10	M30*2	H17/28	1300	10	■ CYL.HEAD STUD:1150bar ■ M.B.C STUD:1150bar	
THS-H2132-M20-10	M20*1.5	H21/32	1300	10	■ CON-ROD SHAFT STUD:1150bar	
THS-H2132-M30-10	M30*2	H21/32	1500	10	■ CON-ROD STUD:950bar ■ M.B.C Side Bolt:850bar ■ FLYWHEEL STUD : 1050bar ■ C/Weight STUD : 850bar	
THS-H2132-M39-10	M39*2	H21/32	1500	10	■ CYL.HEAD STUD:1100bar ■ M.B.C STUD:1200bar	
THS-H2533-M22-11	M22*1.5	H25/33	1500	10	■ CON-ROD SHAFT :1100bar	
THS-H2533-M36-22	M36*2	H25/33, H32/40	1500	10	H25/33 ■ M.B.C SIDE:950bar ■ CON-ROD BIG-END:1100bar ■ FLYWHEEL STUD : 1000bar ■ C/Weight STUD : 850bar H32/40 ■ ENGINE BLOCK COUPLING STUD:1200bar	
THS-H2533-M39-22	M39*2	H25/33, H32/40	1500	10	H25/33 ■ M.B.C STUD:1200bar ■ CYL.HEAD STUD:900bar H32/40 ■ M.B.C SIDE BOLT:900bar ■ C/Weight STUD : 1000bar	
THS-H3240-M33-33	M33*2	H32/40	1200	3.5	■ BIG END(M33):1100bar ■ SHAFT:1100bar	
THS-H3240-M36-12	M36*2	H25/33, H32/40	1500	10	H25/33 ■ M.B.C SIDE:950bar ■ CON-ROD BIG-END:1100bar ■ FLYWHEEL STUD : 1000bar ■ C/Weight STUD : 850bar H32/40 ■ ENGINE BLOCK COUPLING STUD:1200bar	
THS-H3240-M39-22	M39*3	H25/33, H32/40	1500	10	H25/33 ■ M.B.C STUD:1200bar ■ CYL.HEAD STUD:900bar H32/40 ■ M.B.C SIDE BOLT:900bar ■ C/Weight STUD : 1000bar	
THS-H3240-M48-22	M48*3	H3240	1500	10	■ M.B.C STUD:1200bar ■ CYL.HEAD STUD:1150bar	
THS-L2330-M33-10	M33*2	L23/30, L23/30DH	1050	10	■ L23/30 :700bar ■ L23/30DH:700bar	
THS-L2330-M39-10	M39*4	L23/30, L23/30DH	1050	10	■ L23/30 :700bar ■ L23/30DH:750bar	
THS-L2330-M45-10	M45*3	L23/30	1050	6	■ WORKING PRESSURE :700bar	
THS-L2832-M39-23	M39*3	L28/32	1050	6	■ WORKING PRESSURE :700bar	
THS-H4660-M45-11	M45*3	H46/60	1500	10	■ WORKING PRESSURE :1100bar	
THS-H4660-M56-11	M56*5.5	H46/60	1700	10	■ WORKING PRESSURE :1500bar	
THS-H4660-M72-10	M72*6	H46/60	1700	10	■ WORKING PRESSURE :1500bar	
THS-H4660-M90-11	M90*6	H46/60	2000	15	■ WORKING PRESSURE :1250/1700bar	
THS-L70ME-M80-10	M80*6	L70ME	2000	15	■ WORKING PRESSURE :1500bar End chock bolts	
THS-G50ME-M48-12	M48*5	G50ME	2000	10	■ WORKING PRESSURE :1500bar Exhaust Valve, Turning Wheel	