

Keyblok - Interlock Manifold

A double block and bleed valve offering unique solutions to High Integrity Pressure Protection Systems (HIPPS) applications for isolation and calibration of instrumented equipment

General Application

Suitable for use in instrumented pressure protection systems requiring SIL3 capabilities and where full flow relief proves impractical. Process to instrument isolation with controlled operation of isolation and vent functions for operator and system safety

TECHNICAL DATA

Materials

Stainless steel, LT carbon steel, duplex, Inconel®

Sizes:

Inlet: 1" to 2" (DN 25 to 50)

Outlet: 1/2" (DN 15)

Connections: Transition plate x threaded; Flanged x threaded

Pressure and temperature ratings:

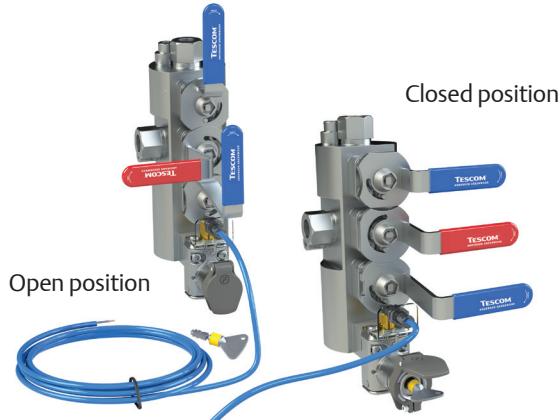
Valve pressure ratings in accordance with ASME B16.5/API 6A (as applicable)

PEEK seats:

400°F (204°C) max

Minimum temperature rating:

-70°F to (-57°C)



Features

- Compact and ergonomic single-piece body design reduces installation cost due to reduced weight and smaller envelope space than alternative designs.
- Unique single key interlock system provides enhanced safety with reduced chance of error.
- Easy to identify actuation position increases safety in process operations by visual confirmation of valve position.
- Application flexibility increases cost savings by utilizing only specification required valve(s) compared to alternative designs.
- Flexibility of design through a single design style provides a cost effective solution for single or multiple pressure tap points.
- Sequenced valve operation.
- PEEK seats (ANSI Classes 150 and 2500).
- Proximity switch (SIL3, ExII 1G Exia IIC T6) plus bracket.
- Compliant with Pressure Equipment Directive.
- Body material certified to EN10204 3.1.

H64T/H64F SERIES

Keyblok - Interlock Manifold

Overview

The Keyblok interlock manifold's simple, single step key operation and quarter-turn positive visible indication provides a safer manifold for HIPPS applications.

It represents the ultimate solution in a range of compact, single-piece, forged-body assemblies, featuring a choice of end connections and mounting styles.

Interlock DBB valve assemblies are designed to comply with the following code requirements:

- ASME B16.34 Material wall thickness
- ASME VIII, DIV 1 Design procedures and materials
- ASME B1.20.1 National Pipe Threads
- Compliant to IEC 61508.2010 and IEC 61511:2003

SIL compliance

The Keyblok interlock manifold is suitable for use in SIL3 and above applications.

Manifold arrangements: HFT0 = SIL3; HFT1 = SIL4; HFT2 = SIL4.

Safety Function: The valves within the HIPPS manifold will be open allowing the end device to read the process pressure.				
Summary of Clauses, IEC 61508 2/7.4.2 and 2/7.4.4	HIPPS Manifold PTI = 1 year	HIPPS Manifold PTI = 5 years	HIPPS Manifold PTI = 8 years	Verdict
Architectural constraints	HFT = 0	HFT = 0	HFT = 0	Type A
Safe Failure Fraction (SFF)	92%	92%	92%	SIL 3
Random hardware failures: λ DD [h ⁻¹] (dangerous)	$1.94E-07$	$1.94E-07$	$1.94E-07$	
λ DU	$2.67E-08$	$2.67E-08$	$2.67E-08$	
Random hardware failures: λ SD [h ⁻¹] (safe)	$0.00E+00$	$0.00E+00$	$0.00E+00$	
λ SU	$1.20E-07$	$1.20E-07$	$1.20E-07$	
Diagnostic coverage (DC)	89%	89%	89%	
PFD @ PTI MTTR = 8 Hrs ^[1]	$1.19E-04$	$5.87E-04$	$9.38E-04$	SIL 3
Risk Reduction factor (RRF)	8417	1704	1066	
Hardware safety integrity compliance ^[2]	Route 1 _H			
Systematic safety integrity compliance ^[3]	Route 1 _S			
Systematic Capability ^[3] (SC1, SC2, SC3, SC4)	SC3			
Overall RRF	RRF = 1066 & 8 yrs which meets SIL 3			

Safe Failure Fraction (SFF)	Type A Subsystem		
	Hardware Fault Tolerance		
	0	1	2
90% - < 99%	SIL3	SIL4	SIL4
≤ 99%	SIL3	SIL4	SIL4

NOTES

1. Table from IEC61508-2 2010
2. Hardware Fault Tolerance = HFT

HFT: 0 = 1 out of 1
1 = 1 out of 2
2 = 2 out of 3

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Materials of Construction

	Standard	Options available
Body	Stainless steel (ASTM A182 F316)	LT carbon steel (ASTM A350 LF2) Duplex (ASTM A182 F51) Inconel® 625 (ASTM B564 UNS N06625)
Trim	316 SS (available for all body materials)	Duplex SS UNS S31803 (Duplex F51 body only) Inconel® UNS N06625 (Inconel® body only)
Bolting	ASTM A193 B8M Class 2	

Optional versions

- Compliant to NACE MR0175.
- Master key per manifold set.
- Enclosure protection - designed and fitted solutions can be provided to meet with customer requirements.

Testing

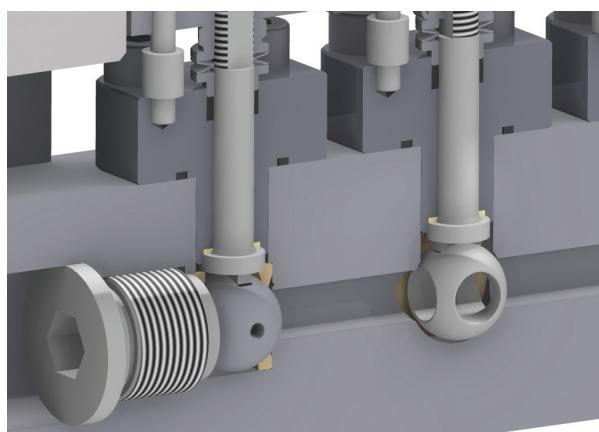
All valves are tested in accordance with API 598 as standard.

Ball valve technical specifications

The Keyblok interlock DBB valve features our high performance ball valve design for reliable performance and bubble-tight isolation. The isolation and vent functions are achieved with our 10 mm (3/8") bore ball valve which has a floating pattern, through bore - fully roddable, anti-static design.

- Precision machined solid ball and seats to provide effective isolation and repeatability, with a low operating force.
- Anti-blow out stem design.
- Valve design provides cavity relief and uni-directional flow.
- Fire-safe design and tested to API 607.
- Pressure rating up to 10,000 psig (680 barg).
- Temperature range -70°F to +400°F (- 57°C to +204°C).
- Soft seat - PEEK.
- One piece stem design.
- Graphite fire-safe seal.
- 316 SS lever handle.
- T-ball vent valve.
- Cam handle anti-tamper system.

Quarter-turn ball valve for isolation and T-ball vent



H64T/H64F SERIES

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Installation Variants

DBB valve - The Keyblok interlock manifold is available in two designs to provide the ideal solution in accommodating different installation practices.



H64T style - Transition plate version for multi-instruments on single tapping point.



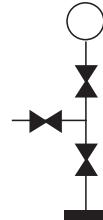
H64F style - Flanged version for instrument on individual tapping point.

Product Configurations^[1]

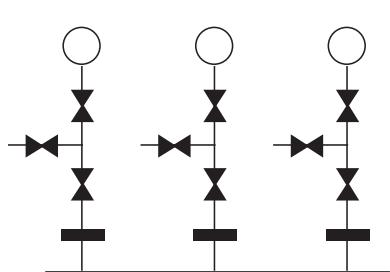
Single transmitter assembly - for individual tapping connections

H64F style

Individual pressure tapping arrangement
HFT0 = SIL3



Arrangement of three transmitters on individual tappings HFT2 = SIL4



NOTE

1. It is important that any device (instrument) connected to the outlet of the manifold must be SIL3 or greater to maintain SIL compliance.

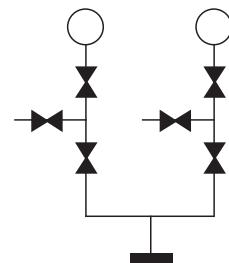


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Multiple Transmitter Assemblies - for instrument redundancy applications

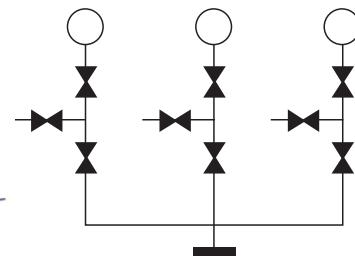
H64T_TP*2 style

1oo2 (one out of two) arrangement HFT1 = SIL4



H64T_TP*3 style

2oo3 (two out of three) arrangement HFT2 = SIL4



Option: Instrument enclosure for protection of assembly

H64T_TP** Enclosure style

Where environmental conditions require the manifold DBB assembly to be protected, we can provide design and supply to fit the manifold system into our instrument enclosure range to satisfy the installation specification.

NOTE

1. It is important that any device (instrument) connected to the outlet of the manifold must be SIL2 or greater to maintain SIL compliance.



H64T/H64F SERIES

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Selection Guide

H64T	E	S	S	-081A				
BASIC SERIES		BALL VALVE SEAT MATERIAL	VALVE BODY MATERIAL	TRIM MATERIAL ^[4]		STANDARD INLET CONNECTION		
Ball valve type isolate								
H64T	Transition plate x threaded - double block and bleed interlock	E PEEK	S Stainless steel (A182 F316)	S 316 SS	08	1"	1 RF	A ANSI CL150
H64F	Flanged x threaded - double block and bleed interlock		L LT carbon steel (A350 LF2)	D Duplex stainless steel UNS S31803	12	1 1/2"	3 RTJ	J ANSI CL300
			D Duplex stainless steel (A182 F51)	N Inconel® 625. UNS N06625	16	2"	4 BX(AP)	K ANSI CL600
			N Inconel® 625 (B564 UNS N06625)		17	1 13/16"		P API 10,000
								T ANSI CL900
								L ANSI CL1500
								M ANSI CL2500

-047B				TPS2				
STANDARD OUTLET CONNECTION ^[5]				OPTIONS				
04	1/2"	7 Female	B NPT	TP*2	Transition plate for two DBB assembly ^[1]	AL	Low temperature service (-70°F [-57°C])	
		2 Male		TP*3	Transition plate for three DBB assembly ^[1]	SG	(Sour gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions < 50 mg/l [ppm]*) and NACE MR0103-2005	
OPTIONAL OUTLET CONNECTION (H64F STYLE)					* Add material suffix Std 'S' = 316 SS	BD	Bi-directional flow	
08	1"	1 RF	A ANSI CL150			PV	Plugged vent	
12	1 1/2"	3 RTJ	J ANSI CL300			MK	Interlock master key	
16	2"	4 BX(AP)	K ANSI CL600			ENCL	Instrument enclosure arrangement as per specification	
17	1 13/16"		P API 10,000					

NOTES

- When option TP*2 or 3 are selected, this identifies an assembly arrangement and includes the same number of DBB valve units within the supply.
Use product configuration H64T coding.
- For sour gas with chloride > 50 mg/l [ppm] - consult factory.
- Inconel® is a registered trademark of the Special Metals Corporation.
- Standard trim combinations:**
S and L Body = S Trim, D Body = D Trim, N = N Trim
- All ASME B1.20.1