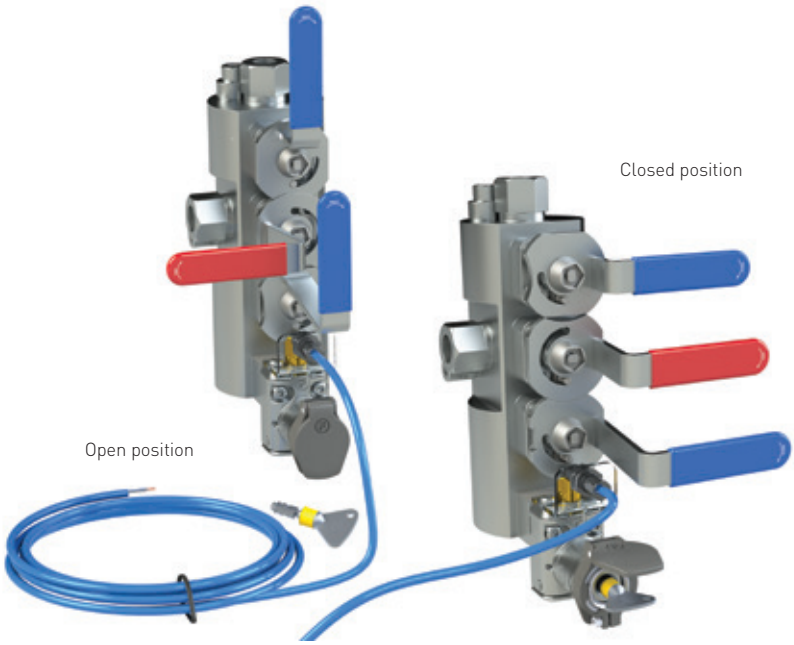
ANDERSON GREENWOOD H64T/H64F KEYBLOK INTERLOCK MANIFOLD

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



FEATURES

- Compact and ergonomic single-piece body design reduces installation cost due to reduced weight and smaller envelope space than competitive 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 competitive 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.

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:	½" (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 (-57°C)

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:[h-1] (dangerous)	λ_{DD} λ_{DU}	1.94E-07 2.67E-08	1.94E-07 2.67E-08	1.94E-07 2.67E-08	
Random hardware failures: [h-1] (safe)	λ_{SD} λ_{SU}	0.00E+00 1.20E-07	0.00E+00 1.20E-07	0.00E+00 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 1H		
Systematic safety integrity compliance[3]			Route 1S		
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

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	SS 316 (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

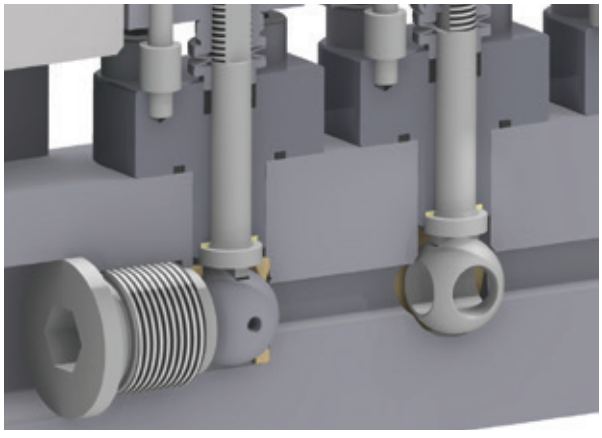
All valves are tested in accordance with API 598 as standard.

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 (⅜") 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.
- SS 316 lever handle.
- T-ball vent valve.
- Cam handle anti-tamper system.

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



INSTALLATION VARIANTS

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

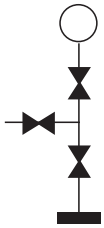
H64T style - Transition plate version for multi-instruments on single tapping point.

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

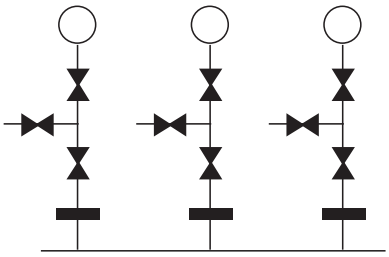
PRODUCT CONFIGURATIONS[1]

Single transmitter assembly - for individual tapping connections

H64F style
Individual pressure tapping arrangement
HFT0 = SIL3



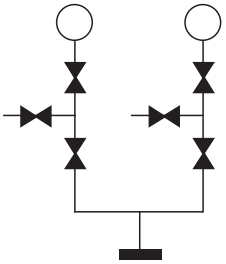
Arrangement of three transmitters on individual tappings HFT2 = SIL4



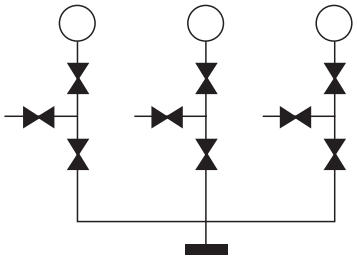
1. It is important that any device (instrument) connected to the outlet of the manifold must be SIL3 or greater to maintain SIL compliance.

Multiple transmitter assemblies - for instrument redundancy applications

H64T_TP*2 style
1oo2 (one out of two) arrangement HFT1 = SIL4

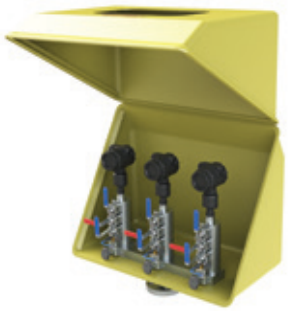


H64T_TP*3 style
2oo3 (two out of three) arrangement
HFT2 = SIL4



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.



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

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SELECTION GUIDE

Example:								H64T	E	S	S	- 081A	- 047B -	TPS2
Configuration														
Ball valve type isolate														
H64T	Transition plate x threaded - double block and bleed interlock													
H64F	Flanged x threaded - double block and bleed interlock													
Ball valve seat material														
E	PEEK													
Valve body material														
S	Stainless steel (A182 F316)													
L	LT carbon steel (A350 LF2)													
D	Duplex stainless steel (A182 F51)													
N	Inconel® 625 (B564 UNS N06625)													
Trim material														
S	SS 316					*Standard trim combinations*								
D	Duplex stainless steel UNS S31803					S and L Body = S Trim, D Body = D Trim, N Body = N Trim								
N	Inconel® 625. UNS N06625													
Standard inlet connection														
08	1"	**1**	RF	**A**	ANSI CL150	**T**	ANSI CL900	(All ASME B16.34)						
12	1½"	**3**	RTJ	**J**	ANSI CL300	**L**	ANSI CL1500							
16	2"	**4**	BX (API)	**K**	ANSI CL600	**M**	ANSI CL2500							
17	$1^{13}/_{16}$"			**P**	API 10,000									
Standard outlet connection														
04	½"	**7**	Female	**B**	NPT	(All ASME B1.20.1)								
		2	Male"											
Optional outlet connection (H64F style)														
08	1"	**1**	RF	**A**	ANSI CL150									
12	1½"	**3**	RTJ	**J**	ANSI CL300									
16	2"	**4**	BX (API)	**K**	ANSI CL600									
17	$1^{13}/_{16}$"			**P**	API 10,000									

Options

TP*2 Transition plate for two DBB assembly[1]

TP*3 Transition plate for three DBB assembly[1]

* Add material suffix Std 'S' = 316SS

AL Low temperature service (-70°F [-57°C])

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

BD Bi-directional flow

PV Plugged vent

MK Interlock master key

ENCL Instrument enclosure arrangement as per specification

NOTES

1. 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.
2. For sour gas with chloride > 50 mg/l [ppm] - consult factory.
3. Inconel® is a registered trademark of the Special Metals Corporation.