

Plant Risk Assessments & Consulting

 Machine Safety Guarding & Consulting
 IRADE MANAGEMENT Pty

 Machine Safety Guarding & Control
 'Australian Safety Guarding

 Mechanical, Electrical, Pneumatic & Hydraulic Safety Solutions
 91 Warrigal Road Oakleigh

 Power Press Safety Specialists
 Melbourne Vic 3166

 Monitored Valves
 PO Box 2258 Mt. Waverley

 General Engineering & Fabrication
 Phone: (03) 9569-4506 Fax

 Industrial Electrical Contracting (REC 11659) Winner of WorkSafe Award 2002

TRADE MANAGEMENT Pty Ltd t/as 'Australian Safety Guarding' PO Box 2258 Mt. Waverley 3149 Phone: (03) 9569-4506 Fax: (03) 9569-4508 Email: admin@australiansafetyguarding.com.au Website: www.australiansafetyguarding.com.au

Specialists in Machine Safety Integration



-INTERFACING FLUID POWER OPERATION WITH ELECTRICAL SAFETY CIRCUITS-

-PNEUMATIC RANGE-

TECHNICAL HANDBOOK



Suitable for Category 4 applications in accordance with AS 4024.1 and EN 954.1



SAFETY PACKAGE SYSTEM

ASG ISO 1 5/3 COMPONENT BLOCK

Due to our policy of continued research and development, we reserve the right to amend, without notice, the specifications given in this document.

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1. RANGE OVERVIEW

WHAT ARE MONITORED VALVES AND HOW DO THEY WORK?

- Monitored Valves are essential for any fluid power systems interfaced with electrical safety circuits and suitable for use in all pneumatic safety applications (up to and including Category 4 applications in accordance with AS 4024.1 and EN 954.1).
- They are based around an ISO range of solenoid operated, pneumatic spool valves. Spool monitoring is achieved by the positively driven electro-mechanical switches integrated to the valves.
 - o Solenoids control valve activation via an approved dual channel safety relay.
 - o Switch contacts change state upon movement of the valve spool.
 - Valve spool movement is monitored by the switches.
 - Switch operation is interfaced through the electrical safety circuit to achieve the appropriate category of control system.

WHAT ARE THEY DESIGNED TO DO?

- They are designed as an interface between the fluid power operation and electrical safety circuits of machinery, with the objective of eliminating the exposure to workplace risks and hazards associated with pneumatic machinery.
- They are designed to:
 - Provide a means of compliant fluid power control.
 - Produce a safety system where both the fluid power and electrical systems meet their risk category requirements.
 - Replace non-monitored valves and regular solenoid valves in safety circuits or in circumstances where they are controlling critical processes.
 - o Enhance existing systems which require a safety upgrade, by retro-fitting into the existing circuit.
 - Integrate into new system designs.
 - o Be used in conjunction with the latest technologies of programmable safety systems.

WHO AND WHAT NEEDS MONITORED VALVES?

- Safety system designers.
- Designers and Integrators of fluid power systems and electrical safety circuits.
- Designers, Users, Suppliers and Manufacturers of machinery, manufacturing and process equipment utilising compressed air.
- Fluid power systems interfaced with electrical safety circuits.
- Pneumatic systems/processes associated with hazard and risk.

WHY MONITORED VALVES?

- Safe control and isolation of pneumatic power.
- To comply with requirements in AS 4024.1 and AS 1219.
- To ensure risk category compliance.
- To prevent accidents caused by the use and misuse of compressed air.
- To legally fulfil the duty of controlling risks.
- Because non-monitored valves can undetectably fail to danger.
- To increase and maintain the highest possible levels of safety.

PRODUCT RANGE

Product range available in both single and dual monitored configurations:

- 'Single Units' (Suit Category 1 and 2), and
- 'Safety Package Systems' (Suit Category 3 and 4).

1.1. Safety Package Systems

WHAT ARE SAFETY PACKAGE SYSTEMS?

- 'Safety package systems' are dual monitored valve systems which comprise of 2 monitored valves mounted on 1 series ported manifold for pneumatic safety applications.
- Used to interface fluid power operation of plant with electrical safety circuits, 'Safety package systems' prevent single faults, within fluid power safety systems, from leading to the loss of the safety function.
- Correct monitoring ensures single fault detection and prevents further operation of the secondary valve until the fault is corrected.
- Thus, once correctly connected to an approved device (an approved, dual channel safety relay) for monitoring of the dual redundancy, the 'Safety package systems' are:
 - o Dual redundant in function.
 - Monitored for a fault and, therefore, the loss of dual redundancy.
 - o Of fail-to-safe design (a single fault does not lead to the loss of the safety function).
 - o Able to lock-out and inhibit further operation upon detection of a fault until corrected.

RANGE DESIGN

- 'Safety package systems' are available in a variety of port sizes, flow rates and spool configurations (depending on the application). This signifies that the versatile range is capable of safely controlling and isolating pneumatic power, whilst fulfilling the widest range of needs in pneumatic energy control.
- Refer to the following page for 'Safety package systems' ordering codes (Safety Package System Part No.).

APPROVALS

 Our 'Safety package systems' comply with all applicable directives (EC Machinery Directive 98/37/EC) and harmonized standards (EN 292-1, EN 292-2, EN 1050, EN 60204, EN 954.1, EN 983) for pneumatic fluid power systems and their components. They qualify for CE compliance and for use with Category 4 of control system in accordance with AS 4024 and EN 954.1.



		SYSTEM COMPONENTS	COMPONENT PART NO.	SAFETY PACKAGE SYSTEM PART NO.
2/2 SYSTEM BLOCK	SIZE	Valve A	ASG-BE-3700-5/2-3131	
Dual monitored 2/2 system block	ISO 1 (¹⁄4")	Valve B	ASG-BE-3700-5/2-3131	ASG ISO 1 2/2 SYSTEM BLOCK
includes:	(/4)	Sub-base	ASG-SM-1-2/2	
	ISO 2	Valve A	ASG-BE-4700-5/2-3131	ASG ISO 2
 2x 5/2 monitored valves mounted on a series ported 	(3⁄8")	Valve B	ASG-BE-4700-5/2-3131	2/2 SYSTEM BLOCK
manifold to suit 2/2 operation	. ,	Sub-base Valve A	ASG-SM-2-2/2 ASG-BE-5700-5/2-3131	
for pneumatic safety	ISO 3	Valve A Valve B	ASG-BE-5700-5/2-3131	ASG ISO 3
applications.	(1⁄2")	Sub-base	ASG-SM-3-2/2	2/2 SYSTEM BLOCK
Typically used for safely blocking		Valve A	ASG-BE-6700-5/2-3131	
air to and from machinery.	ISO 4	Valve B	ASG-BE-6700-5/2-3131	ASG ISO 4
	(3⁄4")	Sub-base	ASG-SM-4-2/2	2/2 SYSTEM BLOCK
3/2 SYSTEM DUMP	SIZE			
	ISO 1	Valve A	ASG-BE-3700-5/2-3131	ASG ISO 1
Dual monitored 3/2 system dump	(1/4")	Valve B Sub-base	ASG-BE-3700-5/2-3131 ASG-SM-1-3/2	3/2 SYSTEM DUMP
includes:		Valve A	ASG-BE-4700-5/2-3131	
 2x 5/2 monitored valves 	ISO 2	Valve B	ASG-BE-4700-5/2-3131	ASG ISO 2
mounted on a series ported	(3⁄8")	Sub-base	ASG-SM-2-3/2	3/2 SYSTEM DUMP
manifold to suit 3/2 operation for pneumatic safety	10.0.0	Valve A	ASG-BE-5700-5/2-3131	
applications.	ISO 3	Valve B	ASG-BE-5700-5/2-3131	ASG ISO 3
	(1⁄2")	Sub-base	ASG-SM-3-3/2	3/2 SYSTEM DUMP
Typically used for safely exhausting air from machinery.	ISO 4	Valve A	ASG-BE-6700-5/2-3131	ASG ISO 4
exhausting an nom machinery.	(³ ⁄4")	Valve B	ASG-BE-6700-5/2-3131	3/2 SYSTEM DUMP
	. ,	Sub-base	ASG-SM-4-3/2	
4/2 COMPONENT BLOCK	SIZE	Valve A	ASG-BE-3940-5/2-3131	
Dual monitored 4/2 component	ISO 1	Valve A Valve B	ASG-BE-3940-5/2-3131	ASG ISO 1
block includes:	(1/4")	Sub-base	ASG-SM-1-4/2	4/2 COMPONENT BLOCK
 2x 5/2 closed centre 		Valve A	ASG-BE-4940-5/2-3131	
monitored valves mounted	ISO 2	Valve B	ASG-BE-4940-5/2-3131	ASG ISO 2
on a series ported manifold	(³⁄8")	Sub-base	ASG-SM-2-4/2	4/2 COMPONENT BLOCK
to suit 4/2 operation for pneumatic safety	ISO 3	Valve A	ASG-BE-5940-5/2-3131	450 150 3
applications.	130 3 (1⁄2")	Valve B	ASG-BE-5940-5/2-3131	ASG ISO 3 4/2 COMPONENT BLOCK
True is a literate of factor and the latitude	(72)	Sub-base	ASG-SM-3-4/2	4/2 COMI CHENT BECCK
Typically used for safely holding individual actuators or cylinders	ISO 4	Valve A	ASG-BE-6940-5/2-3131	ASG ISO 4
in place.	(3⁄4")	Valve B	ASG-BE-6940-5/2-3131	4/2 COMPONENT BLOCK
5/3 COMPONENT BLOCK	SIZE	Sub-base	ASG-SM-4-4/2	
5/3 COMPONENT BLOCK		Valve A	ASG-BE-3940-5/2-3131	
Dual monitored 5/3 component	ISO 1	Valve B	ASG-BE-3940-5/3-3131	
block includes:	(1⁄4")	Sub-base	ASG-SM-1-5/3	5/3 COMPONENT BLOCK
 1x 5/2 & 1x 5/3 closed centre 	ISO 2	Valve A	ASG-BE-4940-5/2-3131	450 150 1
monitored valves mounted	(³ ⁄8")	Valve B	ASG-BE-4940-5/3-3131	ASG ISO 2 5/3 COMPONENT BLOCK
on a series ported manifold to suit 5/3 operation for	(/0)	Sub-base	ASG-SM-2-5/3	
pneumatic safety	ISO 3	Valve A	ASG-BE-5940-5/2-3131	ASG ISO 3
applications.	(1/2")	Valve B	ASG-BE-5940-5/3-3131	5/3 COMPONENT BLOCK
Typically used for safely holding	()	Sub-base	ASG-SM-3-5/3	
individual actuators or cylinders	ISO 4	Valve A	ASG-BE-6940-5/2-3131	ASG ISO 4
in place.	(3⁄4")	Valve B Sub-base	ASG-BE-6940-5/3-3131 ASG-SM-4-5/3	5/3 COMPONENT BLOCK
5/3 COMPONENT DUMP	SIZE	Sub-base	AGG-0101-4-3/3	
Dual monitored 5/3 component	ISO 1	Valve A	ASG-BE-3900-5/2-3131	ASG ISO 1
dump includes:	(¹ ⁄4")	Valve B	ASG-BE-3900-5/3-3131	5/3 COMPONENT DUMP
 1x 5/2 & 1x 5/3 open centre 	(/*)	Sub-base	ASG-SM-1-5/3	
monitored valves mounted	ISO 2	Valve A	ASG-BE-4900-5/2-3131	ASG ISO 2
on a series ported manifold	(3⁄8")	Valve B	ASG-BE-4900-5/3-3131	5/3 COMPONENT DUMP
to suit 5/3 operation for pneumatic safety		Sub-base	ASG-SM-2-5/3	
applications.	ISO 3	Valve A Valve B	ASG-BE-5900-5/2-3131 ASG-BE-5900-5/3-3131	ASG ISO 3
	(1/2")	Valve B Sub-base	ASG-BE-5900-5/3-3131 ASG-SM-3-5/3	5/3 COMPONENT DUMP
Typically used for safely exhausting air from specific parts		Valve A	ASG-BE-6900-5/2-3131	
of machinery i.e. single actuator	ISO 4	Valve A Valve B	ASG-BE-6900-5/3-3131	ASG ISO 4
or cylinder.	(3⁄4")	Sub-base	ASG-SM-4-5/3	5/3 COMPONENT DUMP
		5460		

1.2. Single Units

WHAT ARE SINGLE UNITS?

- 'Single Units' are single monitored valves which comprise of 1 monitored valve mounted on 1 sub-base.
- They can be used in this configuration for risk Category 1 and 2 applications.
- They are used to create 'Safety package systems' for risk Category 3 and 4 applications.

RANGE DESIGN

- They are based around an ISO range of solenoid operated, pneumatic spool valves. Spool monitoring is achieved by the positively driven electro-mechanical switches integrated to the valves.
- 'Single Units' are available in a variety of sizes, flow rates and spool configurations (depending on the application). This signifies that the versatile range is capable of safely controlling and isolating pneumatic power, whilst fulfilling the widest range of needs in pneumatic energy control.
- Refer to the table below for 'Single Units' ordering codes (Single Units Part No.).

APPROVALS

 Our 'Single Units' comply with all applicable directives (EC Machinery Directive 98/37/EC) and harmonized standards (EN 292-1, EN 292-2, EN 1050, EN 60204, EN 954.1, EN 983) for pneumatic fluid power systems and their components. They qualify for CE compliance and for use with Category 1 and 2 of control system in accordance with AS 4024 and EN 954.1.

VALVE TYPE		Symbol	ISO Size	Tii M NRG	IS	Mass Kg	SINGLE UNITS PART NO.
Ways	5/2	14 Zi	1	21	35	0.65	ASG-BE-3700-5/2-3131
Actuation	Electrical	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2	24	30	0.75	ASG-BE-4700-5/2-3131
Return	Mech. Spring	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	3	33	74	1.1	ASG-BE-5700-5/2-3131
Monitored	Single	· ☆·☆	4	39	68	1.3	ASG-BE-6700-5/2-3131
Ways	5/2	14 21	1	17	8	0.75	ASG-BE-3900-5/2-3131
Actuation	Electrical	$\begin{array}{c} 33 \\ \swarrow \\ \checkmark \\ \checkmark$	2	18	9	1	ASG-BE-4900-5/2-3131
Return	Mech. Spring	$\begin{bmatrix} 133 & 113 \\ 34 & 114 \\ 144 & 142 \\ \end{bmatrix} \begin{bmatrix} 121 & 14 \\ 142 & 122 \\ \end{bmatrix} \begin{bmatrix} 14 & 14 \\ 14 & 142 \\ 122 & 124 \\ \end{bmatrix} \begin{bmatrix} 14 & 14 \\ 14 & 142 \\ 122 & 14 \\ 14 & 142 \\ 123 & 142 \\ 14 & 14 \\ 14 & 142 \\ 14 &$	3	26	17	1.4	ASG-BE-5900-5/2-3131
Monitored	Single		4	27	18	1.6	ASG-BE-6900-5/2-3131
Ways	5/3		1	17	28	0.95	ASG-BE-3900-5/3-3131
Actuation	Electrical	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	2	18	25	1.2	ASG-BE-4900-5/3-3131
Return	Mech. Spring	34 14 42 22 <u> / </u>	3	26	46	1.6	ASG-BE-5900-5/3-3131
Monitored	Double	~ ~		27	42	1.8	ASG-BE-6900-5/3-3131
Ways	5/2	14 21	1	17	25	0.7	ASG-BE-3940-5/2-3131
Actuation	Electrical	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2	18	27	1	ASG-BE-4940-5/2-3131
Return	Mech. Spring		3	26	50	1.4	ASG-BE-5940-5/2-3131
Monitored	Single	·		30	47	1.6	ASG-BE-6940-5/2-3131
Ways	5/3		1	17	25	0.9	ASG-BE-3940-5/3-3131
Actuation	Electrical	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	2	18	27	1.2	ASG-BE-4940-5/3-3131
Return	Mech. Spring	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	3	26	50	1.6	ASG-BE-5940-5/3-3131
Monitored	Double	v v	4	30	47	1.8	ASG-BE-6940-5/3-3131

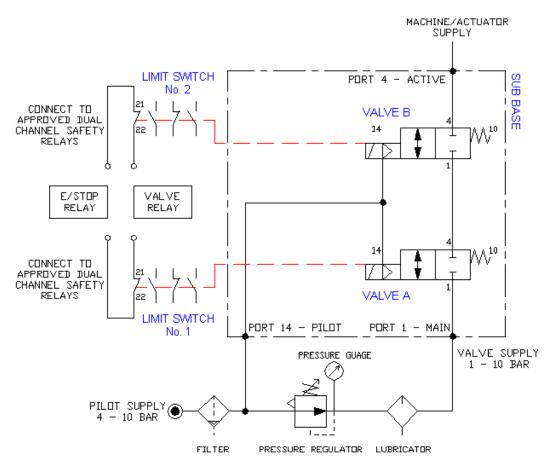
1.3. Technical Specifications

Notes the set of the				C				
number of spool configurations and flowrates. Configurations 22, 32, 42, 52, 53 (open 3 code centres) Solenoid operated, monitored, floating spool system, preumatic valves. Configurations 22, 32, 42, 52, 53 (open 3 code centres) Solenoid operated, monitored, floating spool system, preumatic valves. Connection of value redundint) Port Size 1 % 185P % 185P 1 % 185P 2 % 185P 2 % 185P % 185P % 195P % 185P % 195P % 195P % 195P <th c<="" th=""><th></th><th></th><th></th><th></th><th></th><th>luo sustama in 4 la</th><th>SO sizes and a</th></th>	<th></th> <th></th> <th></th> <th></th> <th></th> <th>luo sustama in 4 la</th> <th>SO sizes and a</th>						luo sustama in 4 la	SO sizes and a
Configurations 22, 3/2, 6/2, 5/2, 6/2 (open 3 closed centres) Selenci operated, monitord, floating spool system, preumatic valves. Configurated, monitord, floating system, preumatic valves. Configurated, monitord, floating system, preumatic valves. Configurated, monitord, floating system, preumatic valves. Size Pilot Port Kalves Valves Valve operating pressure Valve SSP V/r SSP Valve operating pressure 4 10 bar V/r SSP Valve operating pressure 4 10 bar V/r SSP Performance Ambient temperature 4 000 (Minut) Cr (Ginmito) Float Port Intered (Solym) and lubricated 1.5 Performance Float Port 200 (- v.50°C Valve Float Entered 200 (- v.50°C 2.4 2.4 Ambient temperature 200 (- v.50°C 2.4 2.4 Float Entered 2.0 2.42 2.3 Performance Float Entered (Solym) and lubricatesin 1.5 Float Entered Valve 2.0 2.42 3.42 Material Solog (- valves) 2.42 3.42		Models						
Design Solenoid operated. monitored. floating spool system. pneumatic values.		Configurations						
Approval Connection (Port sizes) Connection (Port sizes) Piol Port Port Size 1 1/3								
Approval Category 4 control system in accordance with AS 4024 and EN 954.1 MartIoti (single or dail redundant) MartIoti (single or dail redundant) Port Size 1 Valle SP Valle SP Valle SP 2 Valle SP Valle SP Valle SP 4 Valle SP Valle SP Valle SP 4 Valle Operating pressure 1-10 bar Valle Operating pressure 1-10 bar Plid temperature 1-10 bar 1-10 Cate Valle Operating pressure 1-10 bar 1 Valle Operating pressure 1-10 bar 1-15 2 Plid temperature 20°C + 60°C 2-100 4-10 1 14800 1.5 3 42000 4.4 4 3 42000 4.4 4 4 4 0.00 3 42000 4.4 4 4 4 0.00 4.4 4 4 4 4 4 4 4 4 4 4 4 4 4 4								
Maunting Manifold (single or dial redundant) Port Size Size Plot Port Port Size Size Plot Port Port Size 2 Value SpP Value SpP Value operating pressure 1 - 10 bar Value SpP Performance Size 1 - 10 bar Prove the temperature 2 - 200 - 450 °C Size Performance Size Ok (Nimin) Cx (Gl/min) 1 1480 1.5 Size Performance Size Ok (Nimin) Cx (Gl/min) 1 1480 1.5 Size Provided aluminium 2 2 2000 2.4 Size Size Ok (Nimin) Cx (Gl/min) Size Fluid temperature Size Ok (Nimin) Cx (Gl/min) 1 1480 1.5 Size Fluid temperature Size Ok (Nimin) Cx (Gl/min) 1 Internobact Size Ok (Size) Performance Endosis (Size) Nittle rubber Ad (Siz		Approvals						
Size Pilot Port Port Size 1 ½ 'BSP ½'BSP 2 ½'BSP ½'BSP 2 ½'BSP ½'BSP 3 ¼'BSP ½'BSP 4 ½'BSP ½'BSP 4 ¼'BSP ½'BSP 4 ¼'BSP ½'BSP 9 Pilot pressure 1-10 bar 1 1480 1.5 2 2:0'C - 450'C		Mounting					u EN 004.1	
Connection (Port sizes) $\frac{1}{2}$ $\frac{V_{F} BSP}{V}$ $\frac{V_{F} BSP}{V}$ Presumatic data - VsiveMediumCompressed air. filtered (50µm) and lubricatedValve operating pressure Pitol trepresture $1 = 10$ $1 = 10$ $1 = 0$ $- 10$ $1 = 10$ $1 = 0$ PreformanceFluid temperature 						Port	Size	
Value operating pressure in the input of the i								
Image: second								
Presumatic data + Valve %* BSP Valve operating pressure 1 - 10 bar - Performance Ambient temperature 1 - 10 bar - Ambient temperature 20°C - 60°C - - Fluid pressure 20°C - 60°C - - Fluid temperature 20°C - 60°C - - Fluid temperature 22°C - 60°C - - 1 1480 1.5 - 1 1480 1.5 - 1 1480 - - 1 1480 - - 1 1480 - - 1 1 - - 1 1480 - - 1 1480 - - 1 1480 - - 1 - - - - 1 - - - - - 1 Madian RL2 - -<		(Port sizes)						
Anomeson of the second secon								
Image: second	Ducumentia	data Makia	4		78 BSP	94 1	352	
Valve operating pressure 1 - 10 bar Performance Ambient temperature -0°C - +50°C Fluid temperature -0°C - +50°C Housing / Body -0.24.4 Life -000 -0.6.9 Edded aluminium -0.24.4 Bended aluminium -0.24.4 Bend aluminium -0.24.4 <th< th=""><th>Pneumatic</th><th></th><th>Comm</th><th>we are all all a</th><th>iltered (EQ. m) and he</th><th>huin ata d</th><th></th></th<>	Pneumatic		Comm	we are all all a	iltered (EQ. m) and he	huin ata d		
Pilot pressure Ambient temperature Fluid temperature -10°C - +50°C Performance Size Flowrates Co. (N/min) Cv (Gl/min) 1 1480 1.5 2 2300 2.4 3 4200 4.4 6 6 6 Housing / Sub Acadised aluminium 4.4 6 Anodised aluminium Acadised aluminium Materials Seals Ninfle rubber Solo Hard anodised aluminium Anodised aluminium Bestga Single Dual Redundant Category 4 applications. Aluminium Aluminium Electrical data - Switch Euchorar 4 pole positive driven plunger type safety switch pre approved to Category 4 applications. Materials Silver aluminium / Volges Silver aluminium / Volges Performance Ambient temperature Switching ourice life 30x01° switching cycles Ultisation conteger life 30x01° switching cycles Rated insulation voltage U 25 kV Ultisation category to IEC 947-5 C Rated insulation voltage U 25 kV Ultisation category toltage 2 kV UC 12 V DC			· ·		illered (Soµm) and iu	DIICaled		
Performance Image: Im			-					
Fluid temperature -20°C - +50°C Size Qn (NI/min) Cv (Gl/min) Size Qn (NI/min) Cv (Gl/min) Flowrates Size Qn (NI/min) Cv (Gl/min) I 1480 1.5 I 1480 I.5 I I.480 I.5 I I.480 I.5 I I.480 I.5 I I.000 I.15 I I.000 I.10 I I.000 I.10 I I.000 I.000 I I.000		•						
Ambient temperature Switching principal Size 1 Out (NI/min) Cv (GI/min) 1 1480 1.5 2 2300 2.4 3 4200 4.4 4 6600 6.9 Houssin / Soci Spool Hard anodised aluminium (Acetatic resin) 5.9 Houssin / Soci Spool Hard anodised aluminium (Acetatic resin) 5.9 Hard anodised aluminium Spool Hard anodised aluminium (Aubricat) Single Dual Redundant (Aubricat) Spool Hard anodised aluminium (Aubricat) Single Dual Redundant (Aubricat) Switching principle Slow-action contact element (Aubricat) Single Dual Redundant (Aubricat) Switching principle Slow-action contact element (Aubricat) 30x10 ⁶ switching cycles Single Performance Rated insulation voltage (Control creut) tuse) 2.5 kV Single 10 mA Switching current min. at switching current min. at (Control creut) tuse) 1.0 1.0 1.2 k A gG Connection type Sorew terminal 1.0 3.34 Materials Contacts 2.0 k V L, 4 A		•						
$\begin{tabular}{ c c c c } \hline I & 1480 & 1.5 \\ \hline 2 & 2300 & 2.4 \\ \hline 3 & 4200 & 4.4 \\ \hline 4 & 6600 & 6.9 \\ \hline 100 & 100 & 900 \\ \hline 100 & 900 & 100 & 100 \\ \hline 100 & 100 & 900 \\ \hline 100 & 100 & 100 \\ \hline 100 & 100 & 1$		Fluid temperature						
Flowrates22302.4342004.4466006.9Housing / BodyDie-cast aluminium / Acetalic resin	Performance							
$\begin{tabular}{ c c c c c } \hline 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1$							-	
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Ambient temperature Second second leminal Materials Second second leminal Materials Second second leminal Materials Second second leminal Materials Second second leminal Second second leminal Single Dual Redundant Materials Single Dual Redundant Category 4 applications. Aluminium Materials Single Dual Redundant Category 4 applications. Aluminium Materials Single Dual Redundant Category 4 applications. Aluminium Performance Ambient temperature -25°C - 40°C Rated insulation voltage Sitor - Grow action contact element Materials Sitor - Grow action contact element Switching current min. at switching current min. at 1 mA 10 mA Cable entry Mao 24 V DC 12 V DC Villisation category to IEC 947-5-1 Cond -15 U, 220 V U, 4 A 21 V DC Cable entry Mao 21 V DC 12 V D			3		4200	4.	.4	
Housing / Body Die-cast aluminium / Acetalic resin Endeap Anodised aluminium Materials Endeap Anodised aluminium Materials Seals Nitrile rubber Lubricant Shell Avania RL2 Dual Redundant Manifold Zamak Aluminium Electrical data - Switch Euchner 4 pole positive driven plunger type safety switch pre approved to Category 4 applications. Ambient temperature -25°C - +40°C Euchner 4 pole positive driven plunger type safety switch pre approved to Category 4 applications. Performance Rated insulation voltage U Slow -action contact element Machanical service III Switching principle Slow -action contact element 1 mA 10 mA Rated insulation voltage U 25 V = 4 A gG 24 V DC 12 V DC Switching current min. at switching voltage 24 V DC 12 V DC 24 V DC Cable entry Mo N/C N/C N/C N/C Materials Connection type Screw terminal 33-34 N/C N/C N/C N/C Mitri voltage 21.22 <			4		6600	6.	.9	
Image: Field appendix and a set of the set		Life	Long	life – 10 mill	ion operations			
Image: Field appendix and a set of the set		Housing / Body	Die-ca	ast aluminiu	m / Acetalic resin			
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Coil winding H class	Performance Wiring Materials Electrical d	Design Ambient temperature Switching principle Mechanical service life Protection Rated impulse withstand voltage Uimp Rated insulation voltage Ui Short-circuit protection (control circuit fuse) Switching current min. at switching voltage Switching voltage Utilisation category to IEC 947-5-1 Cable entry Connection type Cable cross-section max. Contacts Terminals Housing Contact ata - Coil Rated voltage	Categ -25 ℃ Slow 30x10 IP 67 2.5 kV 250 V 4 A g0 	ory 4 applic - +80 °C action conta ⁶ switching / ² G 1 r 24 V AC-15 Ue DC-13 Ue v terminal n² mally Closed 21-22 N/C zed die-cast alloy, gold f 24, 110, 2 12, 24 V E 5 VA 3,5 W	ations. ct element cycles nA ' DC 230 V I_e 4 A 24 V I_e 4 A 24 V I_e 4 A ct element (positively driven) + 41-42 N/C alloy lashed 20 V AC / 50 - 60 Hz	10 m. 12 V [2 Normally Open c 13-14 N/O	A DC ontacts 33-34	
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	Performance Wiring Materials Electrical d	Design Ambient temperature Switching principle Mechanical service life Protection Rated impulse withstand voltage Uimp Rated insulation voltage Ui Short-circuit protection (control circuit fuse) Switching current min. at switching voltage Switching voltage Switching voltage Utilisation category to IEC 947-5-1 Cable entry Connection type Cable cross-section max. Contacts Terminals Contacts Terminals Abusing Contact ata - Coil Rated voltage	Categ -25 ℃ Slow- 30x10 IP 67 2.5 kV 250 V 4 A g0 	ory 4 applic - +80 °C action conta ⁶ switching / action conta ⁶ switching / action conta switching / action conta action cont	ations. ct element cycles nA ' DC 230 V I_e 4 A 24 V I_e 4 A 24 V I_e 4 A ct element (positively driven) + 41-42 N/C alloy lashed 20 V AC / 50 - 60 Hz	10 m. 12 V [2 Normally Open c 13-14 N/O	A DC ontacts 33-34	
	Performance Wiring Materials Electrical d	Design Ambient temperature Switching principle Mechanical service life Protection Rated impulse withstand voltage Uimp Rated insulation voltage Ui Short-circuit protection (control circuit fuse) Switching current min. at switching voltage Switching voltage Switching voltage Utilisation category to IEC 947-5-1 Cable entry Connection type Cable cross-section max. Contacts Terminals Contacts Terminals Abusing Contact ata - Coil Rated voltage	Categ -25 ℃ Slow 30x10 IP 67 2.5 kV 250 V 4 A g0 	ory 4 applic - +80 °C action conta ⁶ switching / action conta ⁶ switching / action conta action conta vitching / action conta action conta / AC-15 U _e DC-13 U _e / AC-15 U _e DC-13 U _e / action conta action cont	ations. ct element cycles nA ' DC 230 V I_e 4 A 24 V I_e 4 A 24 V I_e 4 A ct element (positively driven) + 41-42 N/C alloy lashed 20 V AC / 50 - 60 Hz	10 m. 12 V [2 Normally Open c 13-14 N/O	A DC ontacts 33-34	

2. CIRCUIT DIAGRAMS

2.1. 2/2 System Block

• SAFETY FUNCTION: Locking air in machinery, whilst blocking the main air supply.

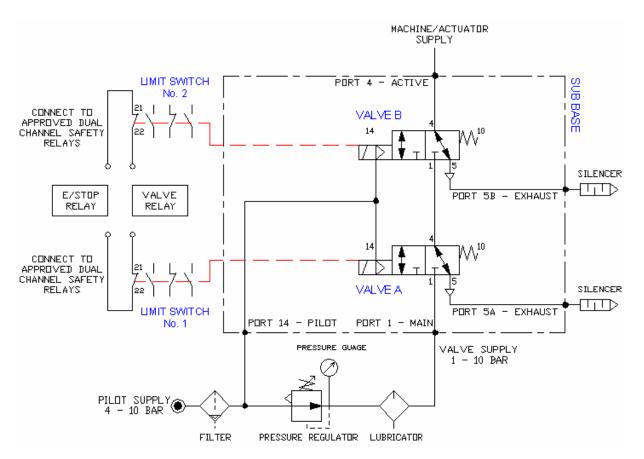


Typical Valve Connection Schematic – 2/2 System Block

- The 2/2 System Block safety package system consists of two 5 port 2 position (5/2) solenoid operated, sliding spool type pneumatic valves, mounted on a series ported manifold to suit 2 port 2 position (2/2) normally closed operation for pneumatic safety applications.
- The valves are integrated to 4 pole positively driven safety switches pre approved to category 4 applications.
- The 2/2 System Block safety package system is typically used for safely supplying air to machinery (when actuated) and locking air in machinery (arresting and holding actuator movement), whilst blocking the main air supply (when un-actuated or upon system fault).
- The main difference between this system and standard solenoid valves is that any condition which might cause one valve element not to shift along with the other, results in all ports being sealed and isolated. In this situation the moving parts of the pneumatic actuators are guaranteed in the position reached.

2.2. 3/2 System Dump

SAFETY FUNCTION: Exhausting air from machinery, whilst blocking the main air supply.

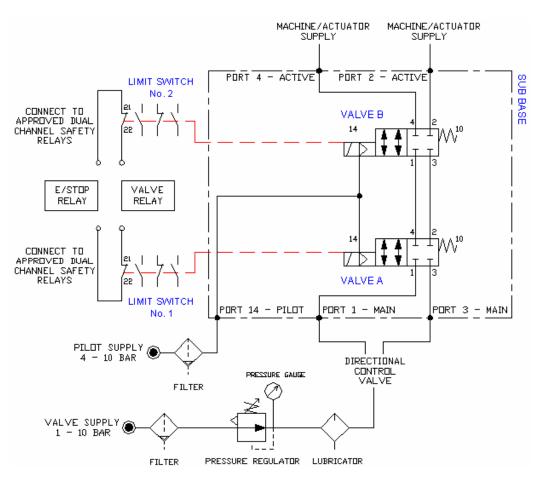


Typical Valve Connection Schematic - 3/2 System Dump

- The 3/2 System Dump safety package system consists of two 5 port 2 position (5/2) solenoid operated, sliding spool type pneumatic valves, mounted on a series ported manifold to suit 3 port 2 position (3/2) normally closed operation for pneumatic safety applications.
- The valves are integrated to 4 pole positively driven safety switches pre approved to category 4 applications.
- The 3/2 System Dump safety package system is typically used for safely supplying air to machinery (when
 actuated) and exhausting air (arresting actuator movement) from machinery whilst blocking the main air supply
 (when un-actuated or upon system fault).
- The main difference between this system and standard solenoid valves is that any condition which might cause one valve element not to shift along with the other, results in no output to the active port. In this situation the active port is connected to the exhaust port and the main inlet port is blocked. Thus air is exhausted from the machinery.

2.3. 4/2 Component Block

 <u>SAFETY FUNCTION</u>: Locking air in specific parts of machinery i.e. single actuator or cylinder, whilst blocking the main air supply.

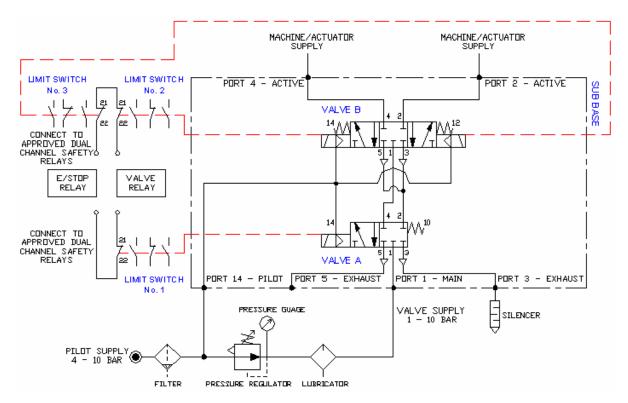


Typical Valve Connection Schematic – 4/2 Component Block

- The 4/2 Component Block safety package system consists of two 5 port 2 position (5/2) solenoid operated, sliding spool type pneumatic valves, mounted on a series ported manifold to suit 4 port 2 position (4/2) blocked centre operation for pneumatic safety applications.
- The valves are integrated to 4 pole positively driven safety switches pre approved to category 4 applications.
- The 4/2 Component Block safety package system is typically used for safely supplying air to machinery (when actuated) and locking air (arresting and holding actuator movement) whilst blocking the main air supply (when unactuated or upon system fault).
- The main difference between this system and standard solenoid valves is that any condition which might cause one valve element not to shift along with the other, results in all ports being sealed and isolated. In this situation the moving part of the pneumatic actuator is guaranteed in the position reached.

2.4. 5/3 Component Block

• <u>SAFETY FUNCTION</u>: Locking air in specific parts of machinery i.e. single actuator or cylinder, whilst blocking the main air supply.

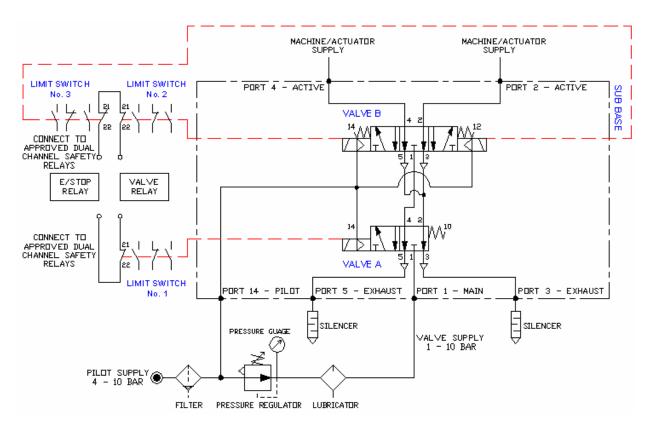


Typical Valve Connection Schematic – 5/3 Component Block

- The *5/3 Component Block* safety package system consists of one 5 port 2 position (5/2) and one 5 port 3 position (5/3) solenoid operated, sliding spool type pneumatic valves, mounted on a series ported manifold to suit 5 port 3 position (5/3) blocked centre operation for pneumatic safety applications.
- The valves are integrated to 4 pole positively driven safety switches pre approved to category 4 applications.
- The 5/3 Component Block safety package system is typically used for safely supplying air and controlling machinery (when actuated) and locking air (arresting and holding actuator movement) whilst blocking the main air supply (when un-actuated or upon system fault).
- The main difference between this system and standard solenoid valves is that any condition which might cause one valve element not to shift along with the other, results in all ports being sealed and isolated. In this situation the moving part of the pneumatic actuator is guaranteed in the position reached.

2.5. 5/3 Component Dump

 <u>SAFETY FUNCTION</u>: Exhausting air from specific parts of machinery i.e. single actuator or cylinder, whilst blocking the main air supply.



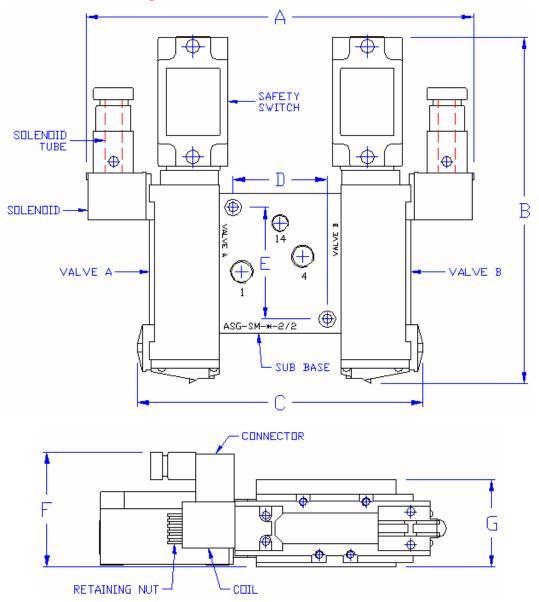
Typical Valve Connection Schematic – 5/3 Component Dump

- The 5/3 Component Dump safety package system consists of one 5 port 2 position (5/2) and one 5 port 3 position (5/3) solenoid operated, sliding spool type pneumatic valves, mounted on a series ported manifold to suit 5 port 3 position (5/3) exhausted centre operation for pneumatic safety applications.
- The valves are integrated to 4 pole positively driven safety switches pre approved to category 4 applications.
- The 5/3 Component Dump safety package system is typically used for safely supplying air and controlling machinery (when actuated) and exhausting air (arresting actuator movement) from machinery whilst blocking the main air supply (when un-actuated or upon system fault).
- The main difference between this system and standard solenoid valves is that any condition which might cause one valve element not to shift along with the other, results in no output to the active ports. In this situation the active ports are connected to the exhaust ports and the inlet port is blocked. Thus air is exhausted from the machinery.

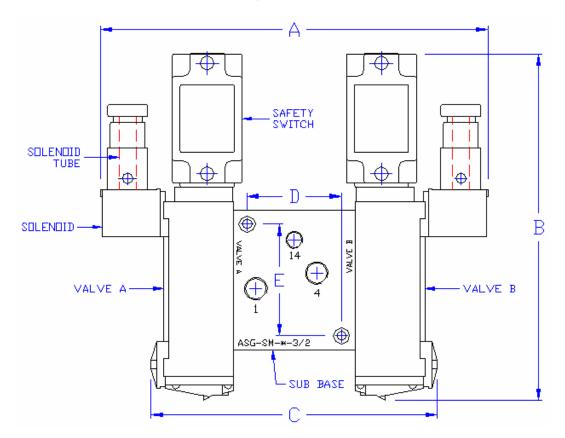
3. **DIMENSIONAL DRAWINGS**

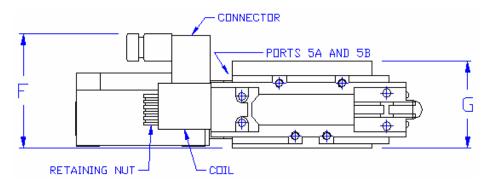
3.1. Safety Package Systems

3.1.1. 2/2 System Block

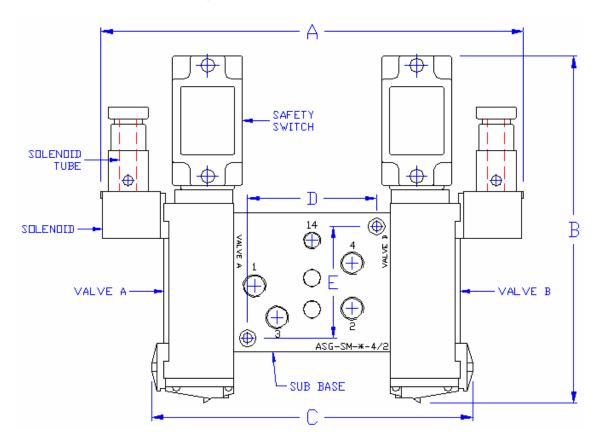


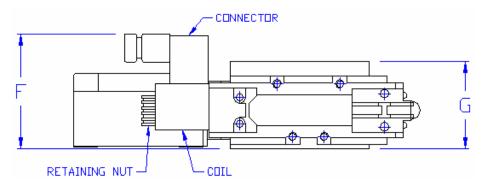
DIMENSION	ASG ISO 1 2/2 SYSTEM BLOCK	ASG ISO 2 2/2 SYSTEM BLOCK	ASG ISO 3 2/2 SYSTEM BLOCK	ASG ISO 4 2/2 System Block
	mm	mm	mm	mm
A	210	250	290	320
В	210	220	270	300
С	170	200	230	270
D	54	70	90	110
E	64	85	105	140
F	75	85	90	100
G	50	65	80	100
PORT	PORT SIZE	PORT SIZE	PORT SIZE	PORT SIZE
1	G 1⁄4	G ¾	G ½	G 3⁄4
4	G 1⁄4	G ¾	G ½	G 3⁄4
14	G ⅓	G ⅓	G 1⁄8	G 1⁄8
	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING
	2x M5 SHCS	2x M6 SHCS	2x M8 SHCS	2x M8 SHCS



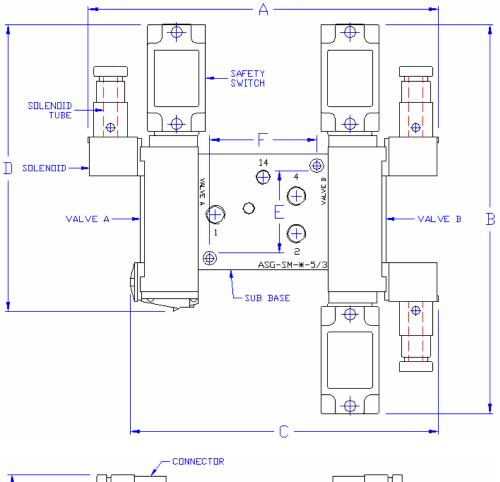


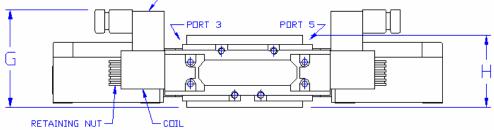
DIMENSION	ASG ISO 1 3/2 System Dump	ASG ISO 2 3/2 System Dump	ASG ISO 3 3/2 System Dump	ASG ISO 4 3/2 System Dump
	mm	mm	mm	mm
A	210	250	290	320
В	210	220	270	300
С	170	200	230	270
D	54	70	90	110
E	64	85	105	140
F	75	85	90	100
G	50	65	80	100
PORT	PORT SIZE	PORT SIZE	PORT SIZE	PORT SIZE
1	G 1⁄4	G ⅔	G 1⁄2	G 3⁄4
4	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
5A	G 1⁄4	G ¾	G ½	G 3⁄4
5B	G 1⁄4	G ¾	G ½	G 3⁄4
14	G 1⁄8	G ⅓	G 1∕8	G ⅓
	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING
	2x M5 SHCS	2x M6 SHCS	2x M8 SHCS	2x M8 SHCS



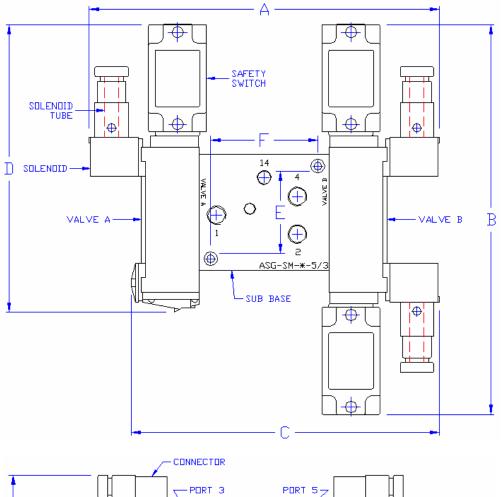


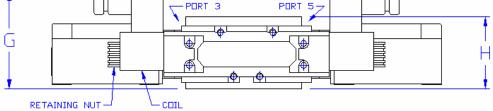
DIMENSION	ASG ISO 1 4/2 Component Block	ASG ISO 2 4/2 Component Block	ASG ISO 3 4/2 Component Block	ASG ISO 4 4/2 Component Block
	mm	mm	mm	mm
Α	210	270	310	350
В	210	220	270	300
С	170	220	250	280
D	54	95	110	135
E	64	85	105	125
F	75	85	90	95
G	50	65	80	100
PORT	PORT SIZE	PORT SIZE	PORT SIZE	PORT SIZE
1	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
2	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
3	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
4	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
14	G 1⁄8	G 1⁄8	G ⅓	G ⅓
	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING
	2x M5 SHCS	2x M6 SHCS	2x M8 SHCS	2x M8 SHCS





DIMENSION	ASG ISO 1 5/3 COMPONENT BLOCK	ASG ISO 2 5/3 COMPONENT BLOCK	ASG ISO 3 5/3 COMPONENT BLOCK	ASG ISO 4 5/3 COMPONENT BLOCK
	mm	mm	mm	mm
Α	230	270	310	350
В	270	290	335	365
С	210	240	270	300
D	210	220	270	300
E	64	85	105	125
F	74	95	110	135
G	80	90	100	110
Н	50	65	80	100
PORT	PORT SIZE	PORT SIZE	PORT SIZE	PORT SIZE
1	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
2	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
3	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
4	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
5	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
14	G ⅓	G 1⁄8	G 1⁄8	G 1⁄8
	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING
	2x M5 SHCS	2x M6 SHCS	2x M8 SHCS	2x M8 SHCS

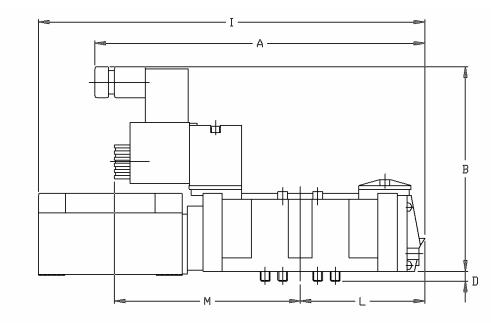


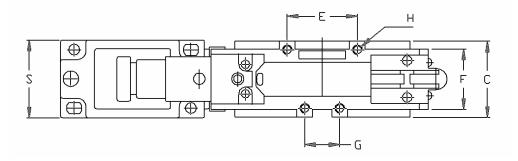


DIMENSION	ASG ISO 1 5/3 COMPONENT DUMP	ASG ISO 2 5/3 COMPONENT DUMP	ASG ISO 3 5/3 COMPONENT DUMP	ASG ISO 4 5/3 COMPONENT DUMP
А	mm 230	270	310	350
B	270	290	335	365
C	210	240	270	300
D	210	220	270	300
E	64	85	105	125
F	74	95	110	135
G	80	90	100	110
Н	50	65	80	100
PORT	PORT SIZE	PORT SIZE	PORT SIZE	PORT SIZE
1	G 1⁄4	G 3⁄8	G 1⁄2	G 3⁄4
2	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
3	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
4	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
5	G 1⁄4	G ¾	G 1⁄2	G 3⁄4
14	G 1⁄8	G ⅓	G ⅓	G 1⁄8
	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING	SYSTEM MOUNTING
	2x M5 SHCS	2x M6 SHCS	2x M8 SHCS	2x M8 SHCS

3.2. Single Units

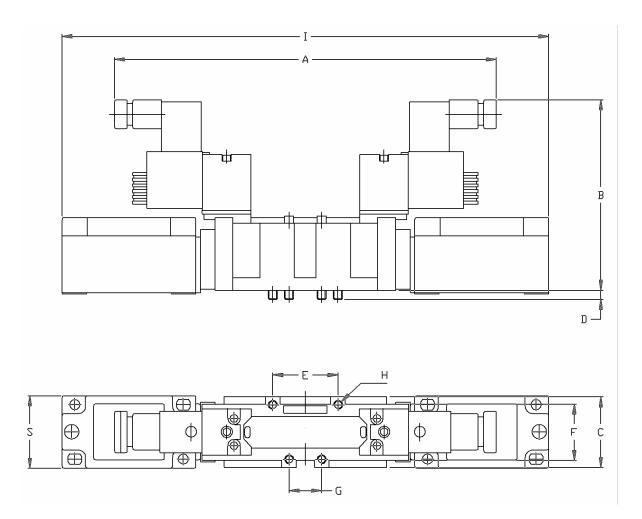
3.2.1. 5/2 Valves





	ISO1	ISO 2	ISO 3	ISO 4
Α	170	195	220	255
В	105	105	120	120
С	40	55	65	75
D	5	5	10	10
Е	36	48	64	80
F	30	40	50	60
G	18	24	32	40
н	M5 x 35	M6 x 35	M8 x 50	M8 x 50
1	200	215	265	295
L	65	75	95	110
М	95	105	115	125
S	40	40	40	40

3.2.2. 5/3 Valves



	ISO1	ISO 2	ISO 3	ISO 4
Α	210	225	250	270
В	105	105	120	120
С	40	55	65	75
D	5	5	10	10
Е	36	48	64	80
F	30	40	50	60
G	18	24	32	40
н	M5 x 35	M6 x 35	M8 x 50	M8 x 50
1	270	290	335	365
S	40	40	40	40

4. **APPROVALS**

ASG

EC MACHINERY DIRECTIVE 98/37/EC ASSESSMENT OF CONFORMITY

FOR SAFETY COMPONENT IN ACCORDANCE WITH ANNEX IIC

Report No.	:	280604
Machine/equipment	:	Monitored pneumatic valves – ASG ISO_2/2 System Block using ASG-BE700-5/2-3131 valves and ASG-SM2/2 Sub-base ASG ISO_3/2 System Dump using ASG-BE700-5/2-3131 valves and ASG-SM3/2 Sub-base ASG ISO_4/2 System Block using ASG-BE940-5/2-3131 valves and ASG-SM4/2 Sub-base ASG ISO_5/3 Component Block using ASG-BE940-5/2-3131 valves and ASG-SM5/3 Sub-base ASG ISO_5/3 Component Dump using ASG-BE900-5/3-3131 valves and ASG-SM5/3 Sub-base
Manufacturer	:	Australian Safety Guarding
Assessment Dates	:	28 June 2004
Relevant Standards	:	Essential Health and Safety Requirements, EN 292-1, EN 292-2, EN 1050, EN 60204 EN 954.1, EN 983.

Based on the inspection of the valves and evidence presented in the Technical Construction File, RiskPlant Consultants Pty Ltd (EC Conformity Assessment Body No. 929) certify that the valve identified above conforms with the requirements for safety components in accordance with Annex II c of the EC Machinery Directive 98/37/EC.

NATA Authorised signatory:

ROGER LIM, MIEAust, CPEng, MSIA Principal Consulting Engineer



NATA Accredited (No. 14155) Inspection Service EC Designated Conformity Assessment Body (No. 929)



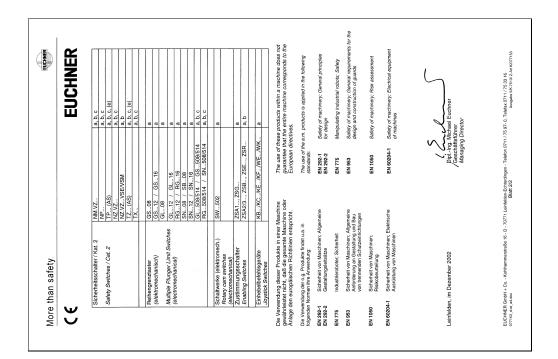
Issued date: 22 July 2004

ASG280604rpt

RiskPlant Consultants Pty Ltd

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ו	Ψ				EUCHNER
		Dec	onformitä claration	Konformitätserklärung Declaration of Conformity	Å
e.	ektromechan	Elektromechanische Schaltgeräte	e	Electromechanical Switchgear	cal Switchgear
urc acler	Gemäß den Anforderur richtlinie 73/23/EWG u 98/37/EG erklären wir h nachfolgend aufgeführt europäischen Normen:	Gemäß den Anforderungen der Niederspannungs- richtlinie 73/23/EWG und der Maschlirernichtlinie 1382/NICE erklater wich hiermit die Kontormität der 1382/NICenden aufgelührten Produkte mit folgenden europäischen Normen:	annungs- richtlinie Ität der genden	In accordance with the low voltage s 73/23/EWG and the machinery dife hereby declare that the beneath listed to the following European standards:	In accordance with the low voltage switchgear directive 7323/EWG and the machinery directive 98/37/EG we hereby declare that the beneath itsled products conform to the following European standards:
ë	EN 60947-5-1	Niederspannung-Schaltgeräte; Steuergeräte und Schalteleimente; Elektromechanische Steuergeräte	altgeräte; haltelemente; Steuergeräte	a: EN 60947-5-1	Low voltage switchgear and controlgear, Control circuit devices and switching elements; Electro- mechanical control circuit devices
ä	EN 60947-5-1	Anhang K; Besondere Anforderungen an zwangsöffnende Hilfsstromschalter	e /angsöffnende	b: EN 60947-5-1	Annex K: Special requirements for control switches with direct opening action
ö	EN 1088	Sicherheit von Maschinen; Verriegelungseinrichtungen in Verbindung mit trennenden Schutzeinrichtungen	ninen; ungen in enden	c: EN 1088	Safety of machinery: Interlocking devices associated with guards
÷	EN 50041	Industrielle Niederspannungs- Schaltgeräte, Hilfsstromschalter; Positionsschalter 42,5x80; Maße und Kennwerte	annungs- omschalter; 5x80;	d: EN 50041	Low voltage switchgear and controlgear for industrial use; Control switches; Position switches 42,5x80; Dimensions and characteristics
	e: EN 50295	Niederspannungsschaltgeräte - Steuerungs- und Geräte-Interface Systeme – Aktuator Sensor Interfac (AS-i)	nungsschaltgeräte gs- und Geräte-Interface- Aktuator Sensor Interface	e: EN 50295	Low voltage switchgear and Low voltage switchgear and controlgear – Controller and device interface systems – Actuator Sensor Interface (AS-i)
ie je	Produkte werc derspannungsi	Die Produkte werden mit dem CE - Zeichen gemäß der Niederspannungsrichtlinie gekennzeichnet	hen gemäß der inet	The products will b according to the lo	The products will be marked with the CE - mark according to the low voltage switchgear directive
	Produkt		Type		Konformität mit EN-Normen
	Product		Type		Conform with European Standards
	Einbaugr (elektrom	Einbaugrenztaster (elektromechanisch)	EGT1/EGT2 EGT1/4/EGT1	EGT1/EGT2/EGT3/EGM12 EGT1/4/EGT11/EGT12	a a (< 50 V)
	Precision Sing Limit Switches (electromecha	Precision Single Hole Fixing Limit Switches (electromechanical)			
	Einzelgrenztaster	inztaster			3
	(elektrom	(elektromechanisch)	NB01/ SN01		5
	Single PI (electrom	Single Plunger Limit Switches (electromechanical)			5 10
			N101508/514.	-508/514, NB01588	a a.b
			NG		
			NM		a, b, c a. b. c. d



	Certificate of Compliance	Certificate Number: LR 113373-1	Revisiou: LR 113373-1 Date Issued: November 19, 1998	Issued to: UNIYER S.p.A. Via Eradito, 31 L.20128 Milauo	Italy	The products listed below are eligible to bear the CSA Mark shown	Issued by:	poord with Standards	PRODUCTS	r the CSA CLASS 3221 02 - VALVES - Actuators	Electrically solenoid valves, Series UI, U2, U3 associate, with actuators for the control of pneumatic circuit, with pressure range fromm 0.01MPa to 0.1MPa and ambient temperature from - 10° C to 45°C and fluid temperature equal to 25°C.	Serie U1	Type reference: DA0103, rated uput 48V cc., 6W, 100% Type reference: DA0104, rated uput 10V cc., 6W, 100% Type reference: DA0104, rated uput 10V cc., 6W, 100%			Type reference: UJ0001, rated input 12 v Cc., 11 W, 100% Type reference: DB0502, rated input 42 v Cc., 11 W, 100% Type reference: DB0503, rated input 110V cc., 11 W, 100%	Type reference: DB0507, rated input 24V. 50/60Hz, 10VA, 100% Type reference: DB0509, rated input 110V, 50/60Hz, 10VA, 100% Type reference: DB0510, rated input 220V, 50/60Hz, 10VA, 100%
CE CONFORMITY DECLARATION	UNIVER S.p.A. Via Etaclito, 31 - 20128 MILANO	Tel.:02.25298.1 - Fax::02.2575254	CONTROL DEVICE, TYPE: ELECTRIC ACTUATOR	морег: <i>U1-U2-U3-U4-U-5</i>	SERIES:	MANUFACTORING YEAR: 2002		It is hereby certified that the above-mentioned control device, correspond with the Directive' precepts 73/23/CEE, 93/68/CEE, according to the European Standards and internal advises.	an electric component is not allowed until the reed Directives. (89/392/C	The Electric Actuators, type U1-U2-U3, are also Certified according the CSA standards N*LR 113373-1.	HARMONISED REFERENCE STANDARDS.	UNI EN 983 Safety of machinery - Safety requirements for fluid power	systems and their components. Pheumatics. CEI EN 60204-1 Safety of machinery - Electrical equipment of machines, Part I: General remnitements	CEI EN 60730-1 Automatic electrical similar. Part 1: General requirements	CEL EN 60529 Standard protection of the shells (code IP)	-	Milano, <u>41-03-202</u> Signature,