Solenoid Pilot Actuated Valves

503 Series - Zoned Safety Manifolds

Table of Contents

Series 503

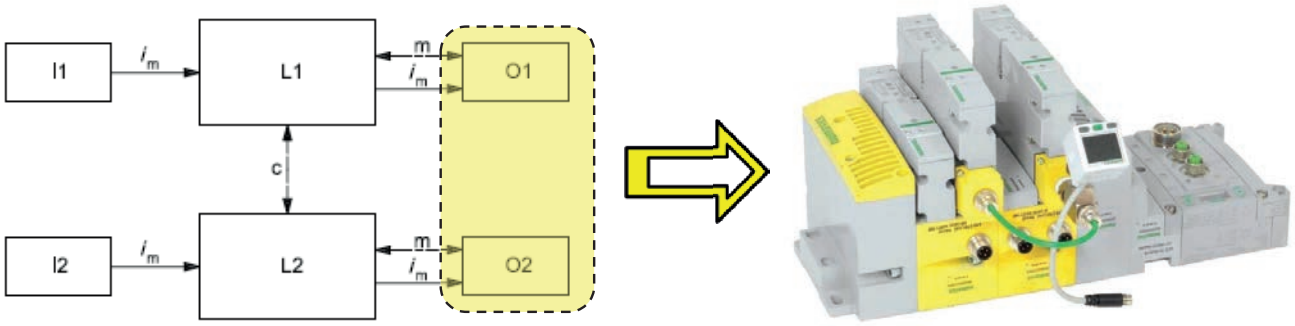
G3 Electronics and I/O

1. Zoned Safety Manifold Introduction

The Zoned Safety manifold of AVENTICS was evaluated for suitability according the standard ISO 13849 regarding the requirements of category 3 PL d.
TÜV evaluation report: 968/FSP 1228.00/16

1.1 Overview

The Zoned Safety Manifold is intended to be used in pneumatic circuits to provide functional safety in accordance with the Machinery Directive 2006/42/CE and the ISO 13849 standards. This unit is an integrated assembly that incorporates the required Output Devices (SRP/CS), necessary to satisfy up to Category 3 of ISO 13849-1; see Category 3 architecture, below from ISO 13849-1. The Zoned Safety Manifold must be connected to the G3 Platform of Aventics Fieldbus Electronics.



Unique components (in yellow) represent the Output Device in each channel identified above. The complete Zoned Safety Manifold integrates these required functions into and easy to render pneumatic system that allows for the required Safety adherence. See section 2 for further breakdown of the complete Zoned Safety Manifold. Complete adherence up to Category 3 requires implementation of the Input Device and Logic Element in addition to the Zoned Safety Manifold.

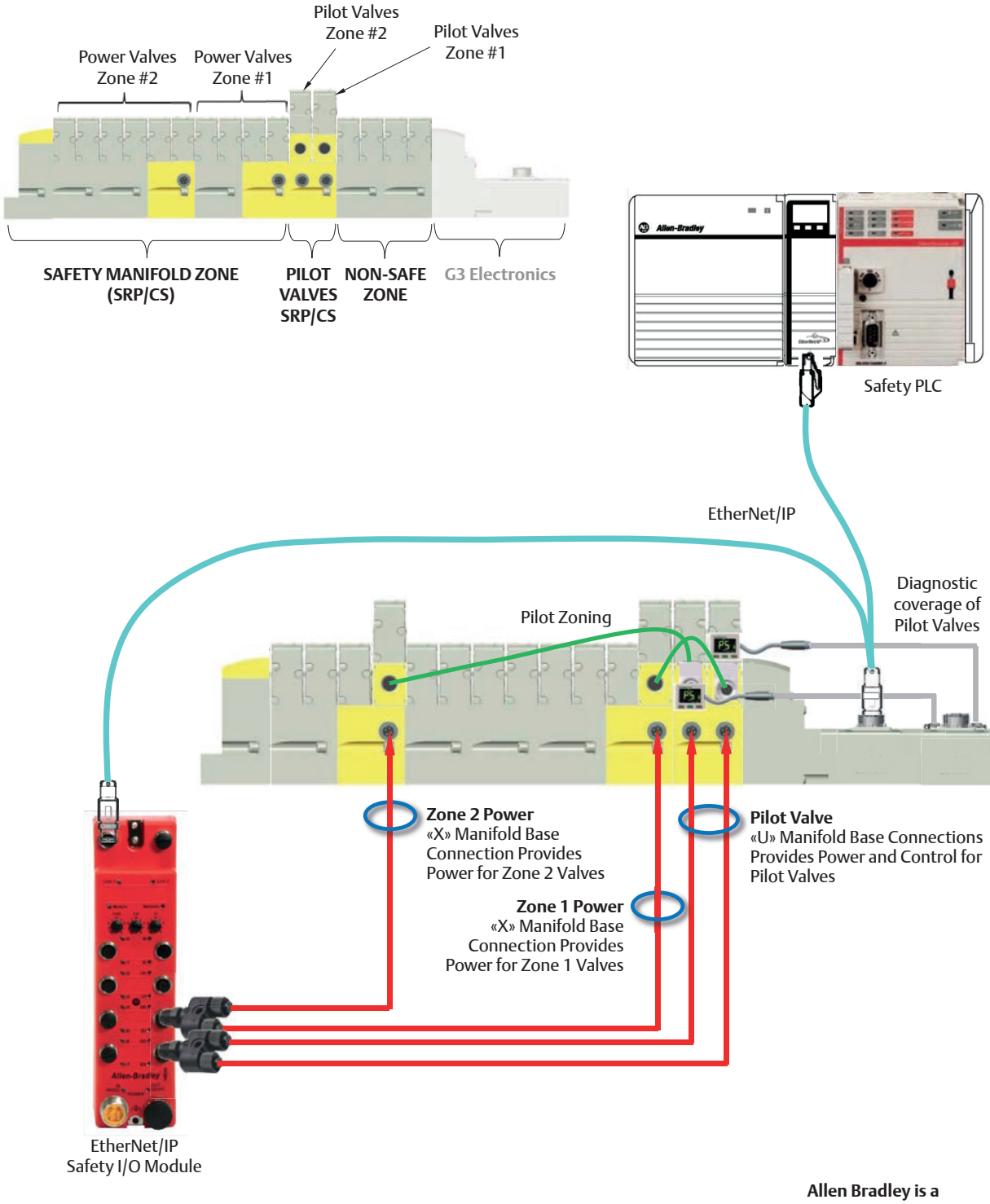
1.2 ZONED SAFETY Manifold

Features	Description
G3 Support	Functional with all ETHERNET based Fieldbus protocols
Compatible up to Category 3 PLd	Evaluated against ISO 13849-1, by TÜV Rheinland
Multiple Zones	One manifold supports up to 3 Safety Zones, up to 16 coils each
Integral Pilot Valve(s)	Pilot valve support integral to manifold, can be external if required
Non-Safe Zone Support	Up to 32 coil capability, in one non-safe zone (in addition to Safety Zones)
Pilot Separation	Optional Pilot Separation of power valves

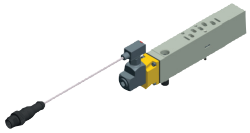
2. Zoned Safety Manifold (SRP/CS)

2.1 Zoned Safety Manifold – Series 503 shown

The Zoned Safety Manifold incorporates the required pneumatic SRP/CS (Safety Related Parts of a Control System) into a single manifold assembly.
The following sub sections detail the various groupings and individual components that make up the Safety Manifold Zone(s). The manifold example below only represents two of the possible three zones.
For complete detail of the Zoned Safety Manifold assembly and I/O mapping; refer to Section 4 of the Technical Manual.



AVENTICS™ Zoned Safety Manifold

First channel (Pilot valves)	2nd channel (safety manifold zone)	Diagnostic coverage First channel	Diagnostic coverage 2 nd channel	Pilot Zoning (Optional)
			According Actuator control	
The Pilot Valve Manifold Base allows the mounted pilot valves to be electrically controlled via the M12 connector, isolated from the connected G3 node. The M12 connector must be externally supplied by a Safety Relay or Safety Output from via a Safety PLC. This becomes one of the redundant channels required in Category 3 applications.	The Zoned Power Manifold base with the integrated M12 connector, supplies power to the integrated valve solenoid drivers and routes the output signals to any additional manifold base(s) connected within the zone. Up to (16) valve solenoid coils can be controlled in each zone. All connected valve solenoid coils are controlled from the attached G3 node. The M12 connector must be externally supplied from a Safety Relay or Safety Output via a Safety PLC. This becomes one of the redundant channels required for Category 3.	The Auxiliary Port 4 Sandwich Block mounts beneath the Pilot Valve(s) incorporating the Pressure Switch for indirect monitoring of the Pilot Valves, and providing Diagnostic Coverage. This block will allow for routing of air from port 4 of the Pilot Valve Manifold Base, to supply pressure to the Pilot Separation Sandwich Block of the manifold. (More detail in the installation manual)	Diagnostic Coverage to implement on the actuator to provide the needed diagnostic of the 2 channel.	A single Zoned Pilot Sandwich Block can be used in each zone to ensure complete disabling of pilot pressure to all power valves within a zone. This ensures that the power valves cannot shift (manually or electronically) unless pressure is supplied to this blocks supply port.

3. Zoned Safety Circuit Examples/Analysis

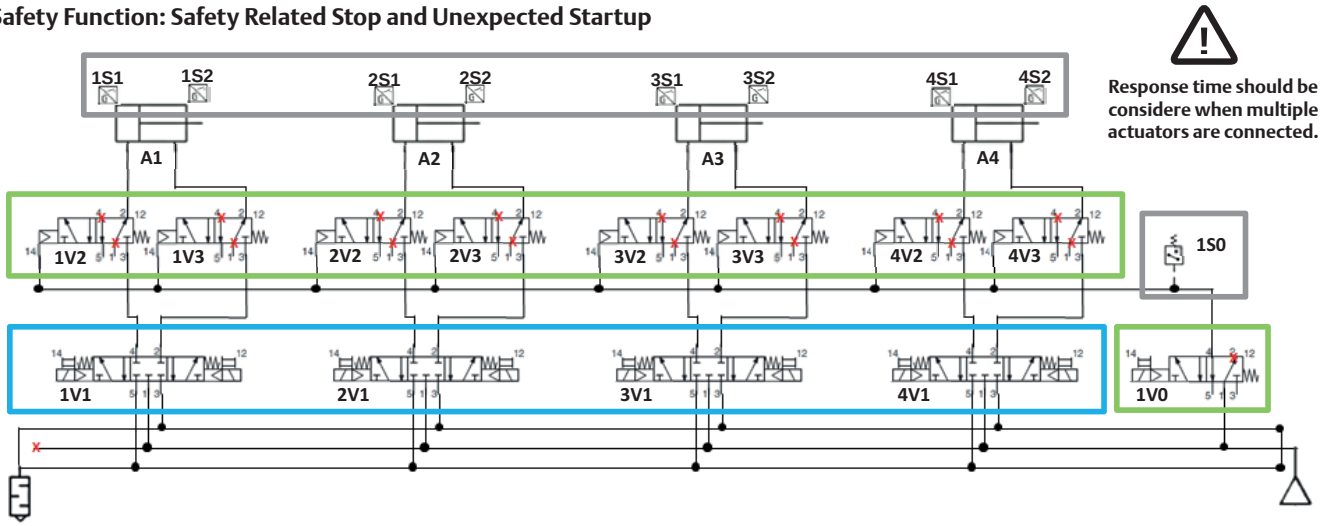
3.1 Example 1: Automated Assembly Machine

The example is based on an automatic assembly machine, with manual loading and unloading of the work piece. It has been determined, based on the Risk Assessment, that the loading/unloading station requires Risk Reduction to make it safe. It has also been determined that the Safety Function requires the motion (Actuators) to stop when the Safety Function is initiated. It has also been determined that the required Category and PLr required, based on ISO 13849-1 is, Category 3 PLd.

The tooling in the load/unload area has four clamps that hold a work piece during the machine process. The four clamps are represented by Actuators A1, A2, A3 and A4 in the pneumatic circuit.

This analysis only considers the pneumatic control, in the form of a sub-system. Additional Safety-Related control components (e.g. protective devices, electrical logic elements, etc.) must be evaluated in the form of a sub-system for a complete evaluation of the Safety Function.

Safety Function: Safety Related Stop and Unexpected Startup



The Safety Functions can be applied to each individual actuator (A1, A2 and A4); however, they can be considered a single Safety Function since they are implemented utilizing the SRP/CS. Each Actuators Safety Function is executed at the same time.

3.2 Example 2: Automated Insertion Tool

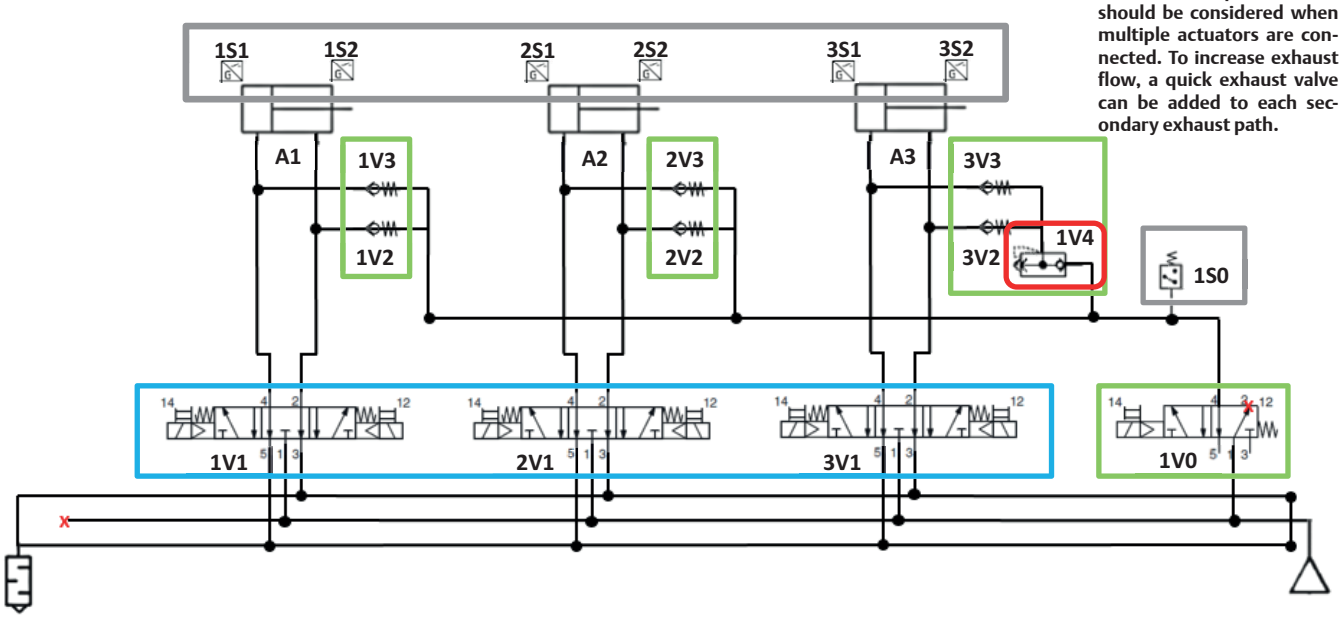
The example is based upon an automatic insertion tool, with manual loading and unloading of the work piece. It has been determined, based on the Risk Assessment, that the loading/unloading station requires Risk Reduction to make it safe. It has also been determined that the Safety Function requires the motion (Insertion Actuators) to release all pneumatic energy when initiated. It has also been determined that the required Category and PLr required, based on ISO 13849-1 is, Category 3 PLd.

The tooling in the load/unload area has three horizontally mounted insertion cylinders that each insert a roll pin in the work piece during the tool process. The insertion cylinders are represented by Actuators A1, A2 and A3 in the pneumatic circuit.

This analysis only considers the pneumatic control, in the form of a sub-system. Additional Safety-Related control components (e.g. protective devices, electrical logic elements, etc.) must be evaluated in the form of a sub-system for a complete evaluation of the Safety Function.

Safety Function: Safe Release of Air

With his type of circuit, Cylinder Volume, Pilot Valve Flow and Response Times should be considered when multiple actuators are connected. To increase exhaust flow, a quick exhaust valve can be added to each secondary exhaust path.



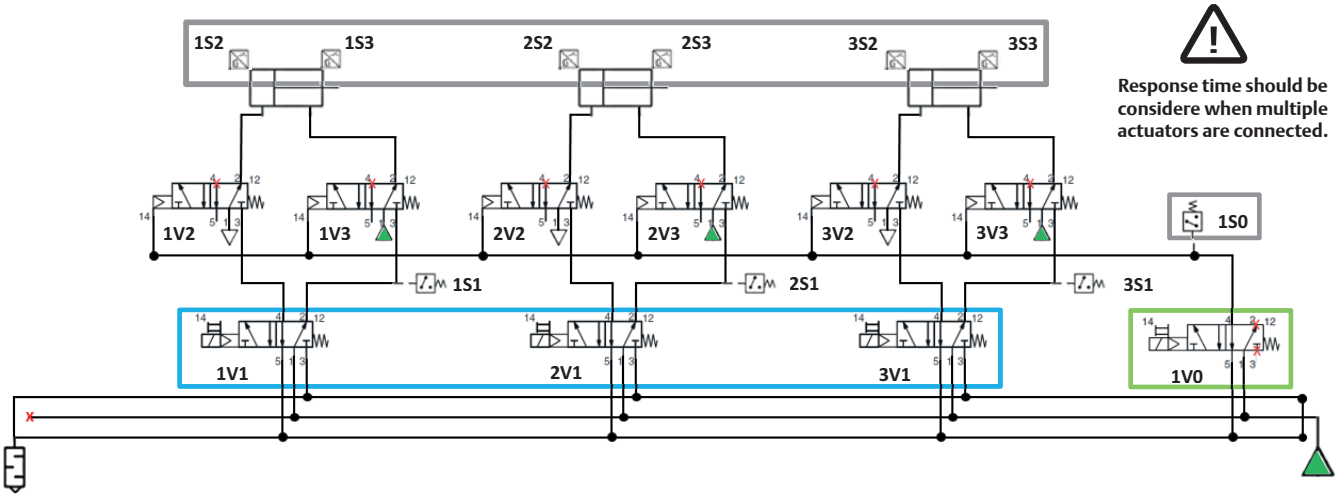
The Safety Functions can be applied to each individual actuator (A1, A2 and A4); however, they can be considered a single Safety Function since they are implemented utilizing the SRP/CS. Each Actuators Safety Function is executed at the same time.

3.3 Example 3: Clamping Weld Fixture

The example is based upon an automated weld fixture, with manual loading and unloading of the work piece. It has been determined, based on the Risk Assessment, that the loading/unloading station requires Risk Reduction to make it safe. It has also been determined that the Safety Function requires the motion (Clamping Cylinders) to move to a safe position. It has also been determined that the required Category and PLr required, based on ISO 13849-1 is, Category 3 PLd.

The tooling in the load/unload area has three pneumatic clamp cylinders that each clamp an area of the inserted sheet metal during the weld process. The clamping cylinders are represented by Actuators A1, A2 and A3 in the pneumatic circuit.

This analysis only considers the pneumatic control, in the form of a sub-system. Additional Safety-Related control components (e.g. protective devices, electrical logic elements, etc.) must be evaluated in the form of a sub-system for a complete evaluation of the Safety Function.



Response time should be considere when multiple actuators are connected.

The Safety Functions can be applied to each individual actuator (A1, A2, A3 and A4); however, they can be considered a single Safety Function since they are implemented utilizing the same SRP/CS. Each Actuators Safety Function is executed at the same time.

4. Technical and Operating Data (Series 503)

Features

- *High flow rate up to 1400 l/min*
- *Spool & Sleeve or rubber packed technology in the same dimension body*
- *Wide electrical connection selection : G3 or 580 Fieldbus Electronics, 25 or 37 Pin Sub D connector, 19 Pin Round connector, 26 Pin Round connector or Terminal Strip*
- *Internal or external pilot pressure supply capability and compliance with ISO standard 15407-2 26 mm*
- *Solenoid air operated valves which can be mounted on manifold bases*
- *580 Electronics*

General

Operating pressure	See «SPECIFICATIONS» [1 bar =100 kPa]
Ambient temperature range (TS)	See «SPECIFICATIONS»
Rated flow	See «SPECIFICATIONS»
conforming to ISO 6358	C (5/2) = 5.21 x 10^{-8} m^3/s.Pa (sonic conductance)
	b (5/2) = 0.34 (critical pressure ratio)
Pneumatic base	High flow subbase or ISO 15407-2 26 mm
Connection	Joinable subbase
Response time	See «SPECIFICATIONS»

fluids (∗)	temperature range (TS)	technology	seal materials (∗)
air or inert gas ISO 8573 Level 7.4.4	-10°C to +50°C	rubber packed	PUR (polyurethane)
	-10°C to +50°C	spool & sleeve	metal-to-metal sealing

Materials in contact with fluid

(∗) Ensure that the compatibility of the fluids in contact with the materials is verified

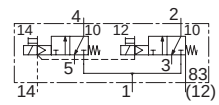
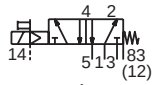
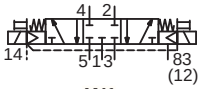
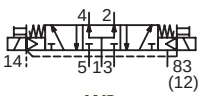
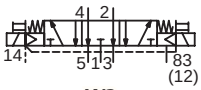
Body	Aluminium, E-coating treatment
Spool	Aluminium or st. steel (spool & sleeve)
Piston	POM (rubber packed)
Spring	Steel
Other seals	NBR
Other materials	PAM (polyarylamide)
	GF 50% (glass fiber reinforced)
Subbases	Aluminium, E-coating treatment

Electrical characteristics

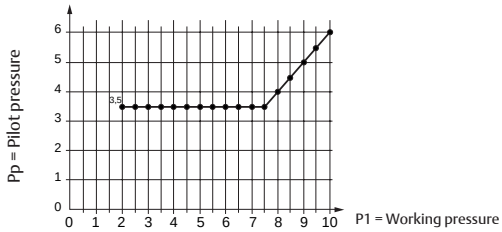
Coil insulation class	F
Electrical safety	IEC-EN 60730-1 / IEC-EN 60730-2-8
Electrical enclosure protection	IP65 (EN 60529)
Standard voltages	DC (=) : 24V
Power ratings (hot/cold) (=)	1.4 W / 1.7 W

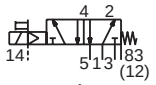
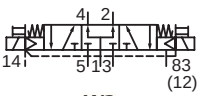
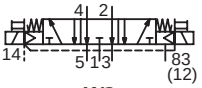
AVENTICS™ Zoned Safety Manifold

Specifications

function type	function code	symbol pilot (14) return (12)	interface	rated flow at 6.3 bar ΔP 1 bar l/min (ANR) 1→2 1→4	rated flow 2→3 4→5	response time open / closed (ms)	pilot pressure at 23°C (bar) min.	pilot pressure max.	operating pressure port 1 min.	operating pressure port 1 max. (PS) air (∗) =	
SPOOL VALVE, RUBBER PACKED TECHNOLOGY, WITH IMPULSE MANUAL OPERATOR											
2 x 3/2 NC	BD	 spring	High flow subbase	1000	800	15 / 20	3.5 [a]	8	2	8	R503A2BD0MA00F1
			ISO subbase	900	800						
5/2	B1	 spring	High flow subbase	1400	1300	20 / 60	2	8	-0.95	8	R503A2B10MA00F1
			ISO subbase	1200	1100						
5/3	B5	 **W1** closed centre position	High flow subbase	1400	1300	15 / 20	4	8	-0.95	8	R503A2B60MA00F1
			ISO subbase	1200	1100						
	B6	 **W2** centre open to pressure	High flow subbase	1300	600	18 / 45	3	8	-0.95	8	R503A2B70MA00F1
			ISO subbase	1100	600						
	B7	 **W3** centre open to exhaust	High flow subbase	600	1300	18 / 45	3	8	-0.95	8	R503A2B50MA00F1
			ISO subbase	600	1100						

[a] NC - NC



SPOOL VALVE, SPOOL AND SLEEVE TECHNOLOGY, WITH IMPULSE MANUAL OPERATOR											
5/2	B1	 spring	High flow subbase	1200	1200	20 / 60	2	8	-0.95	8	R503A1B10MA00F1
			ISO subbase	1100	1000						
5/3	B7	 **W2** centre open to pressure	High flow subbase	1000	1000	20 / 60	2	8	-0.95	8	R503A1B70MA00F1
			ISO subbase	800	800						
	B5	 **W3** centre open to exhaust	High flow subbase	1000	1000	20 / 60	2	8	-0.95	8	R503A1B50MA00F1
			ISO subbase	800	800						

(∗) Ensure that the compatibility of the fluids in contact with the materials is verified.

How to Order: Manifold Assembly kit

PRODUCT CODE

G	503	A	V	3	B	3	0	0	V	A00

Thread connection
G = ISO 228/1
8 = NPT (contact us)
K = Push-in connectors

Product series
503

Revision letter
A = Initial release

Product type
V = Valve Manifold Assembly

Electronics
3 = **G3 Fieldbus Electronics**

Number of Valve Stations

B = 2/34/66	**N** = 14/46/78	**Z** = 26/58
D = 4/36/68	**P** = 16/48/80	**3** = 28/60
F = 6/38/70	**R** = 18/50	**5** = 30/62
H = 8/40/72	**T** = 20/52	**7** = 32/64
J = 10/42/74	**V** = 22/54	
L = 12/44/76	**X** = 24/56	

End Plate Port Size
Used with the first digit «G» or «8»:
3 = 3/8 (manifold base)
Used with the first digit «K»:
K = 8 x 10 mm (push-in connector)
M = 10 x 12 mm (push-in connector)

Valve Station Adder
0 = No Adder
1 = 32+
2 = 64+

Second Valve Series
0 = No Second Valve Series

End Plate Style
V = Vertical

Options
A00 = Standard (no options)
MUF = Muffler in End Plates
DRM = DIN Rail Mount
DWM = DIN Rail Mount with Muffler
14X = External pilot supply from port 14
D12 = External pilot supply from port 14 and Muffler in End Plates
D14 = External pilot supply from port 14 and DIN Rail Mount
F06 = External pilot supply from port 14 Muffler in End Plates and DIN Rail Mount
A45 = Zoned Pilot for End Plate Assembly Kit
A47 = A45 + MUF
A48 = A45 + DRM
A49 = A45 + 14X
F21 = A45 + DRM + MUF
F22 = A45 + 14X + MUF
F23 = A45 + 14X + DRM
K30 = A45 + 14X + DRM + MUF

AVENTICS™ Zoned Safety Manifold

How to Order: Manifolds

G 503 A M S2 2 M A00 1 0

Thread connection
G = ISO 228/1 (1)
8 = NPT (1) (contact us)
K = Push-in connectors

Product series
503

Revision letter
A = Initial release

Product Type
M = Manifold Subbase
Z = Mid-Station Supply (2)

Mounting
S2 = Manifold Subbase, 2 Stations, Side Ports, Single Z-Board™
M2 = Manifold Subbase, 2 Stations, Side Ports, Double Z-Board™

Port connection (2-4)
Used with the first digit «G» or «8»:
2 = 1/4
Used with the first digit «K»:
H = 6 x 8 mm (push-in connector)
K = 8 x 10 mm (push-in connector)

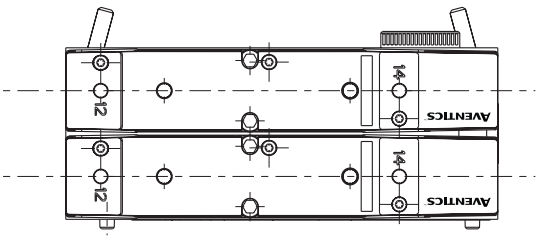
Wiring option
M = Plug-in, Receptacle Assembly
0 = Non-Plug-in
U = M12 Connectors w/ Pass Thru Communication Pin 1= Coil 14; Pin 2=Not Used; Pin 3=Common; Pin 4=Not Used (4)
X = 0 & 24 VDC Separation at First Station of a Safety Zone (5)

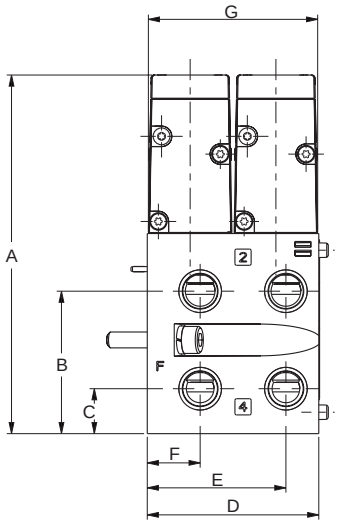
Options
A00 = Standard (No Options)
83H = Pilot Separation for Station 1 (3)

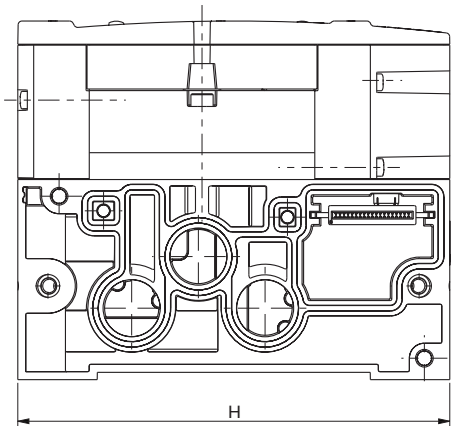
Interface
1 = Pneumatic high flow
2 = ISO 15407-2

(1) Port Type "8" and "G" only available with Port Size "2"
(2) Only available with "M" Wiring and "M2" Mounting
(3) Only available with "X" Wiring
(4) Only available with Product Type "M" and "S2" Mounting
(5) Only available with Product Type "M" and "M2" Mounting

Dimensions (mm) - Plug in Valve Mounted

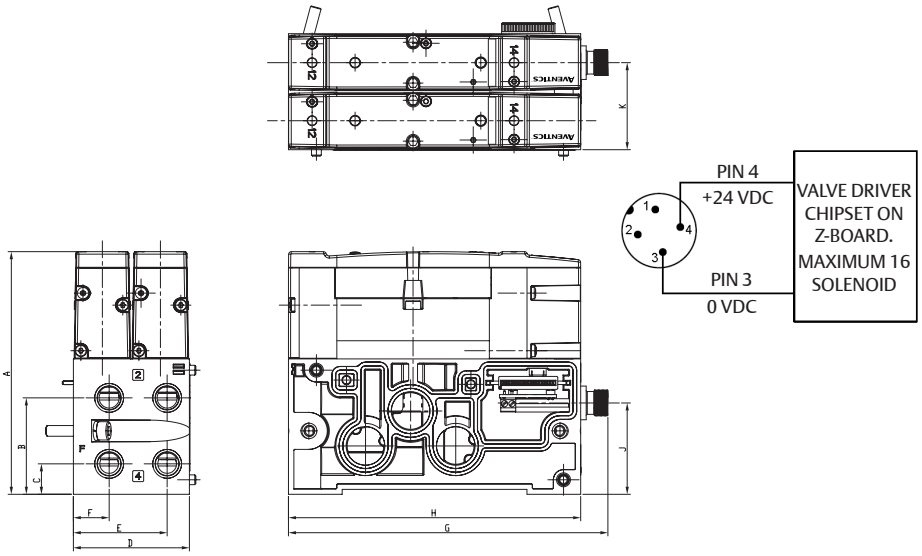






A	B	C	D	E	F	G	H
112.9	44.9	14.2	54	43.7	16.7	53.3	136

Dimensions (mm) - Distributeur à alimentation par plan de pose (Embase “U”)

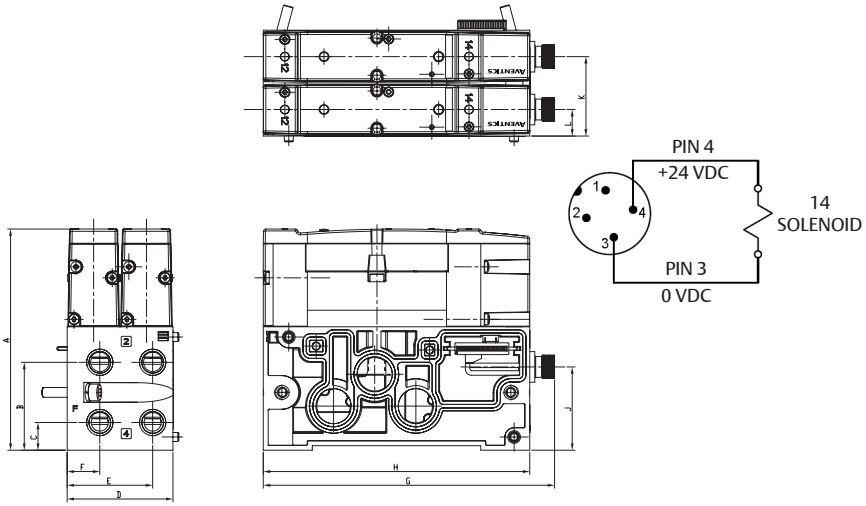


A	B	C	D	E	F	G	H	J	K
112.9	44.85	14.15	54	43.65	16.65	148.654	136	42.5	40.5

Zoned Power Manifold Base (“X” Wiring”)

- Via M12 Connector supplies power to up to 16 valve solenoid coils
- All valve solenoid coils are controlled via the attached G3 node
- When M12 connector is externally supplied by a Safety Relay or Safety Output via a Safety PLC the valves within the Safety zone become one of the redundant channels of a Category 3

Dimensions (mm) - Plug-in Valve Mounted (U Wiring Option)



A	B	C	D	E	F	G	H	J	K	L
112.9	44.85	14.15	54	43.65	16.65	148.654	136	42.5	40.5	13.5

Pilot Valve Manifold Base (“U” Wiring)

- Allows mounted pilot valves to be electrically controlled via M12 connector; isolated from the connected G3 node
- When M12 connector is externally supplied by a Safety Relay or Safety Output via a Safety PLC the pilot valves become one of the redundant channels of a Category 3
- Pilot supply valves when used to supply Pilot Operated Check Valves, Rod-Locks, Pilot Operated Spring Return Valves etc provide one of the channels required for Category 3

AVENTICS™ Zoned Safety Manifold

How to Order: Valves

R 503 A 2 B 4 0 M A00 F1

Product Series
503 = 26 mm valve

Revision letter
A = Initial release

Valve type
1 = Spool and sleeve*
2 = Rubber packed

Actuation
B = Solenoid pilot
(With impulse manual operator)

Function
1 = 5/2, spring return
5 = 5/3, W3, open center to exhaust
6 = 5/3, W1, center closed
7 = 5/3, W2, open center to pressure
D = 2x3/2 NC, dual 3-way

* Spool and Sleeve not available with Functions 6, A, D, and N

Voltage
F1 = 24 V DC

Options (According risk analyse)
A00 = Standard (No option)
With impulse manual operator
11B = With maintained manual operator
11M = Without manual operator

Electrical interface
M = Plug-in (with LED indicator / DC)
N = M12 Connector
Pin#1 = Not Used,
Pin#2 = Coil 12, #3 = Common,
Pin#4 = Coil 14

How to Order: Regulator

R 503 A R S 1 1 J A00 1 0

Product series
503 (26 mm valve)

Revision letter
A = Initial release

Product type
R = Pressure regulator

Regulator type
S = Single regulator - Pressure to port 1
D = Regulator - Pressure to ports 5 & 3
E = Regulator- Pressure to ports 4 & 2, without valve
T = Regulator - Pressure to ports 1 & 3, 2 pressure selector

Pressure range
1 = 0.7 to 9 bar
3 = 0.2 to 2 bar
4 = 0.3 to 4 bar

* For Regulator Type "E" must select "0" wiring option + "0" interface

Interface
1 = Pneumatic high flow
2 = ISO 15407-2
0 = No Interface*

Options
A00 = Standard (no options)
16N = Jumper for Supply Pressure to Valve, 14 End
16P = Jumper for Supply Pressure to Valve, 12 End

Wiring option
J = Plug-in
0 = Non-plug-in*

Gauge type
2 = bar (standard)
1 = PSI

G3 Electronics

G3 EP1 00 R 0 STD

Series
G3 = G3 Electronics

Electronics Protocol
CC1 = CC-Link IE Field
EC1 = EtherCAT
ED1 = EtherNet/IP DLR
EM1 = Ethernet Modbus - TCP
PL1 = Ethernet POWERLINK
PN1 = PROFINET

Number of I/O Modules

00	= 0	09	= 9
01	= 1	10	= 10
02	= 2	11	= 11
03	= 3	12	= 12
04	= 4	13	= 13
05	= 5	14	= 14
06	= 6	15	= 15
07	= 7	16	= 16
08	= 8		

Options
STD = Standard
DRM = DIN Rail Mounting
E40 = Au to Recovery Module (ARM)
G32 = E40 + DRM

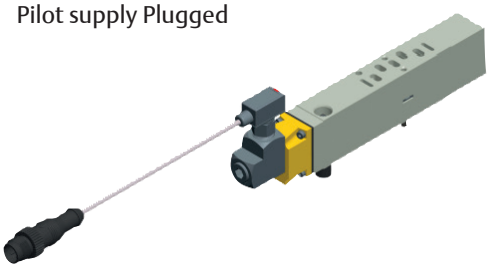
Modification
0 = Initial Release

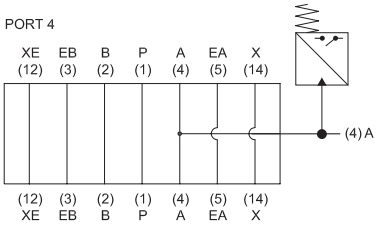
Left Mounting
R = w/Terminating Resistor

SANDWICH PORT 4 SUPPLY BLOCK

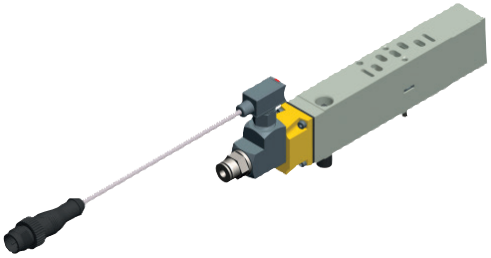
- Monitors pressure to external devices by Pressure Switch AP10 (NPTF)
- Can be use to supply pressure from Port 4 of valve to pilot Safety zone of manifold via Pilot Separation Pilot block

Pilot supply Plugged

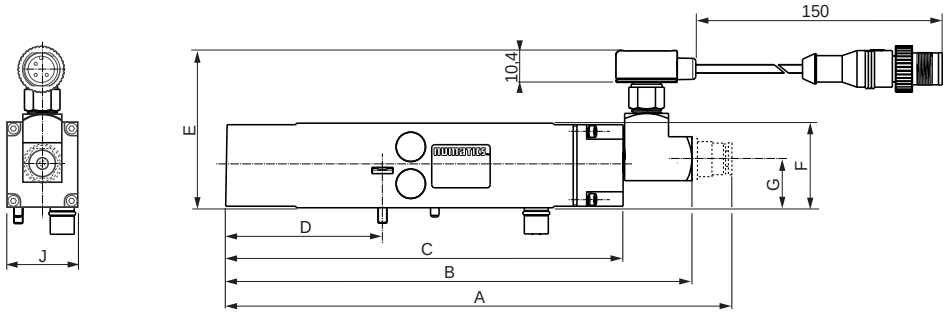




Pilot supply - 5/32 (4 mm) Push-in-fitting



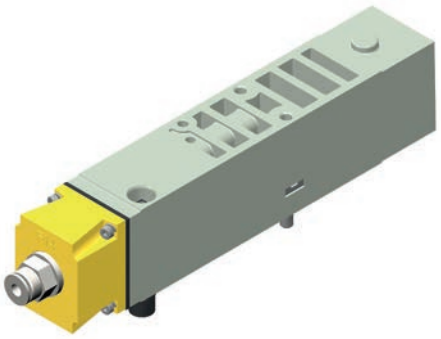
Catalog number	Port for Pilot Supply	Description
8503AU516663013	Plugged 1/4 NPTF	High flow Port 4 supply block with pressure switch AP10
K503AU516663014	5/32 (4mm) Push-In Fitting	High flow Port 4 supply block with pressure switch AP10
G503AU516663016	G 1/4	High flow Port 4 supply block G 1/4 without pressure switch
8503AU516663011	Plugged 1/4 NPTF	ISO 15407-2 Port 4 supply block with pressure switch AP10
K503AU516663012	5/32 (4mm) Push-In Fitting	ISO 15407-2 Port 4 supply block with pressure switch AP10
G503AU516663015	G 1/4	ISO 15407-2 Port 4 supply block G 1/4 without pressure switch



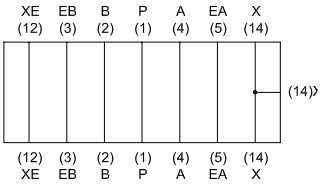
	A	B	C	D	E	F	G	J
Plugged 1/4 NPTF	186.71	184.71	148.78	58.58	52.2	33	17	26.5
5/32 (4mm) Push-In Fitting	197.21	186.33	148.78	58.58	52.2	33	17	26.5

SANDWICH PILOT SUPPLY BLOCK

- Allows for introduction of secondary pilot supply to either an individual valve or zone of valves on manifold. Supply to zone of manifold requires selection of Manifold Block and End Plates with Pilot Separation option
- Pilot Supply air can be from either an external valve or integrated into the manifold via the Port 4 Supply Block



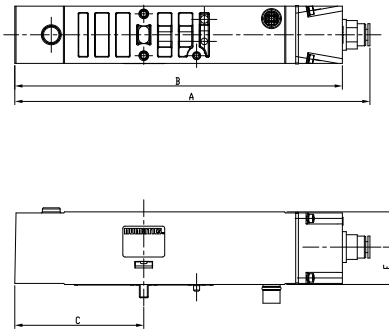
ZONED PILOT



Catalog number	Port for Pilot Supply	Description
G503AP428300008	G 1/4	High flow Zoned Pilot Supply Block
K503AP428300010	4mm Push-In Fitting	High flow Zoned Pilot Supply Block
G503AP428300007	G 1/4	ISO15407-2 Zoned Pilot Supply Block
K503AP428300009	4mm Push-In Fitting	ISO15407-2 Zoned Pilot Supply Block

INDIVIDUAL PILOT

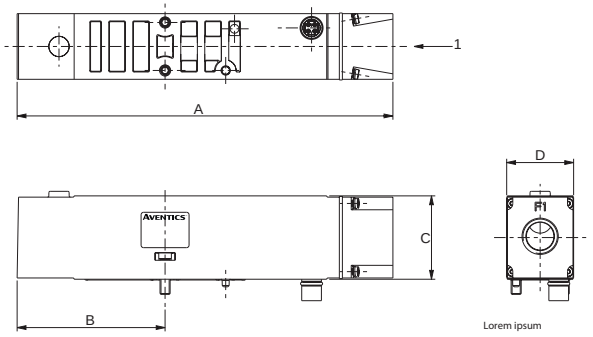
Catalog number	Port for Pilot Supply	Description
G503AP428300006	G 1/4	High flow Independent Pilot Supply Block
G503AP428300005	G 1/4	ISO15407-2 Independent Pilot Supply Block



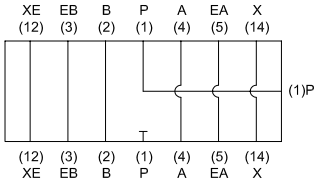
A	B	C	D	E	F
161	148.78	58.58	33	17	26.5

Dimensions (mm)

Sandwich pressure block



- Used to supply a separate pressure to a single valve station without needing blocking disks

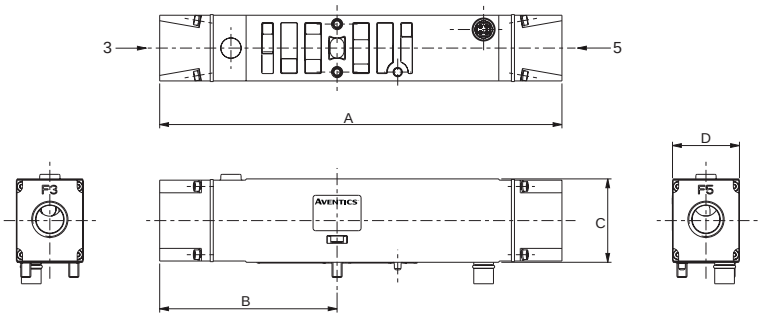


Sandwich Pressure Block Kit

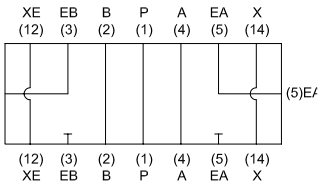
Catalog number	Port Type	Description
G503AW428300004	G 1/4	High Flow Sandwich pressure block
G503AW428300003	G 1/4	ISO 15407-2 Sandwich pressure block

A	B	C	D
148.8	58.6	33	26.5

Sandwich exhaust block



- Used to isolate the exhaust of a single valve station from the manifold
- Allows faster exhaust response by re-routing exhaust externally to the manifold



Sandwich Exhaust Block Kit

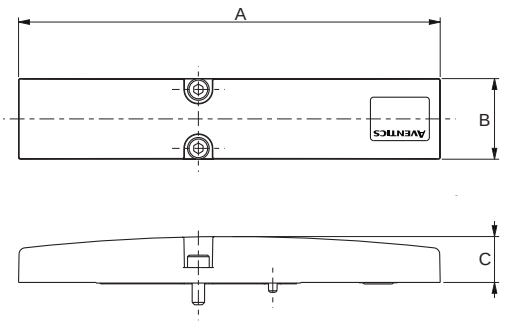
Catalog number	Port Type	Description
G503AX428300002	G 1/4	High Flow Sandwich exhaust block
G503AX428300001	G 1/4	ISO 15407-2 Sandwich exhaust block

A	B	C	D
159.2	70.2	33	26.5

Dimensions (mm)

Blank station plate kit

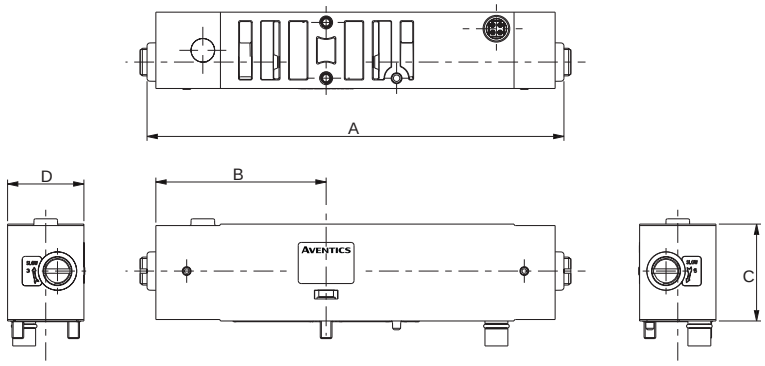
P503AB428359001

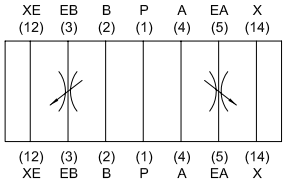


- Used to block off a manifold station block for future use

A	B	C
136	26	14.8

Sandwich speed control kit





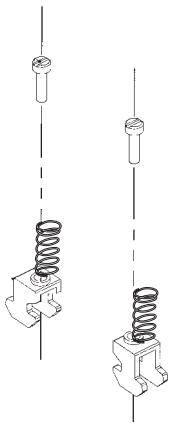
Catalog number	Description
R503AS425575002	High Flow - Sandwich Speed Control
R503AS425575001	ISO 15407-2 - Sandwich Speed Control

A	B	C	D
142	58	33	26

AVENTICS™ Zoned Safety Manifold

DIN Rail Clamp Kit

239-980



Blocking Discs

(Includes tag to label ports blocked)

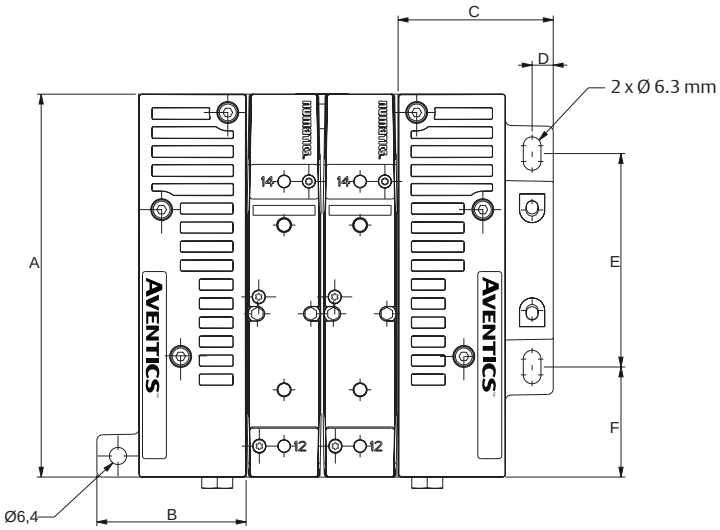
Ports	Catalog number
1	P503AD431191001
3	P503AD431191002
5	P503AD431191003
1 + 3	P503AD431191004
1 + 5	P503AD431191005
3 + 5	P503AD431191006
1, 3, 5	P503AD431191007

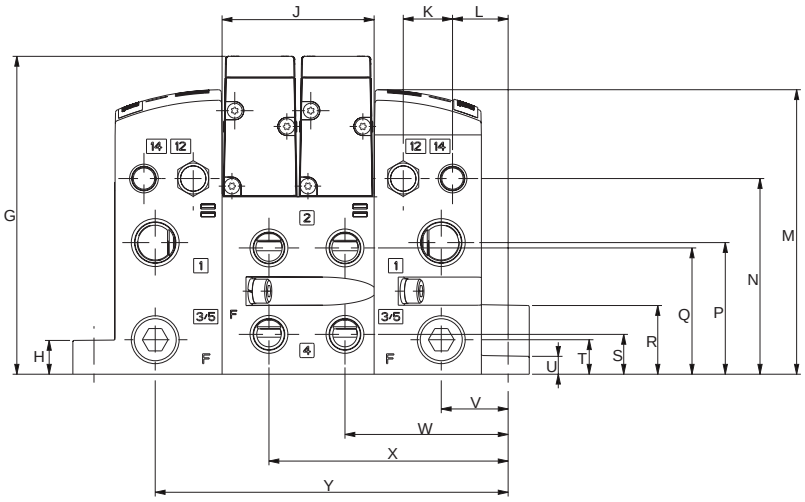
Zoned Safety End Plate Kit - Threaded

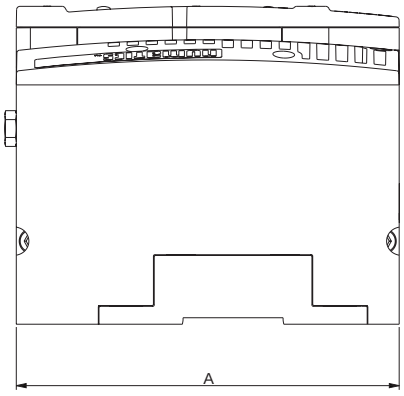
port type	G			push-in			push-in		
	1	3/5	12/14	1	3/5	12/14	1	3/5	12/14
	3/8	3/8	1/8	10 mm	10 mm	6 mm	12 mm	12 mm	6 mm
Vertical w/o muffler, w/o DIN	**G503AK428327013**			**K503AK428327015**			**K503AK428327017**		
Vertical w/o muffler, w/DIN	**G503AK428327014**			**K503AK428327016**			**K503AK428327018**		
Vertical w/muffler, w/o DIN	**G503AK428327019**			**K503AK428327021**			**K503AK428327023**		
Verical w/muffler, w/DIN	**G503AK428327020**			**K503AK428327022**			**K503AK428327024**		
Vertical w/o muffler, w/o DIN, w/Pilot Separation	**G503AK428327037**			**K503AK428327039**			**K503AK428327041**		
Vertical w/o muffler, w/DIN, w/Pilot Separation	**G503AK428327038**			**K503AK428327040**			**K503AK428327042**		
Vertical w/muffler, w/o DIN, w/Pilot Separation	**G503AK428327043**			**K503AK428327045**			**K503AK428327047**		
Vertical w/muffler, w/DIN, w/Pilot Separation	**G503AK428327044**			**K503AK428327046**			**K503AK428327048**		

Dimensions (mm)

Manifold Assembly





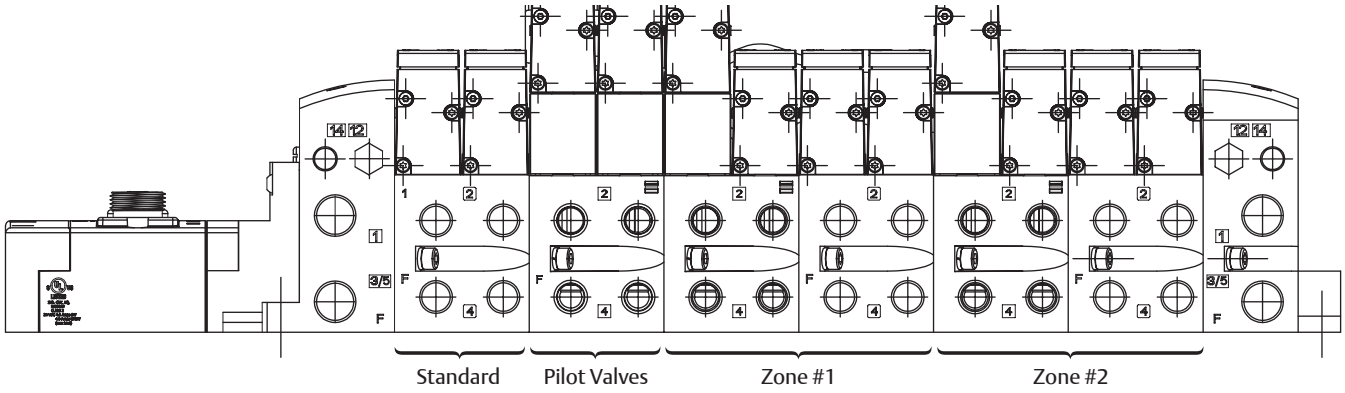


A	B	C	D	E	F	G	H	J	K	L	M
136	53	55.1	7.5	75.8	39.1	112.9	12	54	17.5	19.8	101.1

N	P	Q	R	S	T	U	V	W	X	Y
69.5	46.8	44.9	24.4	14.2	12.3	6.4	23.8	58	85	125.4

AVENTICS™ Zoned Safety Manifold

Ordering Zoned Safety Manifolds with G3 Electronics and 503 Valves



Zoned Safety manifolds can be configured with a combination of valves for non safety related applications and up to 3 independent safety zones. Within each safety zone both power and pilot air to the valves can be isolated.

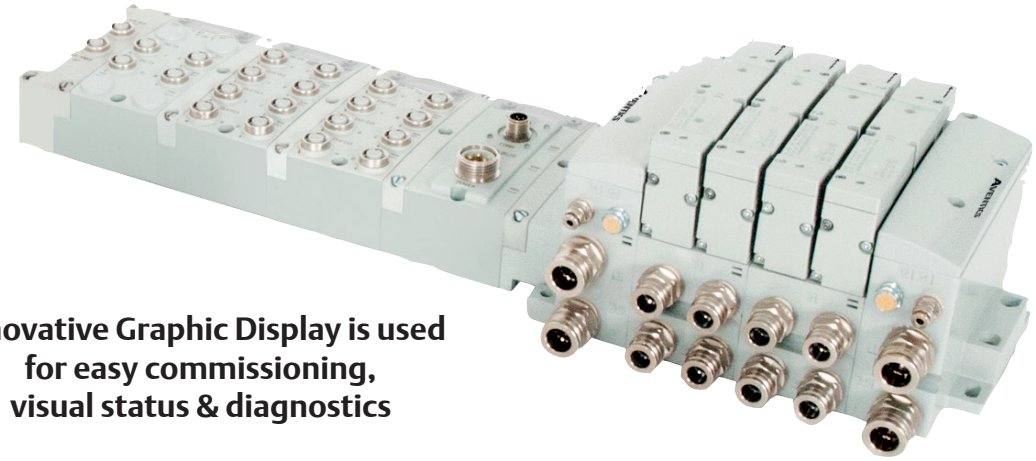
- Any valves that are not part of the safety related functions must be configured starting @ Station 1
- The “U” Wiring block is the beginning of the safety zone. Only 5/2 Single Solenoid /Spring return valves without override may be used. Each valve corresponds to a safety zone. A manifold with 2 Safety zones will have 2 valves with the “U” Wiring
- The “X” wiring block allows 0 and +24 VDC separation for a section of the manifold while the remainder of the manifold remains operational. Each “X” wiring block controls up to 16 solenoids
- If Pilot Zoning is required, must select “Zoned Pilot for End Plate Assembly Kit” in the Valve Assembly number and option “83H” Pilot Separation for Station 1 in the Manifold Assembly Kit
- Refer to the How to Order example to the right

Example Order - 503 Show

Assembly Kit	G503AV3L300VA45	
Valve Station #1	R503A2B40MA00F1	STANDARD
Valve Station #2	R503A2B40MA00F1	
Mounting #1		
G503AMM22MA0010		PILOT VALVES
Valve Station #3	R503A2B10M11MF1	
Accessory Station #3	K503AU516663006	
Valve Station #4	R503A2B10M11MF1	
Accessory Station #4	K503AU516663010	
Mounting #2	G503AMS22UA010	
Valve Station #5	R503A2B40MA00F1	
Accessory Station #5	K503AP48330010	ZONE #1
Valve Station #6	R503A2B40MA00F1	
Mounting #3	G503AMM22X83H10	
Valve Station #7	R503A2B40MA00F1	
Valve Station #8	R503A2B40MA00F1	
Mounting #4		
G503AMM22MA0010		
Valve Station #9	R503A2B40MA00F1	ZONE #2
Accessory Station #9	K503AP48330010	
Valve Station #10	R503A2B40MA00F1	
Mounting #5	G503AMM22X83H10	
Valve Station #11	R503A2B40MA00F1	
Valve Station #12	R503A2B40MA00F1	
Mounting #6	G503AMM22MA0010	
Electronics	G3EP100R0STD	
ASSEMBLED		

AVENTICS™ Zoned Safety Manifold

G3 Electronic displays its innovations !



Innovative Graphic Display is used for easy commissioning, visual status & diagnostics

Commissioning Capabilities

- Set network address
- Set baud rate
- Set auto or manual I/O sizes
- Set fault/idle output states
- Set brightness
- Set factory defaults

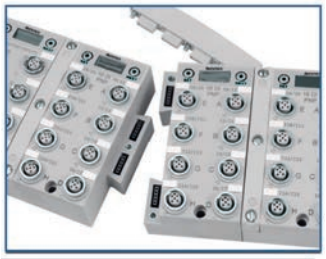
Visual Diagnostics

- Shorted and open load detection
- Shorted sensor/cable detection
- Low & missing power detection
- Missing module detection
- Self-test activation
- Log of network errors / Distribution errors

Graphic Display for Configuration & Diagnostics

Auto Recovery Module

Highly Distributable



Easy, Robust Connections

Benefits:

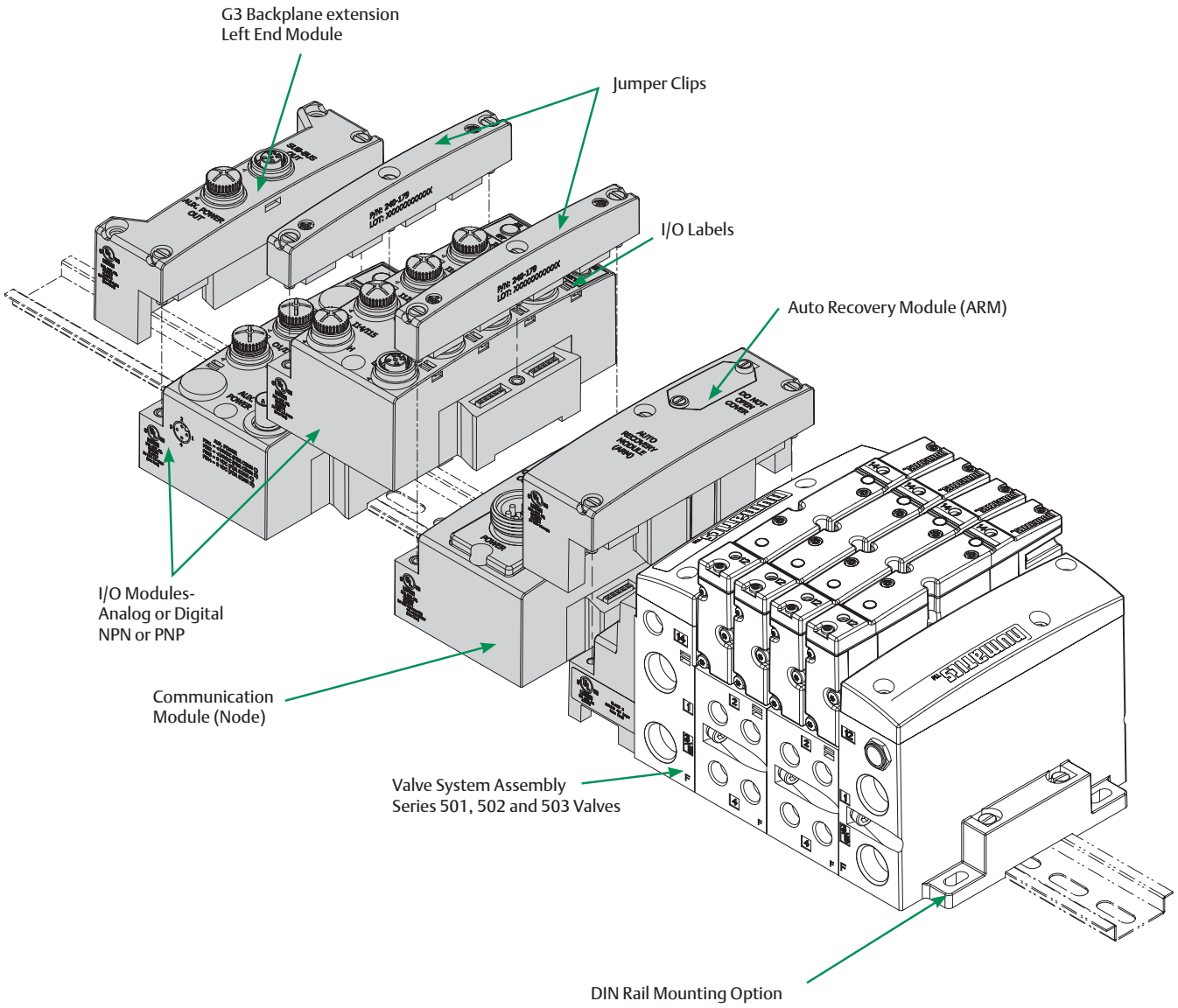
- SPEEDCON M12 connector technology allows for fast and efficient ½ turn I/O connector insertion
- Power connector scheme allows output power to be removed while inputs and communication are left active
- IP65/NEMA 4 Protection
- Auto Recovery Module (ARM) protects configuration information during a critical failure
- Novel “clip” design allows easy module removal/replacement without dismantling manifold
- Interfaces to 501, 502 and 503 valves with flow from 400 l/min up to 1400 l/min ANR
- “On line” CAD files, 85 formats
- Up to 128 coils for 501, 80 coils for 502 and 503

G3 Electronics Modularity

Discrete I/O

The Series G3 product line is a completely modular system. All of the G3 electronic modules plug together, via mechanical clips, allowing easy assembly and field changes. This makes the system highly distributable. Additional flexibility is incorporated because the same modules can be used in either centralized or distributed applications.

The G3 electronics interfaces with the Series 501, 502 and 503 but also with the highly modular Aventics generation Series 2000, Series ISO 5599/2 and ISO 15407-2 valve lines to further enhance the modularity and flexibility of the entire system solution.



AVENTICS™ Zoned Safety Manifold

Modbus® TCP/IP

Ethernet used throughout the world to network millions of PC's has now evolved into a viable industrial network. Ethernet is an open architecture high-level communication network that meets the demands of today's industrial applications requiring high-speed (10/100 Mbit/s), high-throughput and flexibility.
Additionally, Ethernet technology can integrate an on-board web server, which can make the node readily accessible for configuration, testing and even retrieval of technical documentation.

Aventics' G3 nodes for Modbus® TCP/IP have an integrated graphic display and are capable of addressing combinations of up to 1200 outputs and 1200 inputs.

DESCRIPTION	REPLACEMENT PART NUMBER
Modbus® TCP/IP communications module (node)	240-292

Modbus® TCP/IP

COMM  FEMALE

Pin 1 = TX+
Pin 2 = RX+
Pin 3 = TX-
Pin 4 = RX-

POWER  MALE

Pin 1 = +24 V DC (valves & out)
Pin 2 = +24 V DC (node & in)
Pin 3 = 0 V DC (node & in)
Pin 4 = 0 V DC (valves & out)

Technical Data

Electrical Data	Voltage	Current
Node Power at Max. Brightness	24 V DC +/- 10%	0.0657 A
Valves & Discrete I/O	24 V DC +/- 10%	8 A maximum
Power Connector	Single key 4 pin 7/8" MINI type (male)	
Communication Connector	D-coded 4 pin M12 type (female)	
LEDs	Module Status, Network Status and Activity/Link	

Operating Data	
Temperature Range (ambient)	-20°C to +50°C (Electronics only)
Humidity	95% relative humidity, non-condensing
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6
Moisture Protection	IP65, IP67 (with appropriate assembly and termination)

Configuration Data	
Graphic Display	Display used for setting IP Address, Subnet mask, Fault/Idle Actions, DHCP / BootP and all other system settings.
ARM	(Auto Recovery Module) Optional module that contains automatic recovery of system setting in the event of total or partial system failure
Maximum Valve-Solenoid Outputs	128 for Series 501, 80 for Series 502/503
Maximum Addressable I/O Points	Various combinations of 1200 outputs and 1200 inputs

Network Data	
Supported Baud Rates	10 Mbit / 100 Mbit
Communication Connector	D-coded 4 pin M12 type (female)
Diagnostics	Power, short, open load conditions and module health are monitored
Special Features	Integrated web server and fail-safe device settings, HTTP, FTP, and UNICAST (for EtherNet/IP™)

Weight	
Modbus® TCP/IP Communications Module	255 g

Accessories for Modbus® TCP/IP

Accessory	Description		Catalog number
	M12 Straight 4 Pin Male D-Coded to Male RJ45 network Cable - Shielded supply 24 V DC	5m	QA0405MK0VA04000
		10m	QA0410MK0VA04000
	M12 Straight 4 Pin Male D-Coded Field Wireable network Connector PG 9 Cable Gland – Screw Terminal		QA04F20000000000
	4 pin straight female cable network connector 7/8" supply 24 V DC		230-1003
	4 pin elbow female cable network connector 7/8" supply 24 V DC		230-1001
	4 pin elbow female cable network connector 7/8" with 9.15 m cable supply 24 V DC	 1 = brown 2 = white 3 = blue 4 = black	230-950

AVENTICS™ Zoned Safety Manifold

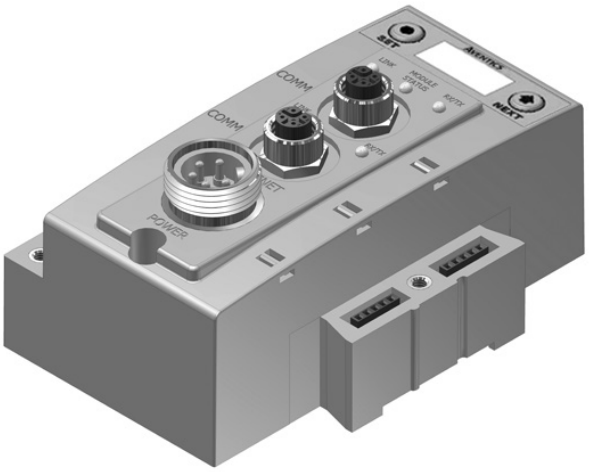
PROFINET™

PROFINET™ is the innovative open standard for Industrial Ethernet, development by Siemens and the PROFIBUS® User Organization (PNO). PROFINET™ complies to IEC 61158 and IEC 61784 standards. PROFINET™ products are certified by the PNO user organization, guaranteeing worldwide compatibility.

Aventics' G3 nodes for PROFINET™ IO (PROFINET™ RT) have an integrated graphic display and are capable of addressing combinations of up to 1200 outputs and 1200 inputs.

PROFINET™ is based on Ethernet and uses TCP/IP and IT standards and complements them with specific protocols and mechanisms to achieve a good Real Time performance.

More information regarding PROFINET™ can be obtained from the following website: www.profinet.com



DESCRIPTION	REPLACEMENT PART NUMBER
PROFINET® communications module (node)	**240-240**

PROFINET COMM

FEMALE

Pin 1 = TD+
Pin 2 = RD+
Pin 3 = TD-
Pin 4 = RD-

POWER

MALE

Pin 1 = 0 V DC (valves & outputs)
Pin 2 = 0 V DC (node & inputs)
Pin 3 = Earth Ground ⏚
Pin 4 = +24 V DC (node & inputs)
Pin 5 = +24V DC (valves & outputs)

Technical Data

Electrical Data	Voltage	Current
Node Power at Max. Brightness	24 V DC +/- 10%	0.0903 A
Valves & Discrete I/O	24 V DC +/- 10%	8 A maximum
Power Connector	Single key 5 pin 7/8" MINI type (male)	
Communication Connector	Two D-coded 4 pin M12 type (female)	
LEDs	Module Status, Network Status and Activity/Link	

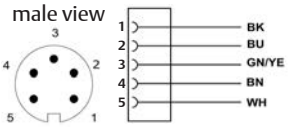
Operating Data	
Temperature Range (ambient)	-20°C to +50°C (Electronics only)
Humidity	95% relative humidity, non-condensing
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6
Moisture Protection	IP65, IP67 (with appropriate assembly and termination)

Configuration Data	
Graphic Display	Display used for setting IP Address, Subnet Mask, Fault/Idle Actions, and all other system settings.
ARM	(Auto Recovery Module) Optional module that contains automatic recovery of system setting in the event of total or partial system failure.
Maximum Valve-Solenoid Outputs	128 for Series 501, 80 for Series 502/503
Maximum Addressable I/O Points	Various combinations of 1200 outputs and 1200 inputs

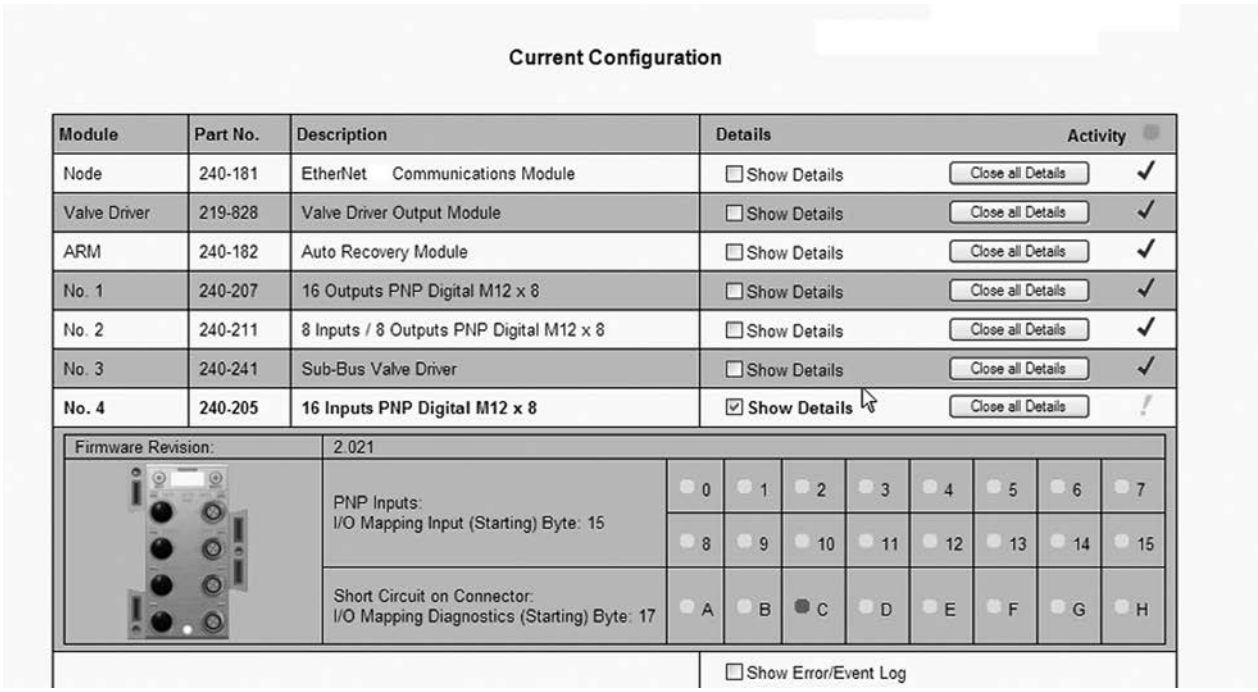
Network Data	
Supported Baud Rates	10 Mbit / 100 Mbit
Communication Connector	Two D-coded 4 pin M12 type (2-Female)
Diagnostics	Power, short, open load conditions and module health and configuration are monitored
Special Features	Integrated web server, Integrated 2 port switch and fail-safe device settings, and FSU

Weight	
PROFINET™ Communications Module	227 g

Accessories for PROFINET™

Accessory	Description		Catalog number
	M12 Straight 4 Pin Male D-Coded to Male RJ45 Cable - Shielded supply 24 V DC	5m	QA0405MK0VA04000
		10m	QA0410MK0VA04000
	M12 Straight 4 Pin Male D-Coded Field Wireable Connector PG 9 Cable Gland – Screw Terminal		QA04F20000000000
	5 pin straight female cable connector 7/8", supply 24 V DC		MC05F90000000000
	5 pin elbow female cable connector 7/8", supply 24 V DC		MD05F20000000000
	5 pin elbow female cable connector 7/8" with 10 m cable Euro colour code supply 24 V DC		MD0510MAG0000000

Server web page



AVENTICS™ Zoned Safety Manifold

Ethernet POWERLINK®

Ethernet POWERLINK® is a open fieldbus protocol designed by B&R for communication between automation control systems and distributed I/O at the device level.

Aventics' G3 Ethernet POWERLINK® nodes have an integrated graphic display and are capable of addressing combinations of up to 1200 outputs and 1200 inputs.

The G3 Ethernet POWERLINK® nodes have been designed and tested to conform to the Ethernet POWERLINK® specifications available at EPSG group (Ethernet Powerlink® Standardization Group). The certification process ensures interoperability for all Ethernet POWERLINK® devices and compatibility with B&R systems.

More information regarding Ethernet POWERLINK® can be obtained from the following website:
www.ethernet-powerlink.org

DESCRIPTION	REPLACEMENT PART NUMBER
Ethernet POWERLINK® communications module (node)	**240-309**

Ethernet POWERLINK®
COMM

FEMALE

Pin 1 = TD+
Pin 2 = RD+
Pin 3 = TD-
Pin 4 = RD-

POWER

MALE

Pin 1 = 0 V DC (valves & outputs)
Pin 2 = 0 V DC (node & inputs)
Pin 3 = Earth Ground ⏚
Pin 4 = +24 V DC (node & inputs)
Pin 5 = +24V DC (valves & outputs)

Technical Data

Electrical Data	Voltage	Current
Node Power at Max. Brightness	24 V DC +/- 10%	0.0955 A
Valves & Discrete I/O	24 V DC +/- 10%	8 A maximum
Power Connector	Single key 5 pin 7/8" MINI type (male)	
Communication Connector	Two D-coded 4 pin M12 type (female)	
LEDs	Module Status, Network Status and Activity/Link	

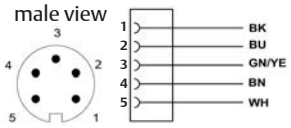
Operating Data	
Temperature Range (ambient)	-20°C to +50°C (Electronics only)
Humidity	95% relative humidity, non-condensing
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6
Moisture Protection	IP65, IP67 (with appropriate assembly and termination)

Configuration Data	
Graphic Display	Display used for setting Node Address, Baud Rate, Fault/Idle Actions, and all other system settings.
ARM	(Auto Recovery Module) Optional module that contains automatic recovery of system setting in the event of total or partial system failure
Maximum Valve-Solenoid Outputs	128 for Series 501, 80 for Series 502/503
Maximum Addressable I/O Points	Various combinations of 1200 outputs and 1200 inputs

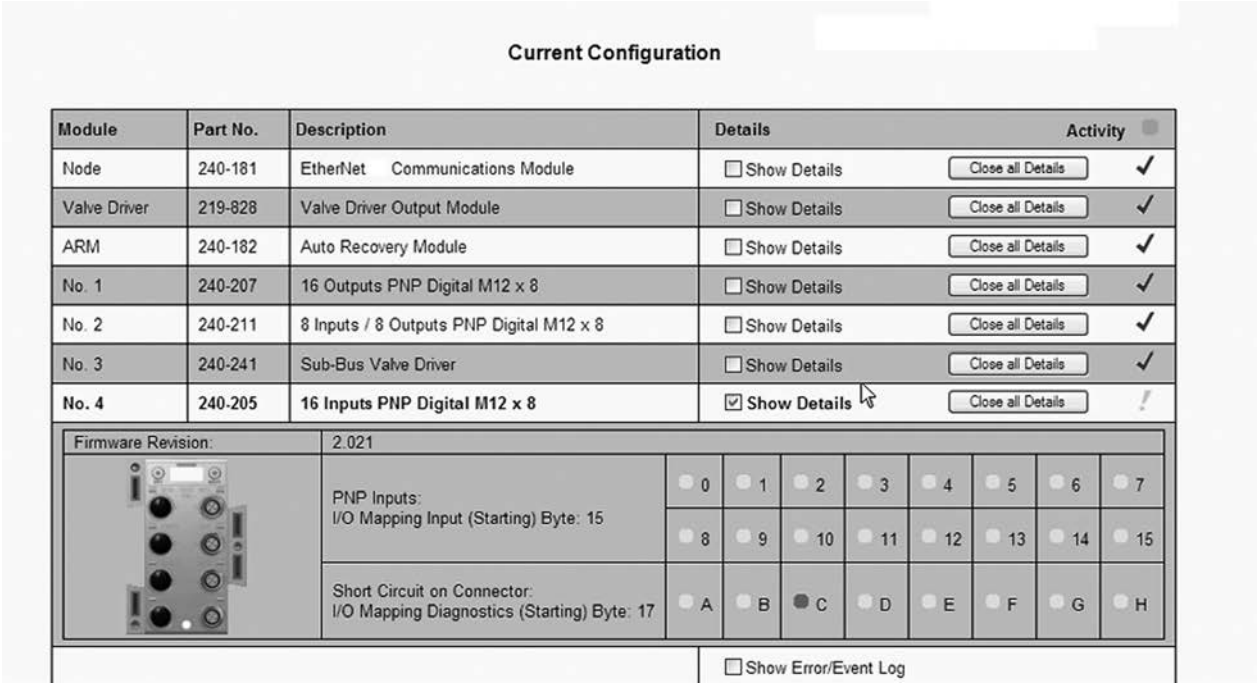
Network Data	
Supported Baud Rates	10 Mbit/100 Mbit
Communication Connector	Two D-coded 4 pin M12 type (female)
Diagnostics	Power, short, open load conditions and module health are monitored
Special Features	Integrated web server, Integrated 2 port switch and fail-safe device settings

Weight	
Ethernet POWERLINK® Communications Module	227 g

Accessories for Ethernet POWERLINK®

Accessory	Description		Catalog number
	M12 Straight 4 Pin Male D-Coded to Male RJ45 Cable - Shielded	5m	QA0405MK0VA04000
		10m	QA0410MK0VA04000
	M12 Straight 4 Pin Male D-Coded Field Wireable Connector PG 9 Cable Gland – Screw Terminal		QA04F20000000000
	5 pin straight female cable connector 7/8”		MC05F90000000000
	5 pin elbow female cable connector 7/8”		MD05F20000000000
	5 pin elbow female cable connector 7/8” with 10 m cable Euro colour code	male view 	MD0510MAG0000000

Server web page



AVENTICS™ Zoned Safety Manifold

EtherNet/IP™ DLR

EtherNet/IP™ used throughout the world to network millions of PCs has now evolved into a viable industry network. EtherNet/IP™ is an open architecture high-level communication network that meets the demands of today's industrial applications requiring high-speed (10/100 Mbit/s), high-throughput and flexibility. Additionally, EtherNet/IP™ technology can integrate an on-board web server, which can make the node readily accessible for configuration, testing and even retrieval of technical documentation.

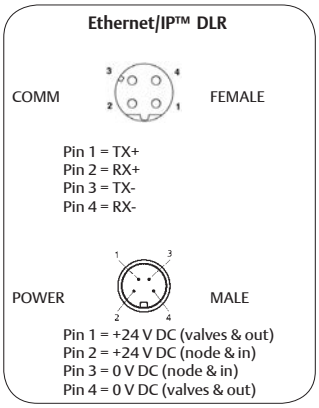
Aventics' G3 EtherNet/IP™ DLR (Device Level Ring) node with integrated display has an embedded switch which allows the unit to be used in simplified networks with linear topology configurations (daisy chain). This technology alleviates the need for an external Ethernet switch device in a single subnet configuration. Additionally, the DLR compatibility allows the node to be used in a fault tolerant "ring" network, when using appropriate EtherNet/IP™ DLR scanners. DLR configuration allows communication recovery from a single point failure on the network ring (e.g. failed network connection or cable).

Aventics' G3 EtherNet/IP™ nodes are capable of addressing combinations of up to 1200 outputs and 1200 inputs.

The G3 EtherNet/IP™ nodes have been tested and approved for conformance by the ODVA.

More information about Ethernet/IP™ and the ODVA can be obtained from the following website: www.odva.org.

DESCRIPTION	REPLACEMENT PART NUMBER
EtherNet/IP™ DLR communications module (node)	**240-325**



Technical Data

Electrical Data	Voltage	Current
Node Power at Max. Brightness	24 V DC +/- 10%	0.0953 A
Valves and Discrete I/O	24 V DC +/- 10%	8 A Maximum
Power Connector	Single key 4 pin 7/8" MINI type (male)	
Communication Connector	Two D-coded 4 pin M12 type (female)	
LEDs	Module Status, Network Status and Activity / Link	

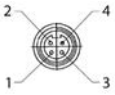
Operating Data	
Temperature Range	-20°C to +50°C (Electronics only)
Humidity	95% relative humidity, non-condensing
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6
Moisture	IP65, IP67 (with appropriate assembly and termination)

Configuration Data	
Graphic Display	Display used for setting IP address, Subnet Mask, Fault/Idle Actions, and all other system settings
ARM	(Auto Recovery Module) Optional module that contains automatic recovery of system settings in the event of total or partial system failure
Maximum Valve Solenoid Outputs	128 for Series 501, 80 for Series 502/503
Maximum Sub-Bus I/O Points	Various combinations of 1200 outputs and 1200 inputs

Network Data	
Supported Baud Rates	10 Mbit / 100 Mbit
Communication Connector	Two D-coded 4 pin M12 type (female)
Diagnostics	Power, short, open load conditions and module health and configuration are monitored
Special Features	Embedded two port switch, Device Level Ring (DLR) compatibility, Linear network topology, QuickConnect™ capability, fail-safe device settings, integrated web server, HTTP, TFTP, UNICAST

Weight	
EtherNet/IP™ DLR Communications module	227 g

Accessories for EtherNet/IT™ DLR

Accessory	Description		Catalog number
	M12 Straight 4 Pin Male D-Coded to Male RJ45 network Cable - Shielded	5m	QA0405MK0VA04000
		10m	QA0410MK0VA04000
	M12 Straight 4 Pin Male D-Coded Field Wireable network Connector PG 9 Cable Gland – Screw Terminal		QA04F20000000000
	4 pin straight female cable connector 7/8", suply 24 V DC		230-1003
	4 pin elbow female cable connector 7/8", suply 24 V DC		230-1001
	4 pin elbow female cable connector 7/8" with 9.15 m cable, suply 24 V DC	 1 = brown 2 = white 3 = blue 4 = black	230-950

AVENTICS™ Zoned Safety Manifold

EtherCAT®

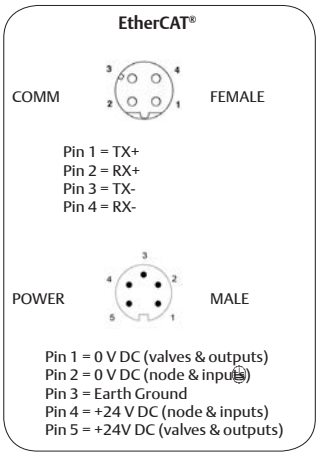
EtherCAT® is an open ethernet based fieldbus protocol developed Beckhoff. EtherCAT® sets new standards for real-time performan and topology flexibility with short data update/cycle times and lc communication jitter.

Aventics' G3 EtherCAT® node has an integrated graphic display for simplified commissioning and diagnostics. It is capable of addressing combinations of up to 1200 outputs and 1200 inputs.

The G3 nodes for EtherCAT® have been designed and tested to conform with EtherCAT® specifications set forth by the ETG.

More information regarding EtherCAT® can be obtained from the following website: www.ethercat.org.

DESCRIPTION	REPLACEMENT PART NUMBER
EtherCAT® communications module	**240-310**



Technical Data

Electrical Data	Voltage	Current
Node Power at Max. Brightness	24 V DC +/- 10%	0.073 A
Valves and Discrete I/O	24 V DC +/- 10%	8 A Maximum
Power Connector	Single key 5 pin 7/8" MINI type (male)	
Communication Connector	Two D-coded 4 pin M12 type (female)	
LEDs	Module Status, Network Status and Activity /Link	

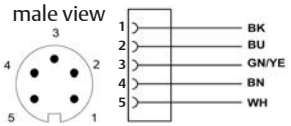
Operating Data	
Temperature Range	-20°C to +50°C (Electronics only)
Humidity	95% relative humidity, non-condensing
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6
Moisture	IP65, IP67 (with appropriate assembly and termination)

Configuration Data	
Graphic Display	Display used for setting IP address, Subnet Mask, Fault/Idle Actions, and all other system settings
ARM	(Auto Recovery Module) Optional module that contains automatic recovery of system settings in the event of total or partial system failure
Maximum Valve Solenoid Outputs	128 for Series 501, 80 for Series 502/503
Maximum Sub-Bus I/O Points	Various combinations of 1200 outputs and 1200 inputs

Network Data	
Supported Baud Rates	10 Mbit / 100 Mbit
Communication Connector	Two D-coded 4 pin M12 type (female)
Diagnostics	Power, short, open load conditions and module health and configuration are monitored.
Special Features	Integrated web server, fail-safe device settings

Weight	
EtherCAT® Communications module	227 g

Accessories for EtherCAT®

Accessory	Description		Catalog number
	M12 Straight 4 Pin Male D-Coded to Male RJ45 Cable - Shielded supply 24 V DC	5m	QA0405MK0VA04000
		10m	QA0410MK0VA04000
	M12 Straight 4 Pin Male D-Coded Field Wireable Connector PG 9 Cable Gland – Screw Terminal		QA04F20000000000
	5 pin straight female cable connector 7/8", supply 24 V DC		MC05F90000000000
	5 pin elbow female cable connector 7/8", supply 24 V DC		MD05F20000000000
	5 pin elbow female cable connector 7/8" with 10 m cable Euro colour code supply 24 V DC		MD0510MAG0000000

I/O Modules M12

with short circuit protection integrated

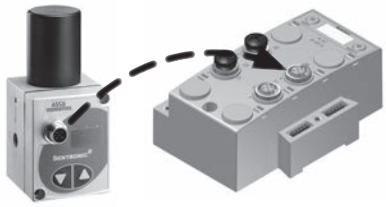
Digital I/O 5-pin M12 Modules

	DESCRIPTION	PART NUMBER		
	SIGNAL TYPE	PNP	NPN	NAMUR
INPUTS	8 Inputs	**240-206**	**240-210**	-
	16 Inputs	**240-205**	**240-209**	-
	8 Inputs (**Ex ia**)	-	-	-
OUTPUTS	8 Outputs PNP	**240-208**	-	-
	16 Outputs PNP	**240-207**	-	-
	8 Outputs PNP high current (1A)	**240-300**	-	-
INPUTS & OUTPUTS	8 Inputs & 8 Outputs	**240-211**	-	-

Analog I/O (16 bit resolution)

5-pin M12 Modules

	DESCRIPTION	PART NUMBER	
	SIGNAL TYPE	0-10 V DC	4-20 mA
ANALOG I/O	4 Inputs	**240-212**	**240-214**
	2 Inputs & 2 Outputs	**240-213**	**240-215**
ANALOG I/O FOR PROPORTIONAL VALVES (SENTRONIC^{PLUS})	2 Inputs & 2 Outputs	**240-307**	-
	4 Inputs & 4 Outputs	-	**240-363**



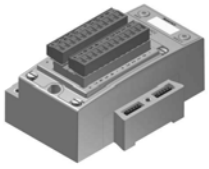
SUB-BUS HUB MODULE	DESCRIPTION	PART NUMBER
HUB (M12)	4 BRANCHES	**240-326**

Digital Inputs -Terminal Strip Modules

with short circuit protection integrated

Digital Inputs -Terminal Strip Modules

	DESCRIPTION	PART NUMBER		
	SIGNAL TYPE	PNP	NPN	NAMUR
INPUTS	16 Inputs	**240-203**	**240-204**	-
	8 Inputs	**204-316**	-	-
	8 Inputs (**Ex ia**)	-	-	-
OUTPUTS	16 Outputs	**240-330**	-	-



Technical Data

OPERATING DATA	5-PIN M12 MODULES	TERMINAL STRIP MODULES
Temperature Range (ambient)	-20°C to +50°C (Electronics only)	
Humidity	95% relative humidity, non-condensing	
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6	
Wire Range	-	12 to 24 AWG
Strip Length	-	7 mm
Tightening Torque	-	0.5 Nm
Ingress Protection	IP65, IP67 (with appropriate assembly and termination)	IP20

	Weight
Module Inputs - Analog	244 g
Module Inputs - Digital	274 g

I/O Modules M12

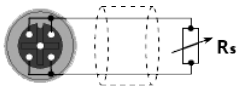
RTD temperature sensor input module
Analog I/O (16 bit resolution)
5-pin M12 Modules

	DESCRIPTION	PART NUMBER
ANALOG I/O	4 Inputs	**240-311**

Operating Data	RTD TEMPERATURE SENSOR INPUT MODULE	
Temperature range (ambient)	-20° to +50° C	
Humidity	95% relative humidity, non-condensing	
Vibration / Shock	IEC 60068-2-27, IEC 60068-2-6	
Sensor type of input	Pt100 - Pt200 - Pt500 - Pt1000	Ni100 - Ni120 - Ni500 - Ni1000
Sensor connection technology	2-3-4 wires (3 wires with compensation of connection cable)	
Temperature range of input signal	-200°C to +850°C	
Minimum temperature scale	25°C	
Moisture protection	IP65, IP67 with appropriate assembly and termination	
Absolute accuracy at +25°C	0.03% (linearity / repeatability / hysteresis / stability)	
Temperature error relatives to input range	+/- 0.05%	
ATEX certification	compatible to zone 2-22 and sensor installed in zone 2-22	
Standard	DIN/IEC 60751, IEC 751, DIN 43710	
Module weight	247 g	

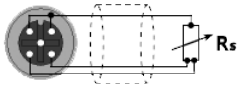
Wiring diagrams

2 Wire Sensor Type Low Accuracy



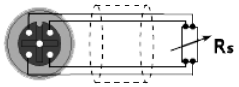
2 Wire Sensor Type
2 Wire Cable (Fig.1)

3 Wire Sensor Type Medium Accuracy

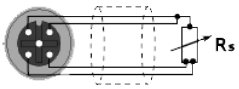


3 Wire Sensor Type
3 Wire Cable (Fig.2)

4 Wire Sensor Type High Accuracy



4 Wire Sensor Type
4 Wire Cable (Fig.4)

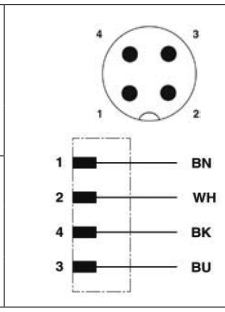


3 Wire Sensor Type
4 Wire Cable (Fig.3)

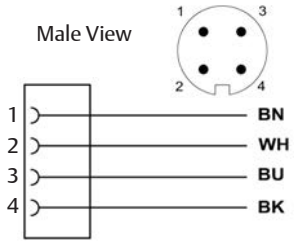
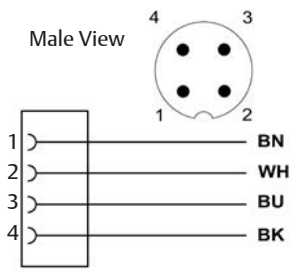
⚠. For maximum accuracy on a 3 wire sensor type make identified jumper connections at the sensor end (see Fig.3). Cable resistance, resulting from cable length, affects mesuring error; therefore use cables that are as short as possible.

. For long cable runs and high accuracy use 4 wire sensor types.

I/O Modules / cables & connectors

Accessory	Description		Catalog number
	5 pin straight male M12 connector		**88100330**
	5 pin elbow male M12 connector		**88161927**
	Dust Cover - M12 Male		**230-647**
	5 pin male DUO M12 connector for 2 inputs (2 cables, Ø3-5 mm)		**88100253**
	M12 SPEEDCON CONNECTOR STRAIGHT 4 PIN MALE SINGLE ENDED CABLE, EURO COLOR CODE		1.5 m **TA04E5MIE000071P** 3 m **TA0403MIE000071P** 5 m **TA0405MIE000071P**
	M12 SPEEDCON CONNECTOR 90° 4 PIN MALE SINGLE ENDED CABLE, EURO COLOR CODE		1.5 m **TB04E5MIE000071P** 3 m **TB0403MIE000071P** 5 m **TB0405MIE000071P**
	Replacement Terminal strip		I/O 0-7 **140-1073** I/O 8-15 **140-1074**
-	Keying Element for terminal strip		**140-1076**

AVENTICS™ Zoned Safety Manifold

N°	Accessories	Description			PART NUMBER
M12 Backplane extension cables with SPEEDCON connector technology					
Ⓐ		M12 Straight 5 Pin Male to Female Backplane extension Cable - Shielded (backplane extension)		1 m	**TA0501MGDTC0571P**
				5 m	**TA0505MGDTC0571P**
				10 m	**TA0510MGDTC0571P**
7/8" MINI 4 Pin cables & connectors for backplane extension valve module power					
Ⓑ		7/8" MINI Straight 4 Pin Female Single Ended Cable, Euro Color Code		5 m	**MC0405MAC0000000**
				10 m	**MC0410MAC0000000**
		7/8" MINI 90° 4 Pin Female Single Ended Cable, Euro Color Code		5 m	**MD0405MAC0000000**
				10 m	**MD0410MAC0000000**
		7/8" MINI Straight 4 Pin Female Field Wireable Connector –Cable Gland – One size fits all			**230-1003**
		7/8" MINI 90° 4 Pin Female Field Wireable Connector – PG 9 Cable Gland			**230-1001**
M12 4 Pin cables for backplane extension In/Out module power					
Ⓒ		M12 to 7/8" MINI Cable for Backplane extension Power M12 Straight 4 Pin Male to 7/8" MINI 4 Pin Female Extension (distribution of the power 24V to valve systems)		1 m	**TA0401MA0MC0471T**
				5 m	**TA0405MA0MC0471T**
				10 m	**TA0410MA0MC0471T**
Ⓓ		M12 Straight 4 Pin Male to Female Cable Extension		1 m	**TC0401MAETA04000**
				5 m	**TC0405MAETA04000**
				10 m	**TC0410MAETA04000**
		M12 Cables for Backplane extension Power M12 Straight 4 Pin Female Single Ended Cable, Euro Color Code		5 m	**TC0405MAE0000000**
				10 m	**TC0410MAE0000000**
		M12 Cables for Backplane extension Power M12 90° 4 Pin Female Single Ended Cable, Euro Color Code		5 m	**TD0405MAE0000000**
				10 m	**TD0410MAE0000000**