



Safe Input/Output Modules

Safety Solutions

- Available in field and enclosure mount versions
- Easily connect existing safe components to modules
- Standard outputs can be controlled by PLC or directly by module
- Connect two safe inputs for Category 2 safety
- Connect one safe input for Category 3/4 safety

Safe Input/Output Modules Overview

SafetyNodes are I/O modules that have been designed and constructed to satisfy the rules and regulations necessary to obtain desired safety ratings. This construction includes redundancy at the inputs and internal components.

Safe Input modules

Typically, safe input modules are used to connect existing safety devices or muting sensors. Modules are available in a number of housing designs to accept dry contacts from an emergency stop or electronic outputs from a light curtain or muting sensor. Also safety input modules have the advantage of accepting two Category 2 inputs when a higher level of safety isn't necessary. The advantage is that two Category 2 e-stops, for example, would take up one AS-i address where two integrated AS-i e-stops would require two addresses.

Safe Output modules

The safety output module has the same safety output rating as a SafetyMonitor, but without programming. All of the programming and logic still resides on the SafetyMonitor itself. The safe output module should be viewed as a remote set of safe contacts controlled

by the SafetyMonitor. These are often used to control motors locally and safely. Two addresses will be programmed into the safety output module. The first is the safe data channel that will control the safe operation of the module, and the second is an A/B address that is used for EDM inputs and diagnostics. Multiple modules can have the same safe data channel if required.

Safe output nodes can also be configured so that their safe relay output is controlled by the PLC. If there is a problem, the SafetyMonitor will act as an override and release the relay.

See pages 128-131 for Safety Solutions Safe Input/Output Modules wiring and dimensions.



Safety Solutions Safe Input/Output Modules

Specifications		Safe Input (Dry Contact)	
INPUTS/OUTPUTS		2-in (safe)	2-in (safe)/2-out
MODEL NUMBER(S)		VAA-2E-KE1-S ⚡	VAA-2E2A-KE1-S/E2 ⚡
EXTENDED ADDRESSING (62 NODES)		No	No
REQUIRED MASTER SPEC.		–	–
OPERATING VOLTAGE AS-i		26.5-31.6 V	26.5-31.6 V
OPERATING VOLTAGE V _{AUX}		–	20-30 VDC
AS-i OPERATING CURRENT		≤ 70 mA	≤ 70 mA
AUXILIARY CURRENT LIMIT		–	1 A
INPUTS	-S	Safety, dry contacts	Safety, dry contacts
TYPE		2-wire	2-wire
SUPPLY VOLTAGE		20-30 V from AS-i, pulsed	20-30 V from AS-i, pulsed
LOAD CURRENT		≤ 15 mA	≤ 15 mA
MAX. INPUT CABLE LENGTH		30 m each	30 m each
OUTPUTS	E2	–	PNP, auxiliary powered
SUPPLY VOLTAGE		–	≥ (V _{AUX} -0.5 V)
CURRENT PER OUTPUT		–	≤ 0.5 A
DATA BITS	D0	Input 1	Input 1/OUT1
	D1	Input 1	Input 1/OUT2
	D2	Input 2	Input 2
	D3	Input 2	Input 2
PARAMETER BITS	P0	–	Outputs controlled via AS-i* or inputs
	P1	–	–
	P2	–	–
PERIPHERAL FAULT BIT		–	Output overload
PROFILE	S-10.ID.ID1.ID2	S-0.B.F.0	S-7.B.F.0
PROTECTION (IEC)		IP20	IP20
TEMPERATURE RANGE	WORKING	-13 °F to +122 °F (-25 °C to +50 °C)	-13 °F to +122 °F (-25 °C to +50 °C)
	STORAGE	-13 °F to +185 °F (-25 °C to +85 °C)	-13 °F to +185 °F (-25 °C to +85 °C)
HOUSING MATERIAL		PA 66-FR	PA 66-FR
WEIGHT		80 g (2.8 oz)	80 g (2.8 oz)
APPROVALS			
AS-INTERFACE CONNECTION		Yellow removable terminals	Yellow removable terminals
AUXILIARY POWER CONNECTION		–	Gray removable terminals
I/O CONNECTION		Black removable terminals	Black removable terminals

* Default setting

⚡ Stocked item
Consult factory for all other models












Safety Solutions Safe Input/Output Modules

Specifications	Safe Input (Dry Contact)		
INPUTS/OUTPUTS	2-in (safe)	2-in (safe)/2-out	
MODEL NUMBER(S)	VAA-2E-G2-S	VAA-2E2A-G2-S/EA2 ⚡	VAA-2E2A-G12-SAJ/EA2L ⚡
BASES	U-G3FF	U-G3FF	Included
EXTENDED ADDRESSING (62 NODES)	No	No	
REQUIRED MASTER SPEC.	-	-	
OPERATING VOLTAGE AS-i	26.5-31.6 V	26.5-31.6 V	
OPERATING VOLTAGE V _{AUX}	-	20-30 VDC	
AS-i OPERATING CURRENT	≤ 70 mA	≤ 70 mA	
AUXILIARY CURRENT LIMIT	-	2 A	4 A
INPUTS <small>-S, -SAJ</small>	Safety, dry contacts		Safety, dry contacts
TYPE	2-wire		2-wire
SUPPLY VOLTAGE	20-30 V from AS-i, pulsed		20-30 V from AS-i, pulsed
LOAD CURRENT	≤ 15 mA		≤ 15 mA
MAX. INPUT CABLE LENGTH	30 m each		30 m each
OUTPUTS <small>EA2, EA2L</small>	-	PNP, auxiliary powered	
SUPPLY VOLTAGE	-	≥ (V _{AUX} -0.5 V)	
CURRENT PER OUTPUT	-	≤ 1 A	≤ 2 A
DATA BITS <small>D0</small>	Input 1	Input 1/OUT1	
<small>D1</small>	Input 1	Input 1/OUT2	
<small>D2</small>	Input 2	Input 2	
<small>D3</small>	Input 2	Input 2	
PARAMETER BITS <small>P0</small>	-	Outputs controlled via AS-i* or inputs	Watchdog on*/off
<small>P1</small>	-	-	Outputs controlled via AS-i* or inputs
<small>P2</small>	-	-	-
PERIPHERAL FAULT BIT	-	Output overload	
PROFILE <small>S-IO.ID.ID1.ID2</small>	S-0.B.F.0	S-7.B.F.0	
PROTECTION (IEC)	IP67	IP67	
TEMPERATURE RANGE <small>WORKING</small>	-13 °F to +131 °F (-25 °C to +55 °C)	-13 °F to +131 °F (-25 °C to +55 °C)	
<small>STORAGE</small>	-13 °F to +185 °F (-25 °C to +85 °C)	-13 °F to +185 °F (-25 °C to +85 °C)	
HOUSING MATERIAL	PBT-FR	PBT-FR	PBT
WEIGHT	100 g (3.5 oz)	100 g (3.5 oz)	
APPROVALS	NFPA 79	NFPA 79	
AS-INTERFACE CONNECTION	Flat yellow cable	Flat yellow cable	
AUXILIARY POWER CONNECTION	-	Flat black cable	
I/O CONNECTION	M12 quick disconnect	M12 quick disconnect	M12 SPEEDCON

* Default setting

⚡ Stocked item
Consult factory for all other models



Specifications		Safe Input (Electronic)
INPUTS/OUTPUTS		2-in (safe)
MODEL NUMBER(S)		VAA-2E-G4-SE ⚡
BASES		U-G1FFA, U-G1PP
EXTENDED ADDRESSING (62 NODES)		No
REQUIRED MASTER SPEC.		-
OPERATING VOLTAGE AS-i		26.5-31.6 V
OPERATING VOLTAGE V_{AUX}		21.4-27.6 VDC
AS-i OPERATING CURRENT		≤ 30 mA
AUXILIARY CURRENT LIMIT		2 A
INPUTS <small>-SE</small>		Safety, electronic auxiliary powered
<i>TYPE</i>		3-wire, PNP
<i>SUPPLY VOLTAGE</i>		V _{AUX}
<i>LOAD CURRENT</i>		≤ 45 mA
<i>MAX. INPUT CABLE LENGTH</i>		30 m each
<i>SWITCH POINT</i>		OFF ≤ 5V/2 mA, ON ≥ 11 V/6 mA
<i>TEST PULSE REQUIREMENTS</i>		1% duty cycle, pulse duration max. 1 ms, 16 V min.
<i>CAPACITANCE</i>		≤ 10 nF
DATA BITS		
<i>D0</i>		Input 1
<i>D1</i>		Input 1
<i>D2</i>		Input 2
<i>D3</i>		Input 2
PARAMETER BITS		
<i>P0</i>		-
<i>P1</i>		-
<i>P2</i>		-
PERIPHERAL FAULT BIT		-
PROFILE <small>S-IO.ID.ID1.ID2</small>		S-0.B.FE
PROTECTION (IEC)		IP67
TEMPERATURE RANGE <small>WORKING</small>		-13 °F to +131 °F (-25 °C to +55 °C)
<small>STORAGE</small>		-13 °F to +185 °F (-25 °C to +85 °C)
HOUSING MATERIAL		PA 6 GF30
WEIGHT		180 g (6.3 oz)
APPROVALS		   
AS-INTERFACE CONNECTION		  Flat yellow or round cable
AUXILIARY POWER CONNECTION		  Flat black or round cable
I/O CONNECTION		 Cage tension spring terminals

⚡ Stocked item
Consult factory for all other models



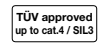


Pepperl+Fuchs Safety Light Curtains

- Versions available for finger, hand, and perimeter access detection
- Control-reliable and self-monitoring (conform to Type 4 according to IEC61496)
- Approvals: CUL, TÜV
- CE marked
- Integral diagnostics
- Signal reserve indication
- Enclosure rating: IP67
- Available with ATEX Approval for Ex Zone 2 and 22

(Refer to the Pepperl+Fuchs Machine Safety Products Selection Guide for further details.)



Safety Solutions Safe Input/Output Modules

Specifications	Safe Output (Relay)
INPUTS/OUTPUTS	4-in/1-out (safe)
MODEL NUMBER(S)	VBA-4E1A-KE3-ZEJ/SR ⚡
RESPONSE DELAY	50 ms
EXTENDED ADDRESSING (62 NODES)	Yes
REQUIRED MASTER SPEC.	M3, M4
OPERATING VOLTAGE AS-i	26.5-31.6 V
OPERATING VOLTAGE V_{AUX}	-
AS-i OPERATING CURRENT	30-200 mA
AUXILIARY CURRENT LIMIT	-
INPUTS <i>-ZEJ</i>	4 PNP, AS-i powered
<i>TYPE</i>	2-, 3-wire
<i>SUPPLY VOLTAGE</i>	26.5-31.6 V from AS-i
<i>MAXIMUM CURRENT</i>	90 mA
<i>SWITCH POINT</i>	OFF ≤ 2 mA, ON ≥ 4 mA
<i>LOAD CURRENT</i>	8 mA
OUTPUTS <i>SR</i>	1 safe relay
<i>DRY CONTACT LOAD (Relay)</i>	DC-13, 3 A @ 24 VDC AC-15, 3 A @ 230 VAC
DATA BITS <i>D0</i>	IN1/LED alarm
<i>D1</i>	IN2/Safe Relay (if P1=0)
<i>D2</i>	IN3 or output status (ID1=7 or F)
<i>D3</i>	1.Y1
PARAMETER BITS <i>P0</i>	-
<i>P1</i>	Output controlled by PLC and safe output channel or by Safe output channel only*
<i>P2</i>	D2 set on relay open* or D2 standard input (ID1 must be 7 or F to use P2 otherwise P2 not used)
PERIPHERAL FAULT BIT	Input overload
PROFILE <i>S-ID.ID1.ID2</i>	S.7.A.5**.F
PROTECTION (IEC)	IP20
TEMPERATURE RANGE <i>WORKING</i>	+32 °F to +131 °F (0 °C to +55 °C)
<i>STORAGE</i>	-13 °F to +185 °F (-25 °C to +85 °C)
HOUSING MATERIAL	PA 66-FR
WEIGHT	170 g (6.0 oz)
APPROVALS	   NFPA 79
AS-INTERFACE CONNECTION	 Yellow removable terminals
AUXILIARY POWER CONNECTION	-
I/O CONNECTION	 Black removable terminals

* Default setting

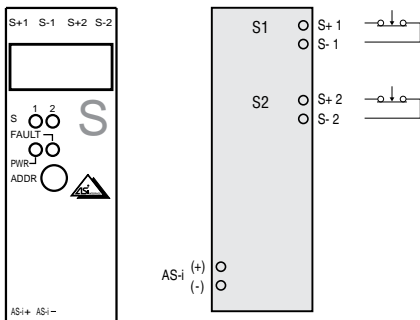
⚡ Stocked item
Consult factory for all other models

** ID1 is 5 then D2 is used as a standard input.
If ID1 is 7 or F then D2 is used to show the status of the safe relays.

Wiring Diagrams

Note: Wiring diagrams show terminal numbers.

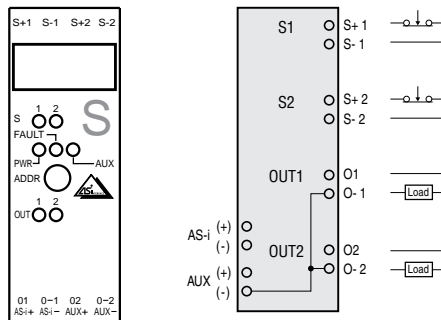
VAA-2E-KE1-S



LED Indicators

IN: Yellow (solid or flashing very fast): Input on
PWR: Green: AS-Interface powered
FAULT: Red (solid): Address 0 or no communication

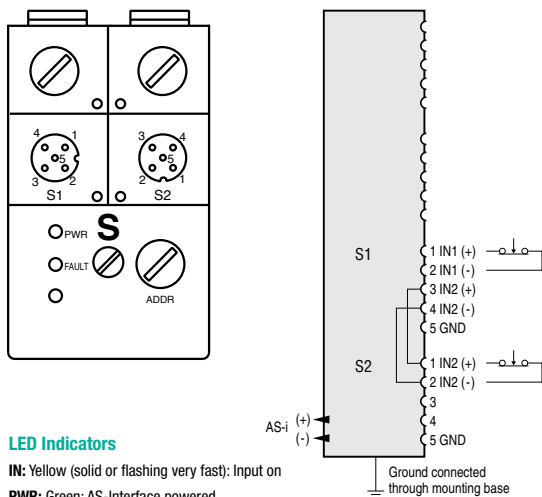
VAA-2E2A-KE1-S/E2



LED Indicators

IN: Yellow (solid or flashing very fast): Input on
OUT: Yellow: Output on
PWR: Green: AS-Interface powered
FAULT: Red (solid): Address 0 or no communication
 Red (flashing): Overload of outputs
AUX: Green: Auxiliary powered

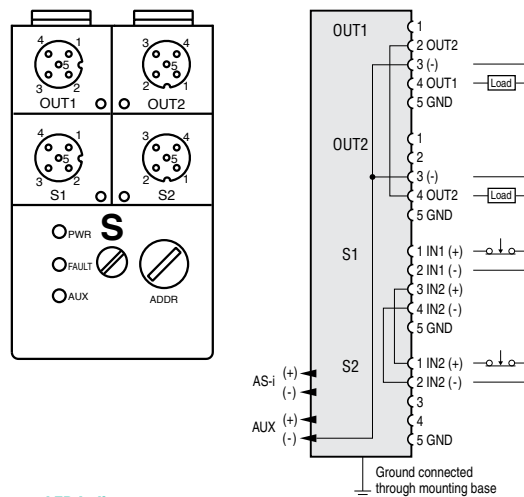
VAA-2E-G2-S



LED Indicators

IN: Yellow (solid or flashing very fast): Input on
PWR: Green: AS-Interface powered
FAULT: Red (solid): Address 0 or no communication

VAA-2E2A-G2-S/EA2



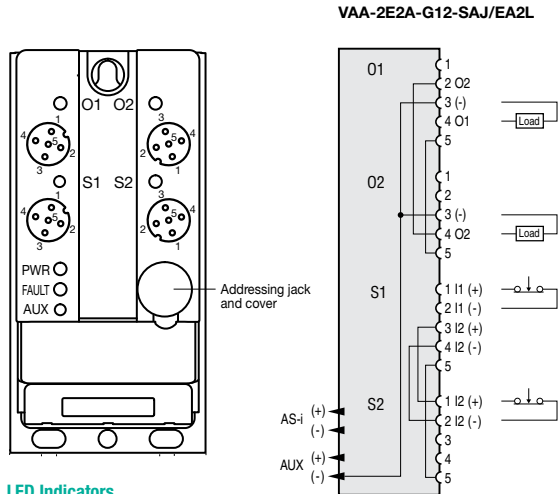
LED Indicators

IN: Yellow (solid or flashing very fast): Input on
OUT: Yellow: Output on
PWR: Green: AS-Interface powered
FAULT: Red (solid): Address 0 or no communication
 Red (flashing): Overload of outputs
AUX: Green: Auxiliary powered

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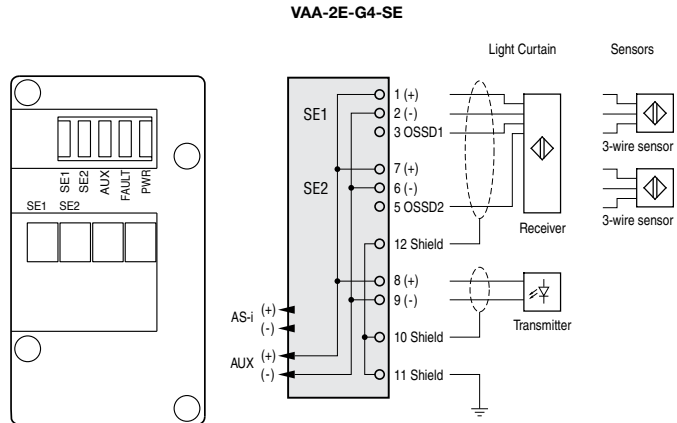
Wiring Diagrams

Note: Wiring diagrams show terminal numbers.



LED Indicators

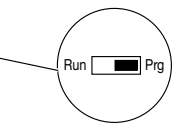
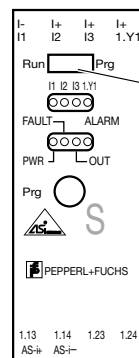
- IN:** Yellow (solid or flashing very fast): Input on
- OUT:** Yellow: Output on
Red: Output overload
- PWR:** Green (solid): AS-Interface powered
Green (flashing): Address 0
- FAULT:** Red (solid): Address 0 or no communication
Red (flashing): Overload of outputs
- AUX:** Green: Auxiliary powered



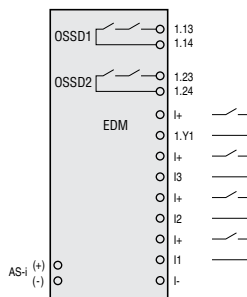
LED Indicators

- SE:** Yellow: Input on
- AUX:** Green: Auxiliary powered
- FAULT:** Red (solid): Address 0 or no communication
- PWR:** Green: AS-Interface powered

VBA-4E1A-KE3-ZEJ/SR



Set switch:
Prg = Programming of safe output channel address enabled. Protected mode not possible.
Run = Programming of standard A/B address enabled. Protected mode possible.



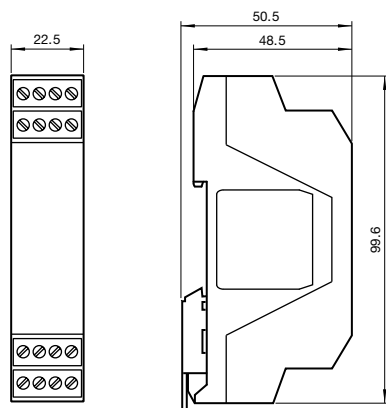
LED Indicators

- PWR:** Off: No power
Green (solid): Power on
Green (flashing): Power on and address 0
- FAULT:** Red: No communication
- OUT:** Yellow (solid): Relay contact closed
Yellow (flashing, 1 Hz): restart inhibited, waiting for start signal
Yellow (flashing, 8 Hz): device locked in error, Waiting for "reset of error condition" signal
- ALARM:** Red (solid): Output D0 has been turned on
- I, 1.Y1:** Yellow: Input on

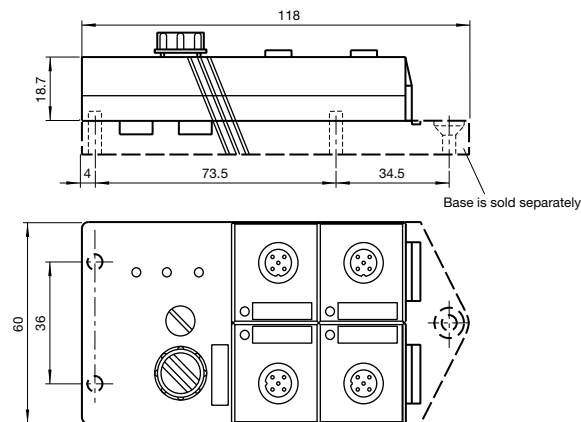
Safety Solutions Safe Input/Output Modules

Dimensions (mm)

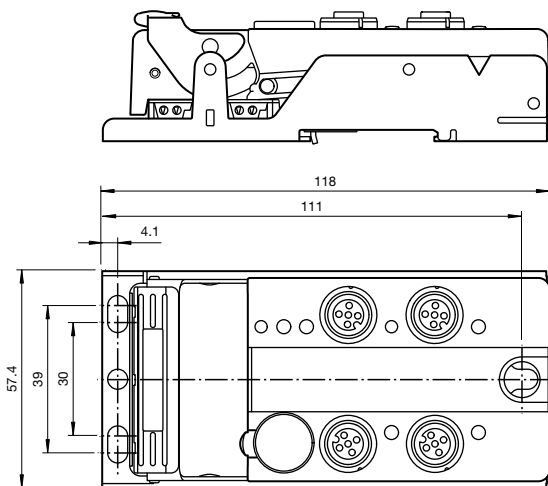
VAA-2E-KE1-S
VAA-2E2A-KE1-S/E2



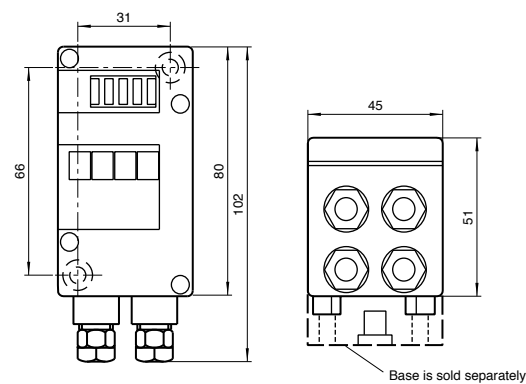
VAA-2E-G2-S
VAA-2E2A-G2-S/EA2



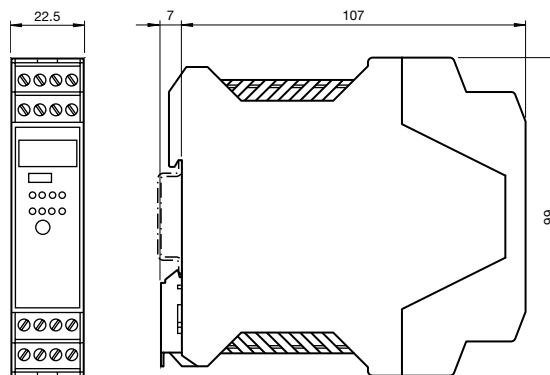
VAA-2E2A-G12-SAJ/EA2L



VAA-2E-G4-SE



VBA-4E1A-KE3-ZEJ/SR



Accessories

Accessories for VAA-2E2A-G2-S/EA2 or VAA-2E-G2-S

U-G3FF

Mounting base for 4-port flat modules



V1-CLIP

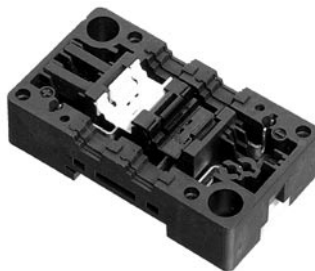
Prevents quick disconnects from being disconnected easily



Accessories for VAA-2E-G4-SE

U-G1FFA

Flat cable mounting base for black and yellow cables with addressing jack



U-G1PP

Round cable base with external power terminals



Safety Solutions Safe Input/Output Modules

See pages 201-216 for complete AS-Interface accessory listing.