



MVK METAL
COMPACT I/O MODULES FOR DEMANDING REQUIREMENTS

SENSORS INCORPORATED
 617 Kelsey Street • Danvers, MA 01923
 Phone 978-752-1500 Fax 978-752-1541
 Toll Free 800-825-0938
 sensorsincorporated.com

- Tough and reliable
- Safe (safety circuits according to EN 13849-1 up to PL e)
- PROFINET – versions compliant with AIDA

MAXIMUM FLEXIBILITY

MVK Metal features a robust metal housing and is extremely resistant to vibration, media, and weld splatter.

- Double valves occupy only one M12 port.
- PROFINET versions with Fast Start Up (< 500 ms)
- Models with multi-functional I/Os
- Fewer variations required, minimizes inventory costs
- Maximum flexibility for expansions

DON'T LOOK FOR ERRORS, FIND THEM


MVK Metal's diagnostic options offer detailed information about the type and location of the failure or the error.


- Only the affected port shuts down, not the whole module
- Detailed message sent to controls and device LED
- Minimizes downtime – failures are fixed faster



MVK Metal I/O Modules


MVK-MP
 • Multi-functional I/Os
 • I/C link
 • Safety outputs
 • Analog I/Os






Page 4.4.1

MVK-MPNIC
 • Multi-functional I/Os
 • Digital I/Os
 • AIDA Push Pull
 • Safety inputs/outputs
 • Fast Start Up





Page 4.4.3

MVK-MK
 • Multi-functional I/Os





Page 4.4.3

MVK METAL

Expanded diagnostic

- 7/8"

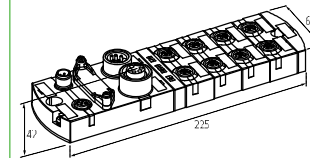


Approvals:   

MVK-MP



Order Data	Art. No.	Art. No.	Art. No.
D18 (D18)	55307		
DIO8 (DIO8)		55308	
DIO8 (DIO8)			55309
Connections			
Fieldbus	M12, B coded		
Sensor-system/actuator supply	7/8", 5-pole, 2 x max. 9 A		
I/O ports	M12, A-coded, 5-pole		
Fieldbus			
Operating voltage	24 V DC (EN 61131 2)		
Operating modes	Sync and freeze mode are supported		
Transfer rate	to 12 Mbit/s		
Addressing	Rotary switch 1..99		
Input			
Sensor supply US	24 V DC (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)		
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131 2)		
Parameterization			
PIN 4	Input	Input/output	
PIN 2	Input/diagnostic	Input/output/diagnostic	
Output			
Actuator supply UA	-	24 V DC (EN 61131 2), max. 9 A	
Switching current per output	-	max. 1.6 A (short-circuit and overload protected)	
Lamp load	-	10 W	
Diagnostic			
Communication status	via LED		
Diagnostic via LED	per module and channel		
Diagnostic via BUS	per module and channel		
Monitoring - under voltage	yes		
Monitoring - no voltage	yes		
Short circuit and overload	yes		
Actuator warning	per channel via LED and BUS		
Cable break	per port		
General data			
Protection	IP67		
Temperature range	-25...+55 °C (storage temperature: -25...+70 °C)		
Mounting method	2-hole screw mounting		
Dimension drawing			



Notes

MVK METAL

Expanded diagnostic

- 7/8"

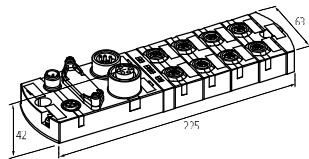


Approvals:

MVK-MP



Order Data	Art.No.	Art.No.
DO8 (DO8)	55290	
DO4 (DC4) D 4 (D4)		55274
Connections		
Fieldbus	M12, B-coded	
Sensor system/actuator supply	7/8", 5 pole, 2 x max. 9 A	
I/O ports	M12, A-coded, 5 pole	
Fieldbus		
Operating voltage	24 V DC (EN 61131-2)	
Operating modes	Sync and freeze mode are supported	
Transfer rate	to 12 Mbit/s	
Addressing	Rotary switch 1...99	
Input		
Sensor supply US	-	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short circuit and overload protected)
Type	-	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)
Output		
Actuator supply UA	24 V DC, (EN 61131-2), max. 9 A	
Switching current per output	max. 16 A (short-circuit and overload protected)	
Lamp load	10 W	
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	yes	
Short circuit and overload	yes	
Actuator warning	per channel via LED and BUS	
Cable break	per port	
General data		
Protection	IP67	
Temperature range	-25...+55 °C (storage temperature -25...+70 °C)	
Mounting method	2-hole screw mounting	
Dimension drawing		



Notes

MVK METAL

Expanded diagnostic

- IO-Link



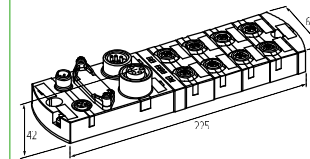
IO-Link

Approvals:

MVK-MP IO-Link



Order Data	Art.No.	Art.No.
DI04 IOI4 (DI08)	55315	
Connections		
Fieldbus	M12, B-coded	
Sensor system/actuator supply	7/8", 5 pole, 2 x max. 9 A	
I/O ports	M12, A-coded, 5 pole	
Fieldbus		
Operating voltage	24 V DC (EN 61131-2)	
Operating modes	Sync and freeze mode are supported	
Transfer rate	to 12 Mbit/s	
Addressing	Rotary switch 1...99	
Input		
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)	
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)	
Parameterization		
PIN 4	Input/output	
PIN 2	Input/output/diagnostic (port 4...7); input/IO-Link master (port 0...3)	
Output		
Actuator supply UA	24 V DC, (EN 61131-2), max. 9 A	
Switching current per output	max. 16 A (short-circuit and overload protected)	
Lamp load	10 W	
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	yes	
Short circuit and overload	yes	
Actuator warning	per channel via LED and BUS	
Cable break	per port	
General data		
Protection	IP67	
Temperature range	0...+55 °C (storage temperature -20...+70 °C)	
Mounting method	2-hole screw mounting	
Dimension drawing		



Notes

MVK METAL

Expanded diagnostic

-IO-Link

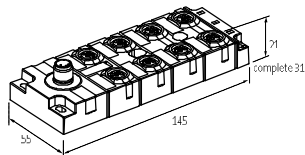
IO-Link

MVP12-M DI16 IO-Link

MVP12-M DI8 DO8 IO-Link



Order Data	Art.No.	Art.No.
DI16 IOL	59407	
D8 DO8 IOL		59408
Internal communication		
LED display	US: sensor supply and internal supply voltage (green: OK); IOL (green: OK); UA: actuator supply (green: OK)	
Current consumption	max. 35 mA	
Input		
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)	
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)	
Input filter	1 ms	
IO-Link		
Type	A	
Operating modes	COM2 (38.4 kbaud)	
Parameterization		
PIN 2	Input/diagnostic	
PIN 4	Input	
Output		
Switching current per output		max. 16 A (short-circuit and overload protected)
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	yes	
Short circuit and overload	yes	
Actuator warning	per channel via LED and BUS	
General data		
Protection	IP67	
Temperature range	0...+55 °C (storage temperature -25...+70 °C)	
Mounting method	4 hole screw mounting	



Notes

MVK METAL

Expanded diagnostic

-Passive

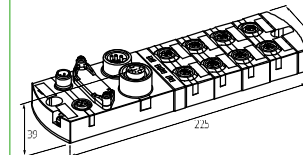
- output groups up to Pld (EN ISO 13849-1) can be switched off via safety relays



MVK-MP Safety



Order Data	Art.No.
K3 DIO4 (DIO4) DIO4 (DIO4)	55291
Connections	
Fieldbus	M12, B coded
I/O ports	M12, A coded, 5 pole
Sensor system/actuator supply	7/8", 5 pole; max. 9 A, safe circuits (1 + 2) via separate 7/8" supply (yellow), 2 pole disconnectable
Fieldbus	
Operating voltage	24 V DC (EN 61131-2)
Operating modes	Sync and freeze mode are supported
Transfer rate	to 12 Mbit/s
Addressing	Rotary switch 1..99
Input	
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)
Parameterization	
PIN 4	4× input/output
PIN 2	4× input/output/diagnostic
Output	
Actuator supply UA	24 V DC, (EN 61131-2), 3 circuits, (max. 9 A)
Switching current per output	max. 16 A (short-circuit and overload protected)
Lamp load	10 W
Safe output	
Switching current by safe output	max. 2 A, short-circuit and overload protected, (EN 13849-1) Pld
M12 (yellow) PIN 4	2 safety circuits (UA1 / UA2) with 2 digital outputs each (EN 13849-1) Pld
M12 (yellow) PIN 2	2 safety circuits (UA1 / UA2) with 2 digital outputs each (EN 13849-1) Pld
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	yes
Short circuit and overload	yes
Actuator warning	per channel via LED and BUS
Cable break	per port
General data	
Protection	IP67
Temperature range	0...+55 °C (storage temperature -20...+70 °C)
Mounting method	2 hole screw mounting



Notes

MVK METAL

Expanded diagnostic

- Analog outputs

- Current

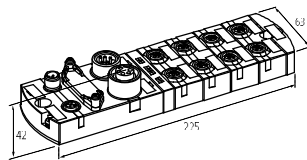


Approvals:

MVK-MP



Order Data	Art.No.
AC4 (U) DIO4 (DIO4)	55292
Connections	
Fieldbus	M12, B coded
Sensor-system/actuator supply	7/8", 5 pole, 2 x max. 9 A
I/O ports	M12, A-coded, 5 pole
Fieldbus	
Operating voltage	24 V DC (EN 61131-2)
Operating modes	Sync and freeze mode are supported
Transfer rate	to 12 Mbit/s
Addressing	Rotary switch 1..99
Input	
Sensor supply US type	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected) for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)
Output	
Actuator supply UA	24 V DC, (EN 61131-2), max. 9 A
Switching current per output	max. 16 A (short-circuit and overload protected)
Lamp load	10 W
Input range (analog)	analog 0...20 mA, 4...20 mA (0...10 V via adapter Art.-No. 7000-42252-0000000)
Conversion time (analog)	1 ms
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	yes
Short circuit and overload	yes
Actuator warning	per channel via LED and BUS
Cable break	per port
General data	
Protection	IP67
Temperature range	0...+55 °C (storage temperature -20...+70 °C)
Mounting method	2-hole screw mounting
Dimension drawing	



Notes

MVK METAL

Expanded diagnostic

- Analog inputs

- Voltage

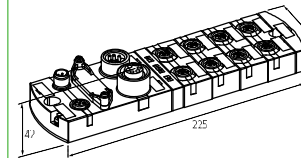


Approvals:

MVK-MP



Order Data	Art.No.
AH (U) DIO4 (DIO4)	55293
Connections	
Fieldbus	M12, B coded
Sensor-system/actuator supply	7/8", 5 pole, 2 x max. 9 A
I/O ports	M12, A-coded, 5 pole
Fieldbus	
Operating voltage	24 V DC (EN 61131-2)
Operating modes	Sync and freeze mode are supported
Transfer rate	to 12 Mbit/s
Addressing	Rotary switch 1..99
Input	
Sensor supply US type	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected) for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)
Resolution (analog)	16 bit
Input range (analog)	0...10 V, 0...20 mA and 4...20 mA via adapter Art.-No. 7000-42251-0000000
Input resistor (analog)	approx. 1 MOhm, differential input
Conversion time (analog)	1 ms
Output	
Actuator supply UA	24 V DC, (EN 61131-2), max. 9 A
Lamp load (8 x M12 left side)	max. 16 A (short-circuit and overload protected)
Lamp load	10 W
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	yes
Short circuit and overload	yes
Actuator warning	per channel via LED and BUS
Wire break upper/over limit overload	per channel via LED and BUS
General data	
Protection	IP67
Temperature range	0...+55 °C (storage temperature -20...+70 °C)
Mounting method	2-hole screw mounting
Dimension drawing	



Notes

MVK METAL

Expanded diagnostic

- 7/8"

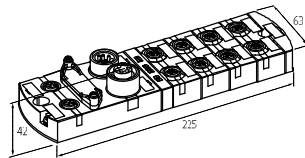


Approvals:

MVK-MPNIO



Order Data	Art.No.	Art.No.	Art.No.
D18 (D18)	55287		
DIO8 (DIO8)		55288	
DIO8 (DIO8)			55289
Connections			
Fieldbus	M12, D-coded		
Sensorsystem/actuator supply	7/8", 5-pole, 2 x max. 9 A		
I/O ports	M12, A-coded, 5-pole		
Fieldbus			
Operating voltage	24 V DC (EN 61131-2)		
Operating modes	Autonegotiation/Auto MDI/MDI-X		
Transfer rate	to 100 Mbit/s Full Duplex		
Addressing	DUP		
Input			
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)		
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)		
Parameterization			
PIN 4	Input	Input/output	
PIN 2	Input/diagnostic	Input/output/diagnostic	
Output			
Actuator supply UA	--	24 V DC, (EN 61131-2), max. 9 A	
Switching current per output	--	max. 1.6 A (short-circuit and overload protected)	
Lamp load	--	10 W	
Diagnostic			
Communication status	via LED		
Diagnostic via LED	per module and channel		
Diagnostic via BUS	per module and channel		
Monitoring - under voltage	yes		
Monitoring - no voltage	yes		
Short circuit and overload	yes		
Actuator warning	per channel via LED and BUS		
Cable break	per port		
General data			
Protection	IP67		
Temperature range	-25...+55 °C (storage temperature -25...+70 °C)		
Mounting method	2-hole screw mounting		
Dimension drawing			



Notes

MVK METAL

Expanded diagnostic



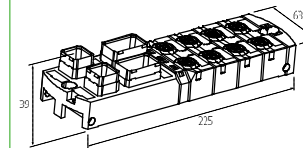
Approvals:

MVK+ MPNIO

Push Pull



Order Data	Art.No.
DIO8 (DIO8)	55283
Connections	
Fieldbus	Push Pull RJ45 Data connector
Sensor-system/actuator supply	Power plug, Push Pull, max. 12 A
I/O ports	M12, A-coded, 5-pole
Fieldbus	
Operating voltage	24 V DC (EN 61131-2)
Operating modes	Autonegotiation/Auto MDI/MDI-X
Transfer rate	to 100 Mbit/s Full Duplex
Addressing	DUP
Input	
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)
Parameterization	
PIN 4	Input/output
PIN 2	Input/output/diagnostic
Output	
Actuator supply UA	24 V DC, (EN 61131-2), max. 12 A
Switching current per output	max. 1.6 A (short-circuit and overload protected)
Lamp load	10 W
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	yes
Short circuit and overload	yes
Actuator warning	per channel via LED and BUS
Cable break	per port
General data	
Protection	IP67
Temperature range	0...+55 °C (storage temperature -20...+70 °C)
Mounting method	2-hole screw mounting
Dimension drawing	



Notes

MVK METAL

Expanded diagnostic

– FSU (Fast-Start-Up)

– galvanically separated input and output potentials



MVK+ MPNIO

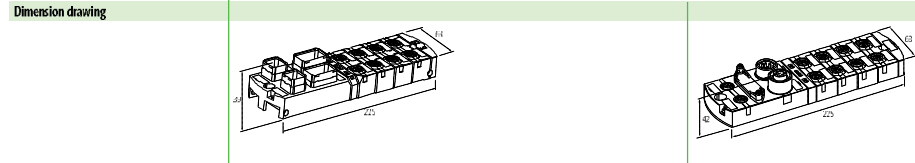
Push Pull



MVK+ MPNIO



Order Data	Art.No.	Art.No.	Art.No.
D18 (D18)	cULus, C051	55268	
D8 (D08)			cULus, C051
D08 (D 4 U4)			55269
			55339
Connections			
Fieldbus	Push Pull RJ45 Data connector		M12, D coded
Sensorsystem/actuator supply	Power plug, Push Pull, max. 12 A		7/8", 5-pole, max. 9 A Protection against reverse polarization
I/O ports	M12, A-coded, 5-pole		
Fieldbus			
Operating voltage	24 V DC (EN 61131-2)		
Operating modes	Autonegotiation/Auto MDI/MDI-X		Autonegotiation/Auto MDI/MDI-X/MRP
Transfer rate	to 100 Mbit/s Full Duplex		
FSU (FastStart-Up)	max. 500 ms		
Addressing	DCP		
Input			
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)		
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)		
PIN 2	–	female 4..7	–
PIN 4	–	female 4..7	–
Parameterization			
PIN 4	Input	Input (female 4..7); output (female 0..3)	
PIN 2	Input	Input (female 4..7); output (female 0..3)	
Output			
Actuator supply UA	–	24 V DC, (EN 61131-2), max. 12 A	24 V DC, (EN 61131-2), max. 9 A
Switching current per output	–	max. 2 A (short circuit and overload protected)	
Lamp load	–	10 W	
Diagnostic			
Communication status	via LED		
Diagnostic via LED	per module and channel		
Diagnostic via BUS	per module and channel		
Monitoring - under voltage	yes		
Monitoring - no voltage	yes		
Short circuit and overload	yes		
Actuator warning	per channel via LED and BUS		
Cable break	per port		
General data			
Protection	IP67		
Temperature range	0...+55 °C (storage temperature -20...+70 °C)		
Mounting method	2-hole screw mounting		



Notes

MVK METAL

LWL-Push Pull

– FSU (Fast-Start-Up)

– galvanically separated input and output potentials

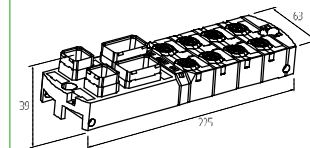


MVK+ MPNIO POF

POF Push Pull



Order Data	Art.No.	Art.No.
D18 (D18)		
D18 (D08)		55257
Connections		
Fieldbus	2 × SCR45 POF-Push Pull	
Sensor system/actuator supply	Power plug, Push Pull, max. 12 A	
I/O ports	M12, A-coded, 5-pole	
Fieldbus		
Operating voltage	24 V DC (EN 61131-2)	
Operating modes	Autonegotiation/Auto MDI/MDI-X/MRP	
Transfer rate	to 100 Mbit/s Full Duplex	
FSU (FastStart-Up)	max. 500 ms	
Input		
Sensor supply US	24 V DC, (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)	
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)	
Parameterization		
PIN 4	Input	Input (female 4..7); output (female 0..3)
PIN 2	Input	Input (female 4..7); output (female 0..3)
Output		
Actuator supply UA	–	24 V DC, (EN 61131-2), max. 12 A
Switching current per output	–	max. 2 A (short-circuit and overload protected)
Lamp load	–	10 W
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	yes	
Short circuit and overload	yes	
Actuator warning	per channel via LED and BUS	
Cable break	per port	
Further	POF-dumping/length measurement	
General data		
Protection	IP67	
Temperature range	0...+55 °C (storage temperature -20...+70 °C)	
Mounting method	2-hole screw mounting	
Dimension drawing		



Notes

MVK METAL

Active

– safe inputs/outputs up to cat. 4/PLe (EN ISO 13849-1), up to SIL 3 (IEC 61508), up to SILCL 3 (IEC 62061)

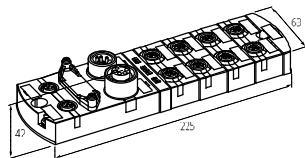


Approvals:

MVK-MPNIO Safety



Order Data	Art.No.	Art.No.
U/I16/3 F	55560	
D18/4 F DO4		55561
Connections		
Fieldbus	M12, D-coded	
Sensor-system/actuator supply	7/8", 5-pole, 2 x max. 9 A	
I/O ports	M12, A-coded, 5-pole	
Fieldbus		
Operating voltage	24 V DC (EN 61131-2)	
Operating modes	Autonegotiation/Auto MDI/MDI-X	
Transfer rate	to 100 Mbit/s Full Duplex	
Addressing	UCP	
Safety input		
Sensor supply US	24 V DC (EN 61131-2), max. 200 mA (per PIN1+5), short-circuit and overload protected, or max. 700 mA for only one PIN	
Type	for electrical sensors or mechanical switches	
Safe output		
Actuator supply UA	–	24 V DC (EN 61131-2), max. 9 A
Switching current by safe output	–	max. 2 A (short-circuit and overload protected)
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	yes	
Short-circuit and overload	yes	
Actuator warning	per channel via LED and BUS	
Cross-link detection	Sensor/Actuator	
Wire break detection	yes	
General data		
Protection	IP67	
Temperature range	-20...+55 °C (storage temperature -40...+70 °C)	
Mounting method	2-hole screw mounting	
Dimension drawing		



Notes

4.4.12

MVK METAL

Expanded diagnostic

– 7/8"

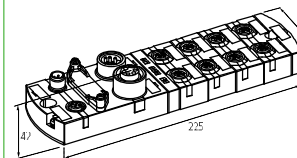
CANopen

Approvals:

MVK-MC




Order Data	Art.No.	Art.No.	Art.No.
D18 (D18)	55304		
D108 (D18)		55305	
D108 (D108)			55306
Connections			
Fieldbus	M12, A-coded, 5-pole		
Sensor-system/actuator supply	7/8", 5-pole, 2 x max. 9 A		
I/O ports	M12, A-coded, 5-pole		
Fieldbus			
Operating voltage	24 V DC (EN 61131-2)		
Operating modes	Polling; change of state; cyclic		
Transfer rate	max. 1 Mbit/s with switchable terminal resistors		
Addressing	Rotary switch 1...99		
Input			
Sensor supply US	24 V DC (EN 61131-2), max. 200 mA per M12 female, (short-circuit and overload protected)		
Type	for 3-wire sensors or mechanical switches, p-switching (EN 61131-2)		
Parameterization			
PIN 4	Input	Input/output	
PIN 2	Input/diagnostic		Input/output/diagnostic
Output			
Actuator supply UA	–	24 V DC (EN 61131-2), max. 9 A	
Switching current per output	–	max. 1.6 A (short-circuit and overload protected)	
Lamp load	–	10 W	
Diagnostic			
Communication status	via LED		
Diagnostic via LED	per module and channel		
Diagnostic via BUS	per module and channel		
Monitoring - under voltage	yes		
Monitoring - no voltage	yes		
Short-circuit and overload	yes		
Actuator warning	per channel via LED and BUS		
Cable break	per port		
General data			
Protection	IP67		
Temperature range	0...+55 °C (storage temperature -20...+70 °C)		
Mounting method	2-hole screw mounting		
Dimension drawing			



Notes

4.4.13

MVK METAL

Blind Plug/caps		Art.No.
	Screw plug M12 x 1 mm Metal, hex, 1 piece	996049
	Blind cap 7/8" Metal	55390
	Blind plug diagnostic M12 x 1 mm Bridge PIN 1 and PIN 2	7000-13481-0000000
	Addressing cap Metal	55317
Labeling accessories		Art.No.
	Label plates 20 x 8 mm (20 pieces per plate)	55318
Connection accessories		Art.No.
	Adapter plug M12/M12 for inputs Current /voltage converter Quantity: 4 pcs.	7000-42251-0000000
	Voltage/current converter Quantity: 4 pcs.	7000-42252-0000000
	MVK PushPull Dust Protection Set	553260
	Ground strap 4 mm² 100 mm for screw (M4)	4000-71001-0410004
	Screw plug M23 Metal	55352