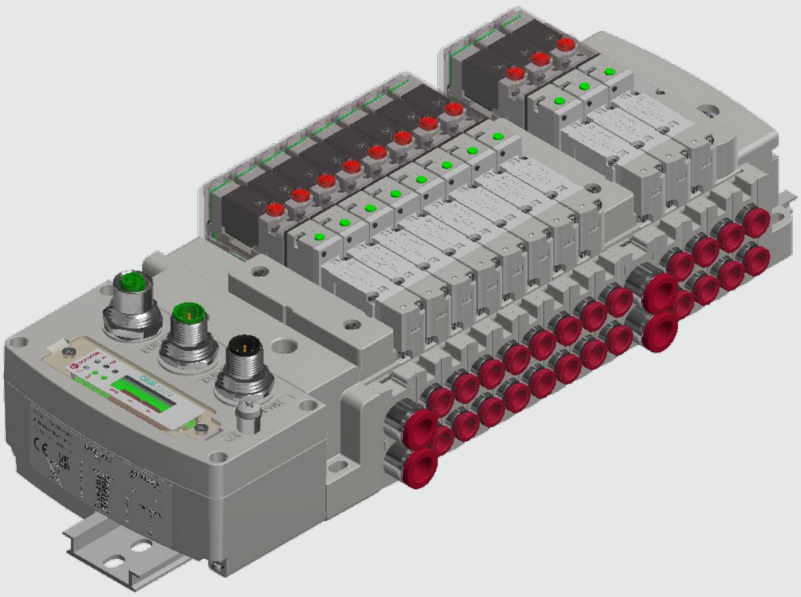
NORGREN

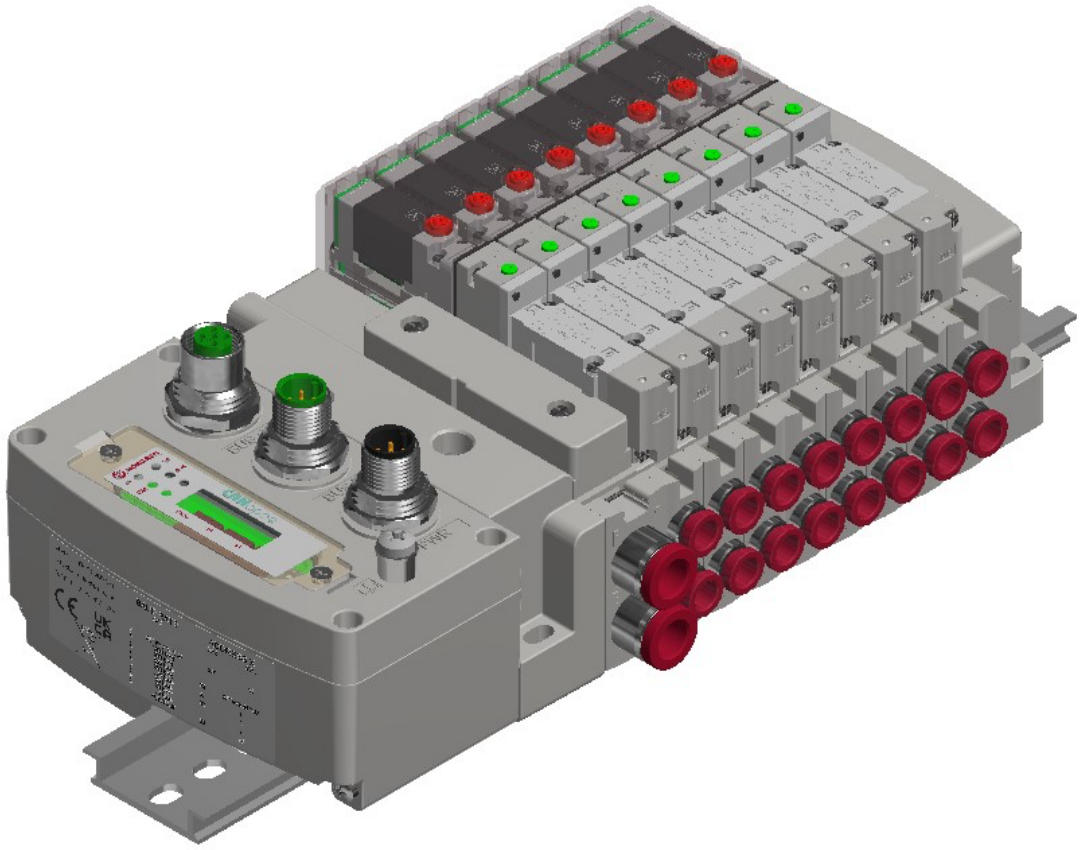
Installation and Maintenance Quick Guide

Valve Islands
VR10 / VR15 With CANopen Interface



Before starting work read these instructions.

IMI



SAFETY, WARNINGS

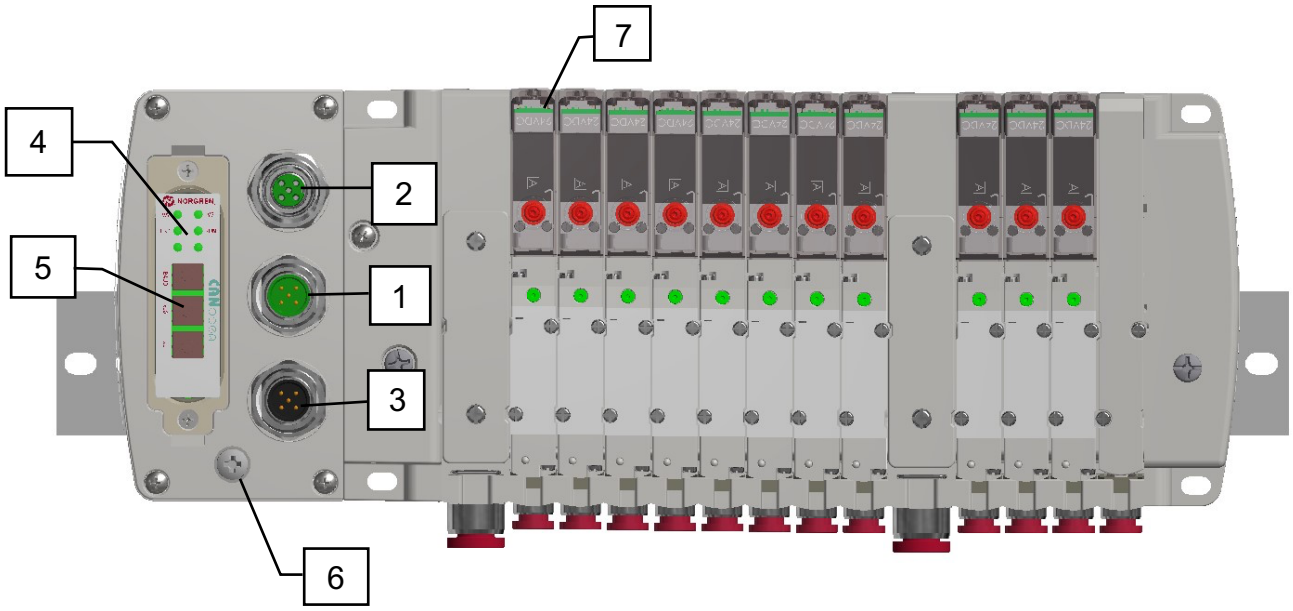
This product is intended for use in industrial compressed air or hydraulic system only. Do not use this product where pressures and temperatures can exceed those under ‘Technical Data’.
Before using this product with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult Norgren. Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided. System designers and end users are cautioned to review specification warnings found in instruction sheets packed and shipped with this product.

Installation and Maintenance Quick Guide

Specific warnings:

- Check that the specification of the Valve Island and marking on the item of the equipment are suitable for the application being used on.
- Check technical data, such as operating pressure, voltage level, current type and temperature, on the product label or in the data sheets for compliance with the existing operating conditions.
- After removing the packaging, ensure that no contamination enters into the system.
- Check before the installation of the system that no contamination exists in the piping and valve island.
- Check during installation of the system that gaskets have not become damaged.
- Take measures to avoid unintentional or improper activation.
- Prior to the first electrical operation, ensure no danger would result from the medium exhausting from any open ports.
- Consider in case of pressurised systems that lines, valves and other components should not be removed.
- To avoid damaging the product, please make sure that the maximum torque values are not exceed.
- **IMPORTANT:** Always switch off the air supply, exhaust the residual pressure and unplug all electrical connections before performing any maintenance.
- Ensure the machine is in a safe condition before operating manual overrides.
- Pay due course and attention to the different polarity types available - PNP/NPN.
- A polarity protection diode is built in: Incorrect polarity does not cause a short circuit and does not require replacement valve slices. In this case only LED indicator works, but not valve slices.

ELECTRICAL COMPONENTS

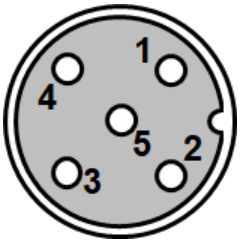


Item No.	Description	Remark
1	Port 1	Port 1 for BUS IN M12 x 1 | Male | 5 – pin | A – coded | green insert
2	Port 2	Port 2 for BUS OUT M12 x 1 | Female | 5 – pin | A – coded | green insert
3	PWR	PWR: Power supply connector M12 x 1 | Male | 5 – pin | A – coded | black insert
4	Status LEDS	CANopen Control Module Status LEDS
5	Bit rate- and node-ID switches	CANopen Control Module Bit rate and node-ID switches
6	Earth Screw	Earth Screw M4
7	Valve Status LEDS	VR10/15 Valve Status LEDS

NOTE: VR1X supports up to 24 solenoids. A valve station can contain 1 or 2 solenoids.

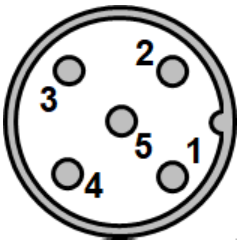
CANopen PORT 1 & PORT 2 – green insert

BUS OUT



M12 / 5 pins / Female Connector / A-coded		
Pin No.	Name	Function
1	Drain	
2		
3	V-	GND
4	CAN_H	SIGNAL
5	CAN_L	SIGNAL

BUS IN

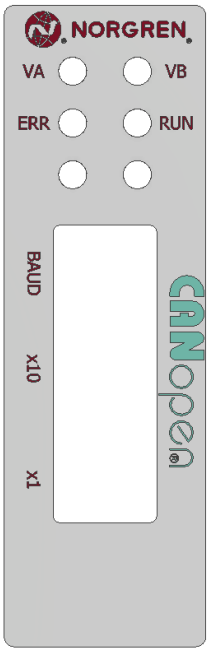


M12 / 5 pins / Male Connector / A-coded		
Pin No.	Name	Function
1	Drain	
2		
3	V-	GND
4	CAN_H	SIGNAL
5	CAN_L	SIGNAL

Note that V- should be connected to GND to provide correct CAN operation.

The device does not include a bus termination resistor.

LED STATUS DESCRIPTION



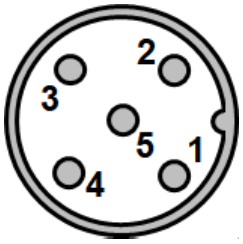
ERROR LED (RED)	LED Status	Description
ERR	Off	The device is in working condition
	Single flash	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames)
	Double flash	A guard event (NMT-slave or NMT-master) or a heartbeat event (heartbeat consumer) has occurred
RUN LED (GREEN)	**LED Status**	**Description**
RUN	Flickering	The auto-bit rate detection is in progress or LSS services are in progress (alternately flickering with error LED)
	Blinking	The device is in state PRE-OPERATIONAL
	Single flash	The device is in state STOPPED
	Green on	The device is in state OPERATIONAL
PWR LED	**LED Status**	**Description**
VA (Valve Power Supply)	Green on	Voltage OK
	Flashing red	Undervoltage
	Red on	Overvoltage
VB (Electronics Power Supply)	Green on	Voltage OK
	Flashing red	Undervoltage
	Red on	Overvoltage

POWER SUPPLY CONNECTOR – black insert

WARNING!

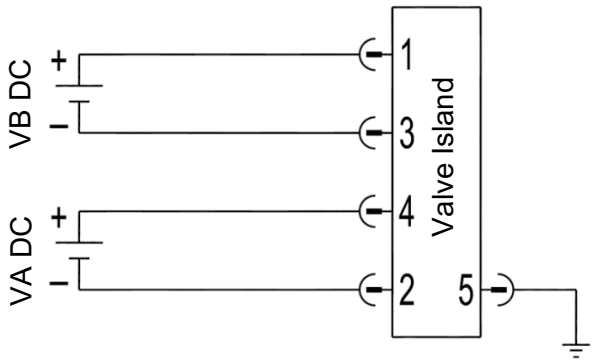
Observe the voltage of the valve island carefully!
Do NOT connect 24 V to a 12 V product!
Over-voltage may cause irreversible damage and excess heating of the product.
Risk of fire! Risk of burns!

- Pin allocation of power supply connector



M12 / 5 pins / Male Connector / A-coded		
Pin No.	Name	Function
1	L1 (VB+)	12 V / 24 V Electronics power supply
2	N2 (VA-)	0V valves power supply
3	N1 (VB-)	0V electronics power supply
4	L2 (VA+)	12 V / 24 V Valves power supply
5	FE	Functional earth

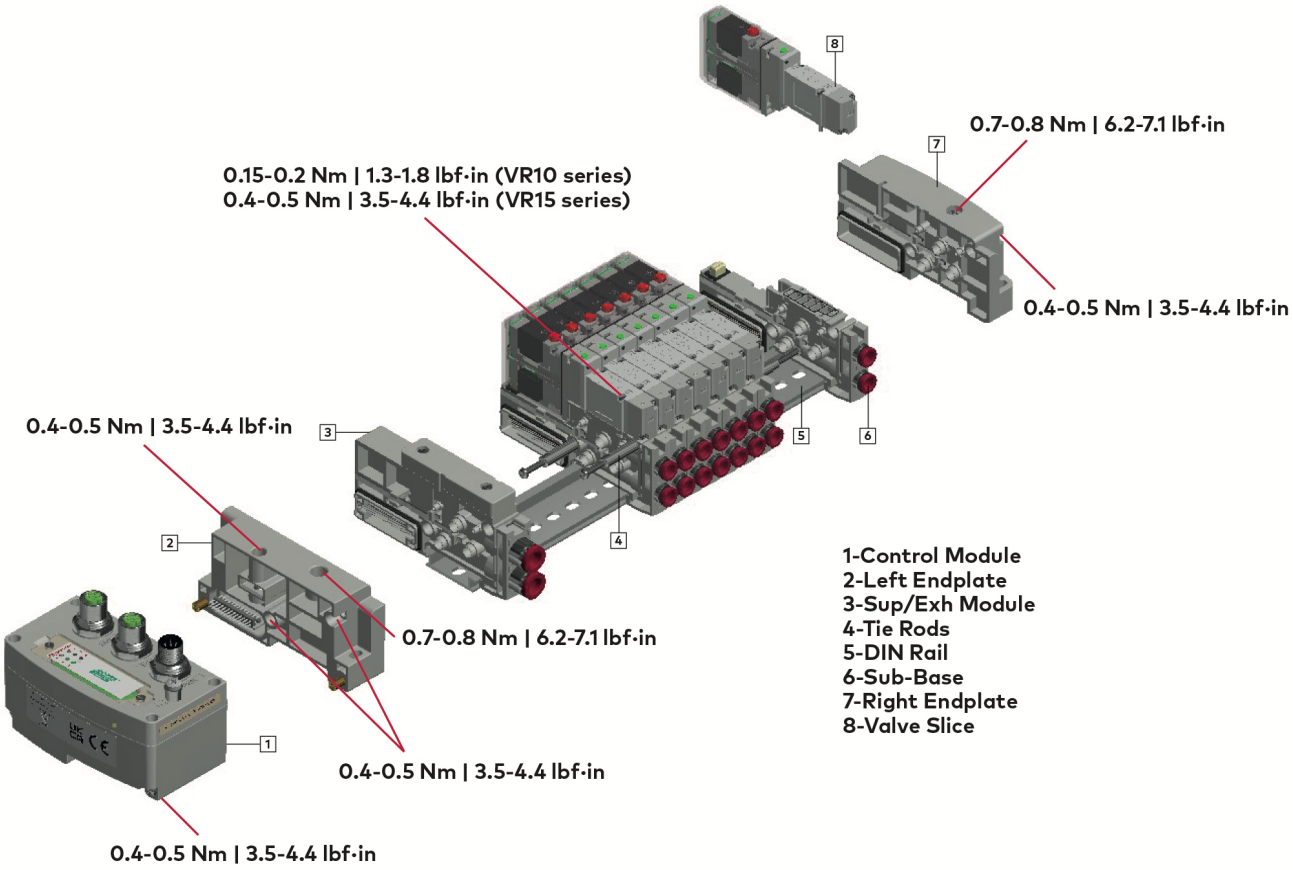
- Power supply connector wiring diagram



Notes:

- Make sure electronics power, valves power and their polarities are connected to correct pins respectively before switching on.
- Select the appropriate cables to mate with the connectors mounted on the control module.
- Connect the earth screw to ground.

INSTALLATION



Notes:

• **Lubrication:** Valves will function reliably when they are supplied with clean dry air either lubricated or non-lubricated. If the air supply is lubricated, then lubrication must be supplied for the life of the product.

• **Vibration:** In applications where there is significant vibration, the axis of the spool (longitudinal axis of the valve) should be at 90° to the direction of the motion.

• **Tightening torque:**

M2: 0.15~0.2 Nm (1.3~1.8 lbf·in)
M3: 0.4~0.5 Nm (3.5~4.4 lbf·in)
M4: 0.7~0.8 Nm (6.2~7.1 lbf·in)

• **Port identification:**

Function	Port / Identification
Main/internal pilot air supply	P / 1
Exhaust	E / 3 / 5
Outlet	A / 4 & B / 2
External pilot air supply (if used)	12 / 14
Collected exhaust of pilot valves	82 / 84

ELECTRICAL DATA

Specification			Remark
Valve voltage range VA	24 V d.c. ± 10 %	12 V d.c. ± 10 %	PELV
Electronics voltage range VB	24 V d.c. ± 30 %	12 V d.c. ± 30 %	PELV
Maximum current VA	1 A (24 solenoids)	2 A (24 solenoids)	
Maximum current VB	50 mA	100 mA	
Voltages are galvanic decoupled	Yes		---
Protection against polarity reversal	Yes		---
Output polarity	PNP		---
Bus termination resistor	No termination included		---

SOLENOID NUMBER, OUTPUT POINT & VALVE STATION MAPPING

VR1X only supports 24 solenoids. A valve station can contain 1 or 2 solenoids.

MAPPING RULES FOR VALVE STATIONS ≤ 12

- If valve stations ≤ 12, 2 solenoid numbers are always reserved for each valve station. * Detailed allocation is shown as below:

Station	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Solenoid A (14 Solenoid)	Sol.01	Sol.03	Sol.05	Sol.07	Sol.09	Sol.11	Sol.13	Sol.15	Sol.17	Sol.19	Sol.21	Sol.23
	Output 0	Output 2	Output 4	Output 6	Output 8	Output 10	Output 12	Output 14	Output 16	Output 18	Output 20	Output 22
Solenoid B (12 Solenoid)	Sol.02	Sol.04	Sol.06	Sol.08	Sol.10	Sol.12	Sol.14	Sol.16	Sol.18	Sol.20	Sol.22	Sol.24
	Output 1	Output 3	Output 5	Output 7	Output 9	Output 11	Output 13	Output 15	Output 17	Output 19	Output 21	Output 23

Notes:
*** For valve station with single solenoid, only Solenoid A (14 Solenoid) is connected. Consider the one which is closest to control module as 1st station (Station #1)**

MAPPING RULES FOR 12 < VALVE STATIONS ≤ 24

- If 12 < valve stations ≤ 24, special rules are required since only 1 solenoid number is allocated to valve station with single solenoid:

- Sequence all solenoids following the rules below by starting from 1st station which is the station closest to control module:
  - If 1st station is with double solenoids, sequence solenoid A as Sol.01, solenoid B as Sol.02, following 2nd station solenoid A as Sol.03, solenoid B as Sol.04…
  - If 1st station is with single solenoid, sequence solenoid A as Sol.01, following 2nd station solenoid A as Sol.02, solenoid B as Sol.03…
  - If a station is originally configured as blank, please make sure whether they are configured “single solenoid” or “double solenoid” and follow the rules above accordingly.
  - The rest of stations should also adhere to the sequence rules above.

A 16-station 24 solenoids valve island example is shown below:

	Double Solenoids	Double Solenoids	Single Solenoid	Single Solenoid	Double Solenoids	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Single Solenoid	Double Solenoids	Single Solenoid
Station	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**#14**	**#15**	**#16**
Solenoid A (14 Solenoid)	Sol.01	Sol.03	Sol.05	Sol.06	Sol.07	Sol.09	Sol.11	Sol.12	Sol.14	Sol.15	Sol.17	Sol.18	Sol.20	Sol.21	Sol.22	Sol.24
	Output 0	Output 2	Output 4	Output 5	Output 6	Output 8	Output 10	Output 11	Output 13	Output 14	Output 16	Output 17	Output 19	Output 20	Output 21	Output 23
Solenoid B (12 Solenoid)	Sol.02	Sol.04	--*	--*	Sol.08	Sol.10	--*	Sol.13	--*	Sol.16	--*	Sol.19	--*	--*	Sol.23	--*
	Output 1	Output 3			Output 7	Output 9		Output 12		Output 15		Output 18			Output 22	

Note:
*** For valve station with single solenoid, only Solenoid A (14 Solenoid) is allocated & connected. Consider the one which is closest to control module as 1st station (Station #1).**

Construction & Design is subject to change

SETTING

- **Node-id and bit rate**

VR10/15 supports setting of the node-id by static (switches), object dictionary or LSS methods. When setting node-id and bit rate the device should be reset for the new settings to take effect.

Baud setting

Baud switch value	Function
0	Set bit rate by object dictionary (OD) or LSS
1	1000 kbps
2	800 kbps
3	500 kbps
4	250 kbps
5	125 kbps
6	50 kbps
7	20 kbps
8	10 kbps
9	AUTOBAUD

Node-ID setting

Node-ID switches value	Function
00	Set node-ID by object dictionary (OD) or LSS
1 - 99	Node-ID

Detailed node-id and bit rate setting information can be found in the operation & service manual.

- **Configuration**

The EDS (Electronic Data Sheet) file can be used with a relevant engineering tool or PLC. There are 12 V and 24 V variants:

- NORGREN-VR1X-12V-CANOPEN-VX.X-YYYYMMDD.eds
- NORGREN-VR1X-24V-CANOPEN-VX.X-YYYYMMDD.eds

The EDS file can be downloaded from the following web link:

- https://www.norgren.com/uk/en/technical-support/software

- **Heartbeat**

VR10/15 must receive a heartbeat every <2000 ms, otherwise the failsafe setting is applied.

- **Parameterization and Diagnostics**

Detailed parameterization settings and diagnostics information is listed in the operation & service manual.

Operation & service manual is available on website:

- https://www.norgren.com/uk/en/technical-support/installation-maintenance-instructions/valves

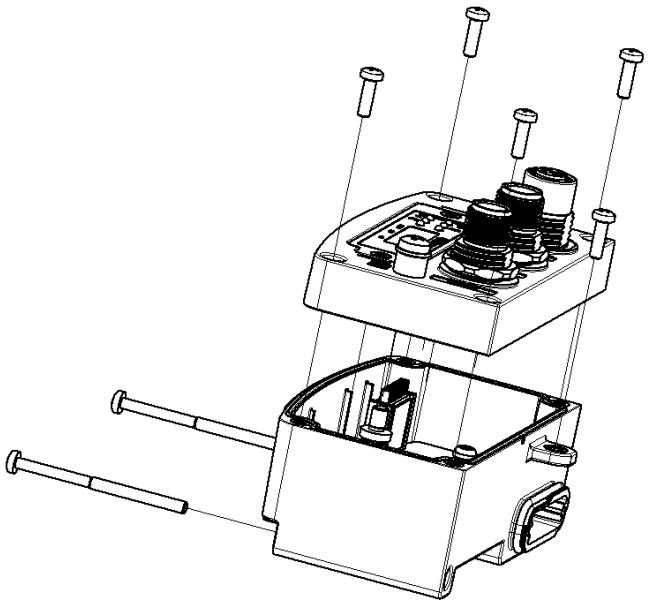
RECYCLING INFORMATION

Device composition

Enclosures	PBT+ASA 20 % GF
Overlay, labels	PET
PCB	Various, dispose of according to WEEE
Gaskets	Nitrile
Screws and connectors	Carbon steel / Stainless steel
Window	TR55 LX

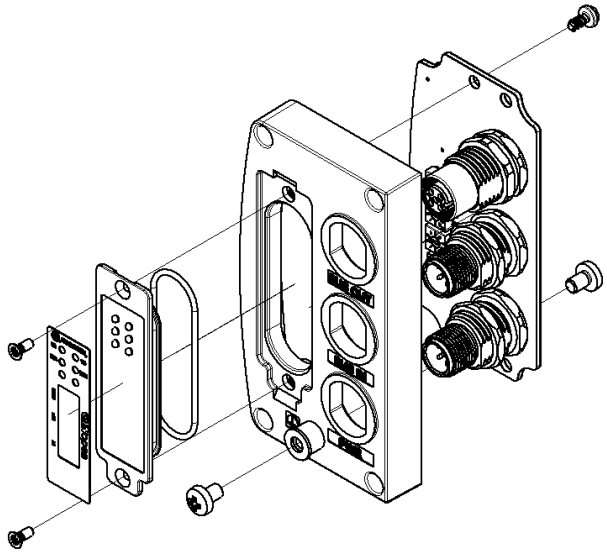
Removing the circuit boards

1. Remove bus node from valve island
2. Remove top assembly from bottom assembly

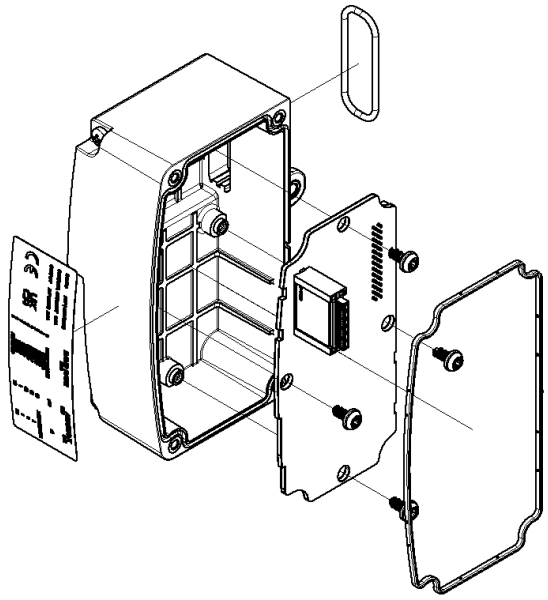


Construction & Design is subject to change

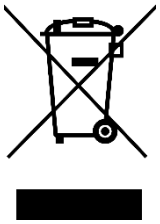
3. Remove circuit board 1 from top assembly



4. Remove circuit board 2 from bottom assembly



WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT



Disposal of this product is regulated by the EU WEEE Directive for waste electrical and electronic equipment. Dispose of the product properly and not as part of the normal waste stream. Observe the regulations of the respective country: information can be obtained from the national authorities.

The data specified above only serve to describe the product.

No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of exercising judgment and verification. It must be remembered that our products are subject to a natural process of wear and ageing.

Subject to change without notice.

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