

Smartive IO Expander

CE technical file

SM-IO-EXP-CE-TF-EN-001 | Issue 1.0 | 2026-06-23 | Final

1. Product Identification

This technical file applies to the Smartive IO Expander SM-IO-EXP Rev. 1.0 final 16-input release configuration.

Field	Value
Product	Smartive IO Expander
Model / code / revision	Input Module / SM-IO-EXP / 1.0
Manufacturer	Apptive Kft, 9932 Viszák, Fő út 56, Hungary
Intended use	16-channel low-voltage input expander for Smartive systems, for switches, motion sensors and similar SELV/dry-contact signals.
PCB size	36.50 x 41.75 mm, from final Gerber outline
BOM / PnP	8 BOM lines, 12 components; 12 pick-and-place positions.
PCB construction	PCB specified for lead-free manufacture; Gerber, drill and CPL sources attached.

2. Electrical Configuration

Item	Final data
Supply	5 VDC SELV from the Smartive server/extender 5 V domain; no mains-voltage supply or output section.
Inputs	16 field inputs on two 10-pole WJ250B terminal blocks; switches, motion sensors or signals in the same SELV domain may be connected; max. 5 V.
Logic expansion	MCP23017-E/SS 16-bit I2C GPIO expander
Signal conditioning	5 kOhm pull-up/signal-conditioning resistors and 330 ohm LED series resistor; 10 uF supply decoupling.
RJ45 extender	Smartive-compatible RJ45 bus connection; use only with documented SELV wiring.
Not permitted	230 VAC, 24 V industrial input or any signal outside the 5 V SELV domain shall not be connected.

3. PCB Trace and Spacing Controls

Control	Final release data
Signal trace	0.25 mm signal trace; min. 0.15 mm clearance according to the release note.
5 V trace	0.5 mm 5 V trace; min. 0.23 mm clearance according to the release note.
Voltage domain	SELV/PELV low voltage only; no HV-LV insulation boundary like on the relay module.
Manufacturing source	Gerber, drill, BOM and PnP sources are included in the final package.

4. Legislation and Standards Mapping

Area	Legislation	Standard / method	Release application
EMC	2014/30/EU EMC	EN 61000-6-1/-6-2/-6-3/-6-4; EN 61000-4-x test methods	Emission and immunity assessment of the wired 5 V digital input module.
RoHS	2011/65/EU + (EU) 2015/863	EN IEC 63000:2018	Component, PCB and manufacturer material documentation.
LVD scope check	2014/35/EU LVD	Outside scope: 5 VDC SELV, no rated input or output above 75 VDC / 50 VAC.	The documentation records that the product is not a mains-voltage module.

5. BOM and Component Functions

ID	Component	Qty	Function
1	WJ250B-3.5-10P-11-00A CN1,CN2	2	10-pole field-input terminal block for 16 low-voltage inputs
2	KT-0603R LED16	1	Status LED
3	0402WGF3300TCE R16	1	LED series resistor
4	CL10A106KP8NNNC C2	1	5 V supply decoupling capacitor
5	R-RJ45R08P-A004 RJ10,RJ9	2	RJ45 Smartive extender connection to the server
6	TR0603B5K00P0525Z U23,U24,U25	3	Input pull-up or signal-conditioning resistor
7	MCP23017-E/SS U9	1	16-bit I2C GPIO expander for reading input states
8	HB-PH8-25423PB2GOP U1	1	Internal 6-pin header / service and bus connection

6. Risk Analysis and Controls

Risk / fault state	Consequence	Control	Verification
Non-SELV signal connected to input	Electronic damage, EMC disturbance or safety boundary violation	Label and guide: max. 5 V SELV input; 24 V industrial input and 230 VAC prohibited.	Label/IFU review, production check
Incorrect 5 V SELV supply or missing common GND	Unstable operation or electronic damage	Smartive-compatible 5 V SELV domain only; polarity and GND continuity checked.	Supply and functional test
Incorrect RJ45 extender wiring	Communication failure or module damage	Documented pinout; Smartive-compatible extender cable/module only.	Extender communication final test
Input short or wiring fault	Incorrect state reading or local heating	Low-voltage input, pull-up/signal-conditioning resistors, production visual inspection.	Per-input switching test
EMC disturbance due to long field wiring	False input state or communication disturbance	Wiring boundary: short, cabinet-internal or documented Smartive wiring; shielding/isolation at system level if required.	Installation review, functional test
RoHS unverified component	Material-conformity non-compliance	EN IEC 63000 BOM evidence, supplier datasheets and JLCPCB RoHS certificate.	Source-documentation review

7. Verification and Production Final Test Plan

Test	Method	Acceptance
Visual inspection	Check PCB, terminals, RJ45 ports, header, soldering and label.	No damage, missing part, soldering defect or marking error.
5 V supply	Start from rated 5 VDC SELV supply and record current draw.	Stable operation without overheating.
I2C / MCP23017	Identify MCP23017 on the Smartive bus.	Address and banks are reachable correctly.
16 inputs	Toggle open/closed state of each input with a test fixture.	Every input is reported correctly by the system.
RJ45 extender	Documented pinout and communication check.	Supply/GND/I2C assignment and communication are correct.
Document/label	Check max. 5 V SELV input and non-mains-voltage use boundary.	Warning is present on label and accompanying document.
RoHS document review	Check BOM, supplier datasheets and PCB RoHS certificate.	The material-conformity claim is supported by the documented sources.

8. Sources Used

This document is based on the final release sources and the referenced official/supplier sources. Product identification, the 5 V SELV use boundary, input functions and the RoHS documentation model are included in this technical file as standalone content.

Referenced EU Sources

Source	URL
JLCPCB RoHS certificate	https://rs.jlpcb.com/static/file/rohs-certificate-of-conformity.pdf
Technical documentation requirements	https://europa.eu/youreurope/business/product-requirements/compliance/preparing-technical-documentation/index_en.htm
CE marking requirements	https://europa.eu/youreurope/business/product-requirements/labels-markings/ce-marking/index_en.htm
LVD scope check	https://single-market-economy.ec.europa.eu/sectors/electrical-and-electronic-engineering-industries-eei/low-voltage-directive-lvd_en
EMC harmonised standards list	https://ec.europa.eu/docsroom/documents/51315/attachments/1/translations/en/renditions/native
RoHS harmonised standards list	https://ec.europa.eu/docsroom/documents/41283/attachments/1/translations/en/renditions/native