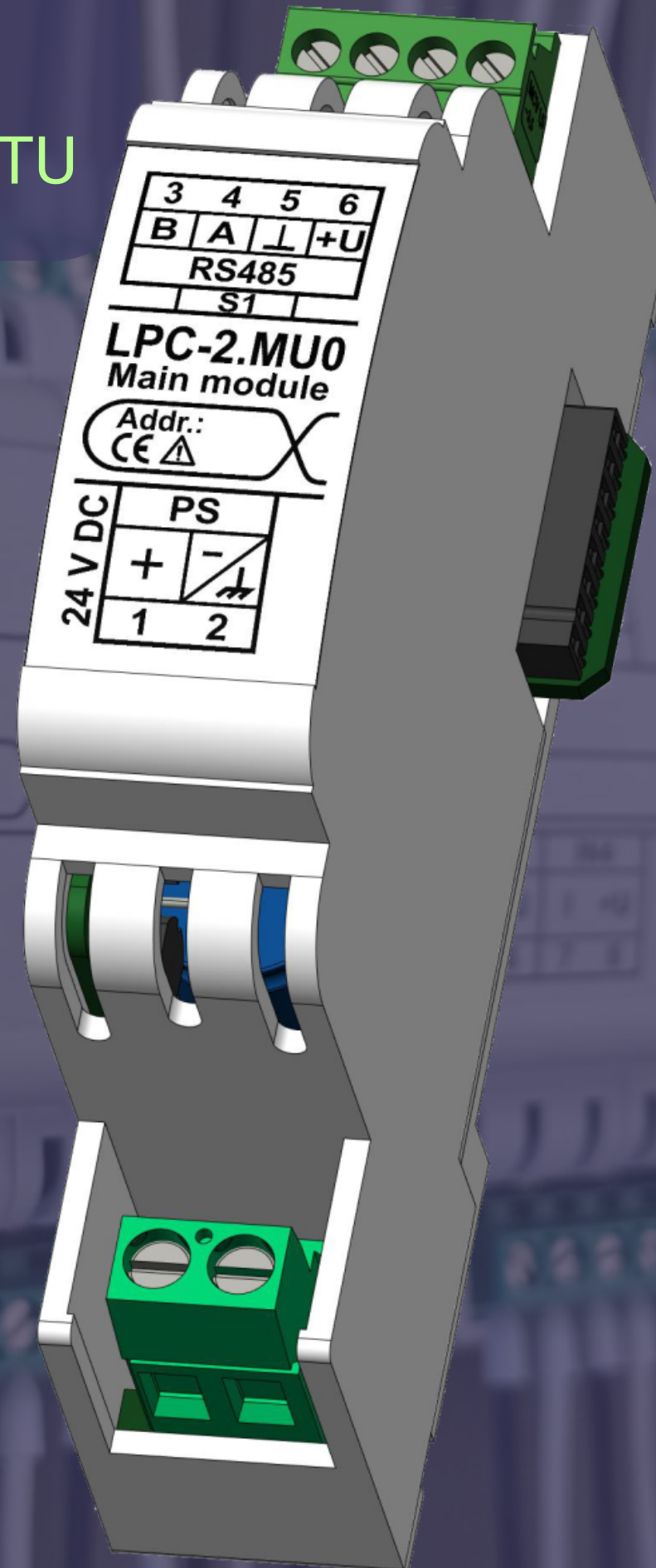


LPC-2.MU0

Remote I/O Main module, Modbus RTU



INTRODUCTION

LPC-2.MU0 Remote I/O Main module, Modbus RTU – expand your automation system with ease

The LPC-2.MU0 module operates as a Modbus RTU Slave (RS-485) device, providing a robust and flexible solution for remote expansion with configuration of Smarteh LPC-2 I/O modules. Designed for seamless integration, it is fully compatible with Smarteh LPC-2 PLCs, LPC-3 touch panels, and any other Modbus RTU Master devices.

Seamless communication & Scalable expansion

The LPC-2.MU0 module acts as a bridge between the Modbus RTU Master device and LPC-2 I/O configuration, enabling smooth and efficient data exchange.

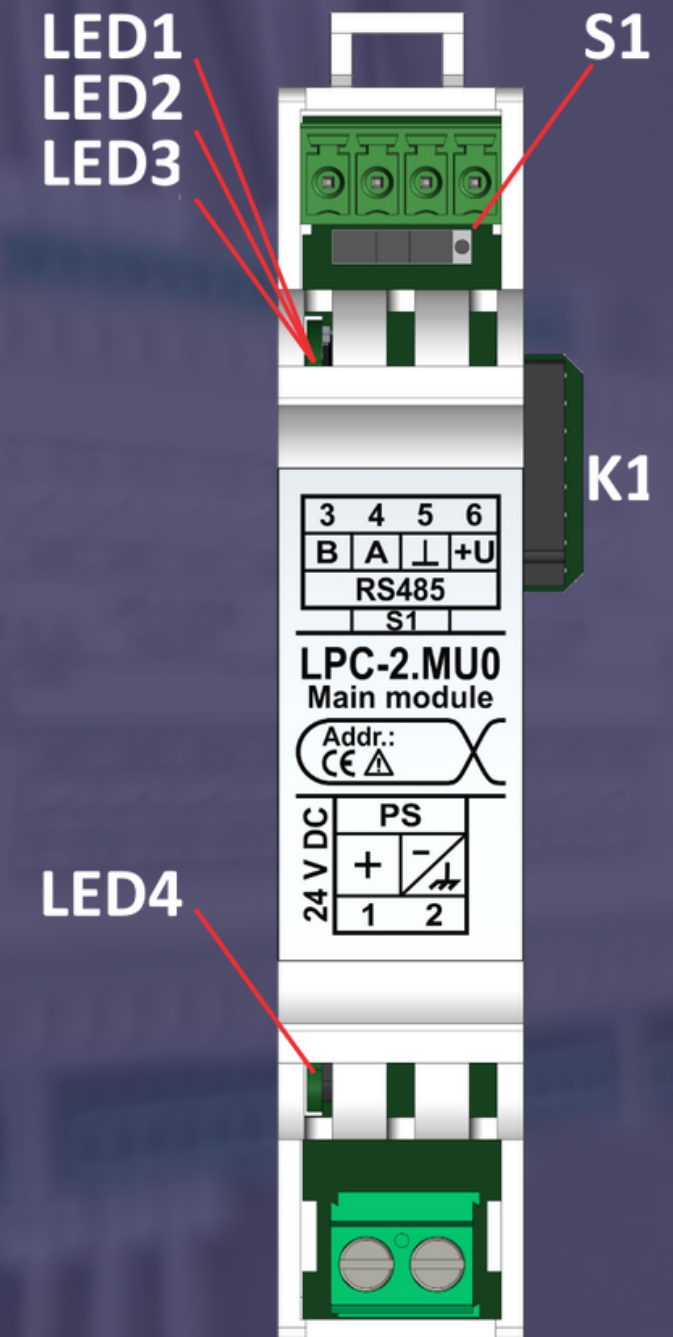
LPC-2.MU0 module powers and connects up to 7 Smarteh LPC-2 I/O modules in one LPC-2 I/O configuration, ensuring flexibility on LPC-2 I/O modules selection and system-wide efficiency.

Whether you need to expand your LPC-2 I/O configuration, create remote I/O connections, or enhance system scalability, the LPC-2.MU0 Main module delivers unmatched flexibility and performance.

Up to 32 LPC-2.MU0 module I/O configurations can be connected to a Modbus RTU Master device, allowing centralized management of thousands of I/O signals.

Compact, reliable, and efficient

Designed with a slim, space-saving profile, the LPC-2.MU0 module is perfect for installations where space is limited. Powered by a 20–28 V DC external power supply, it ensures stable operation while four built-in LEDs provide instant status updates on power supply and Modbus RTU communication, enabling real-time device status monitoring.



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SMARTEH VS. CONVENTIONAL REMOTE I/O SYSTEM EXAMPLE

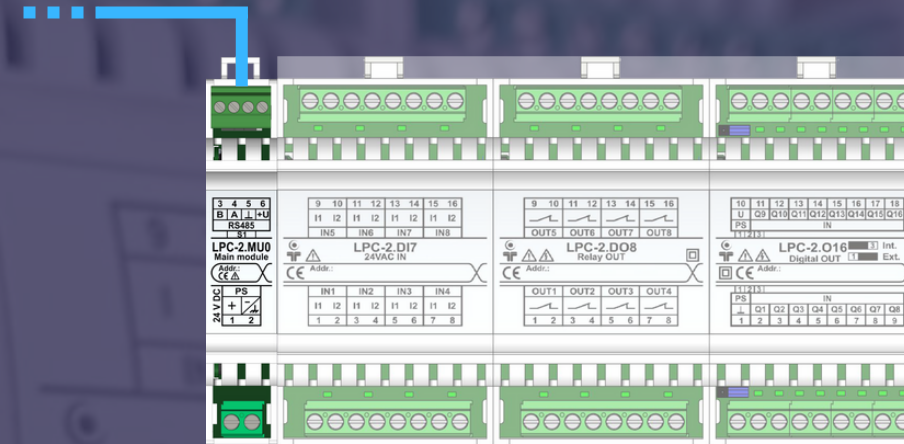
Conventional remote I/O cabinet

Many Modbus RTU nodes



SmarteH remote LPC-2 I/O cabinet

One Modbus RTU node



- **Price efficient solution for remote LPC-2 I/O modules:**

- 49 € LPC-2.MU0 Remote I/O Main module, Modbus RTU
- 30 - 60 € LPC-2 Digital inputs (Voltage free , 24 V DC, 24 V AC, 230 V AC)
- 30 - 80 € LPC-2 Digital outputs (Relay, Transistor, Triac).
- 60 - 100 € LPC-2 Analog modules I/Os (0-10V, 4-20 mA, NTC, Pt1000, PWM output, ...)

All prices are indicative RRP. For accurate pricing, please contact Smarteh sales at: sales@smarteH.si

- **Reduced number of Modbus RTU nodes:** Supports up to 7 LPC-2 I/O modules per LPC-2.MU0 and up to 32 LPC-2.MU0 per Modbus RTU Master module
- **Faster data transfer and refresh rate**
- **LPC-2 I/O signal density:** Centralizes > 1000 of LPC-2 I/O signals across multiple LPC-2.MU0 modules
- **Power supply integration:** LPC-2.MU0 module powers all connected LPC-2 I/O modules directly
- **Ease of use:** Fully integrated with the LPC-2 ecosystem—yet completely open.



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KEY FEATURES & BENEFITS

Modbus RTU communication

RS-485 half-duplex serial port for Modbus RTU Slave communication, enabling reliable data exchange with Modbus RTU Master device.

LPC-2 configuration I/O expansion

Easily extend your Modbus RTU Master automation system by connecting up to 32 LPC-2.MU0 modules with up to 7 LPC-2 I/O modules per each LPC-2.MU0 module configuration.

This allows for expanded LPC-2 I/O configurations beyond the standard Smarteh 7 LPC-2 I/O modules, providing additional functionality for complex control environments.

Remote LPC-2 I/O connection

LPC-2.MU0 module enables remote LPC-2 I/O configurations to connect with LPC-2 PLCs or LPC-3 touch panels or any other Modbus RTU Master device via Modbus RTU over RS-485, ideal for distributed control systems.

Termination Switch (S1)

RS-485 termination switch for easy configuration of signal termination with an internal 1.2 kΩ resistor to ensure stable RS-485 network communication.

Compact design

Features a slim and compact design, making it perfect for installation in tight spaces or environments with limited room.

DIN rail mounting

Designed for DIN EN50022-35 rail mounting, allowing for quick and secure installation in control panels and enclosures.

Power supply

LPC-2.MU0 module is powered by an external 20 to 28 V DC power supply, ensuring stable operation also for all connected LPC-2 I/O modules.

Diagnostic LED indicators

Equipped with four LED indicators to show RS-485 communication and power status (RS-485 Rx/Tx, communication status, power supply), enabling quick troubleshooting.



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USE CASE EXAMPLES

Remote LPC-2 I/O connection

The LPC-2.MU0 module enables the connection of remote LPC-2 I/O module configurations to either the LPC-2 PLC (see Figure 1) or the LPC-3 touch panel (see Figure 2) via Modbus RTU over RS-485 network.

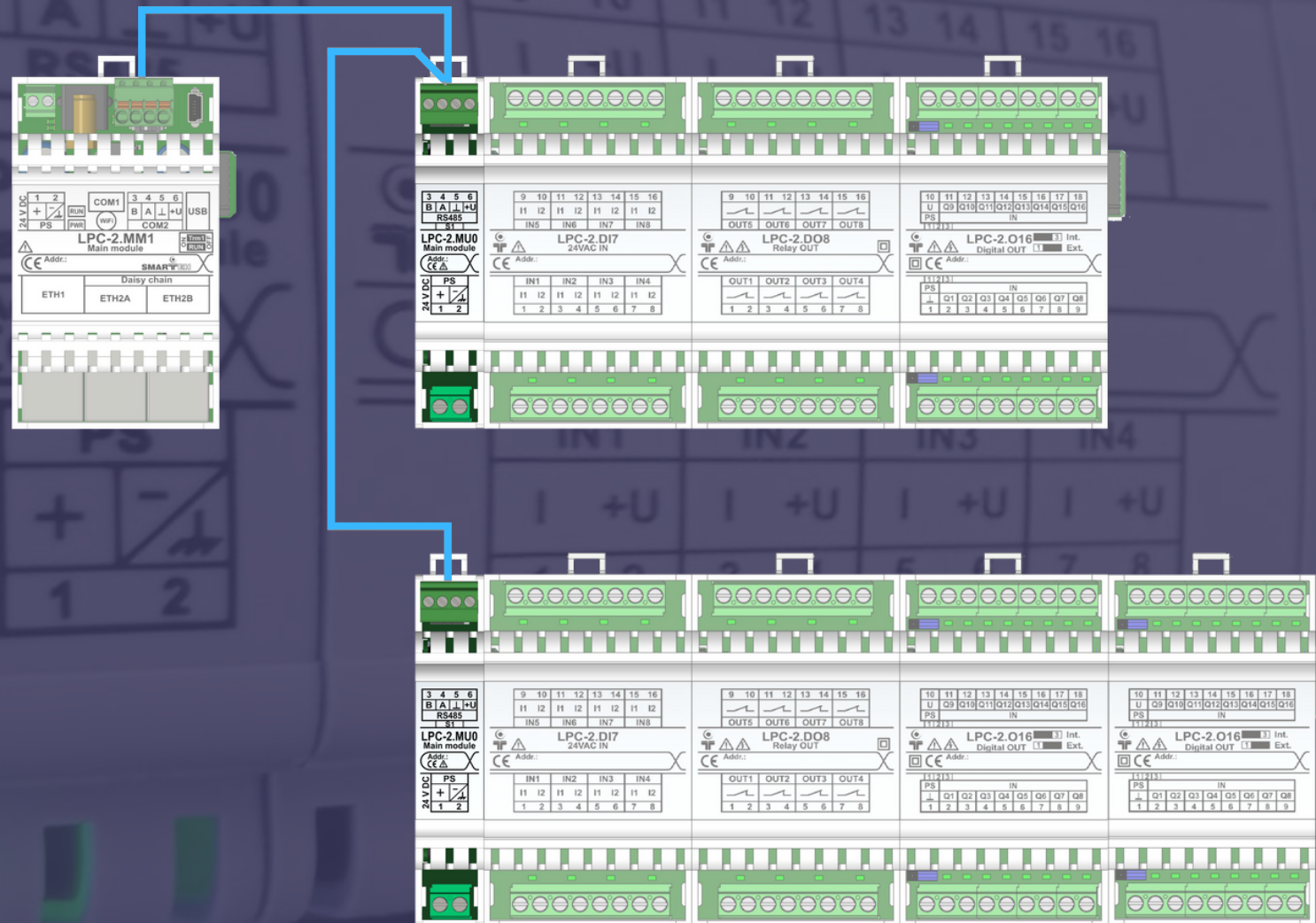


Figure 1: Example of remote connection of LPC-2 I/O configuration to LPC-2 PLC

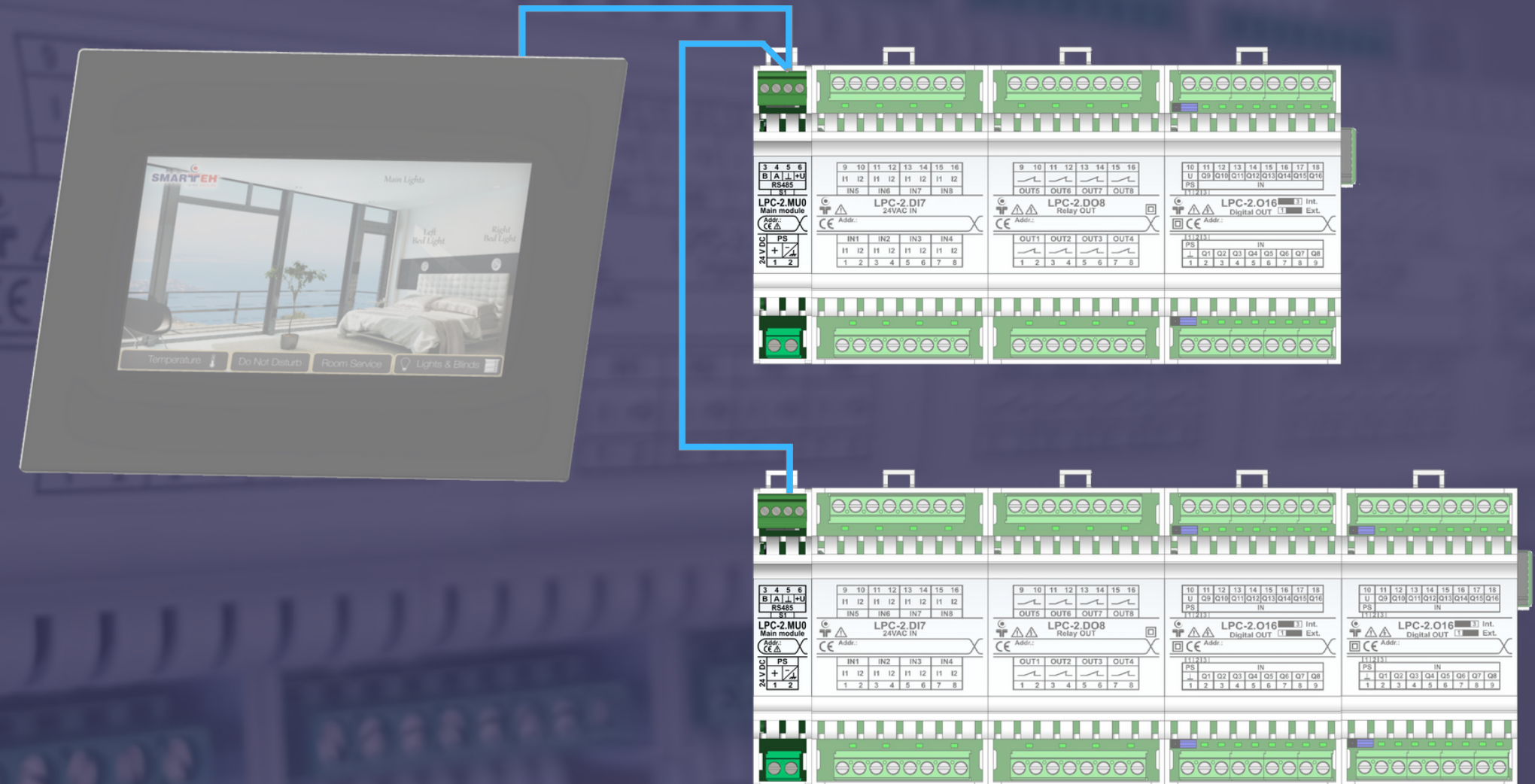


Figure 2: Example of remote connection of LPC I/O configuration to LPC-3 touch panel



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USE CASE EXAMPLES

LPC-2 configuration I/O expansion

The LPC system supports seamless LPC-2 I/O expansion in situations where the enclosure lacks sufficient space for additional LPC-2 I/O modules (see Figure 3), or when more than 7 standard LPC-2 I/O modules are required in a single configuration (see Figure 4).

The LPC-2.MU0 Main module is connected externally and communicates with the Modbus RTU Master device via Modbus RTU over RS-485.

This robust industrial protocol ensures reliable data exchange even in demanding environments.

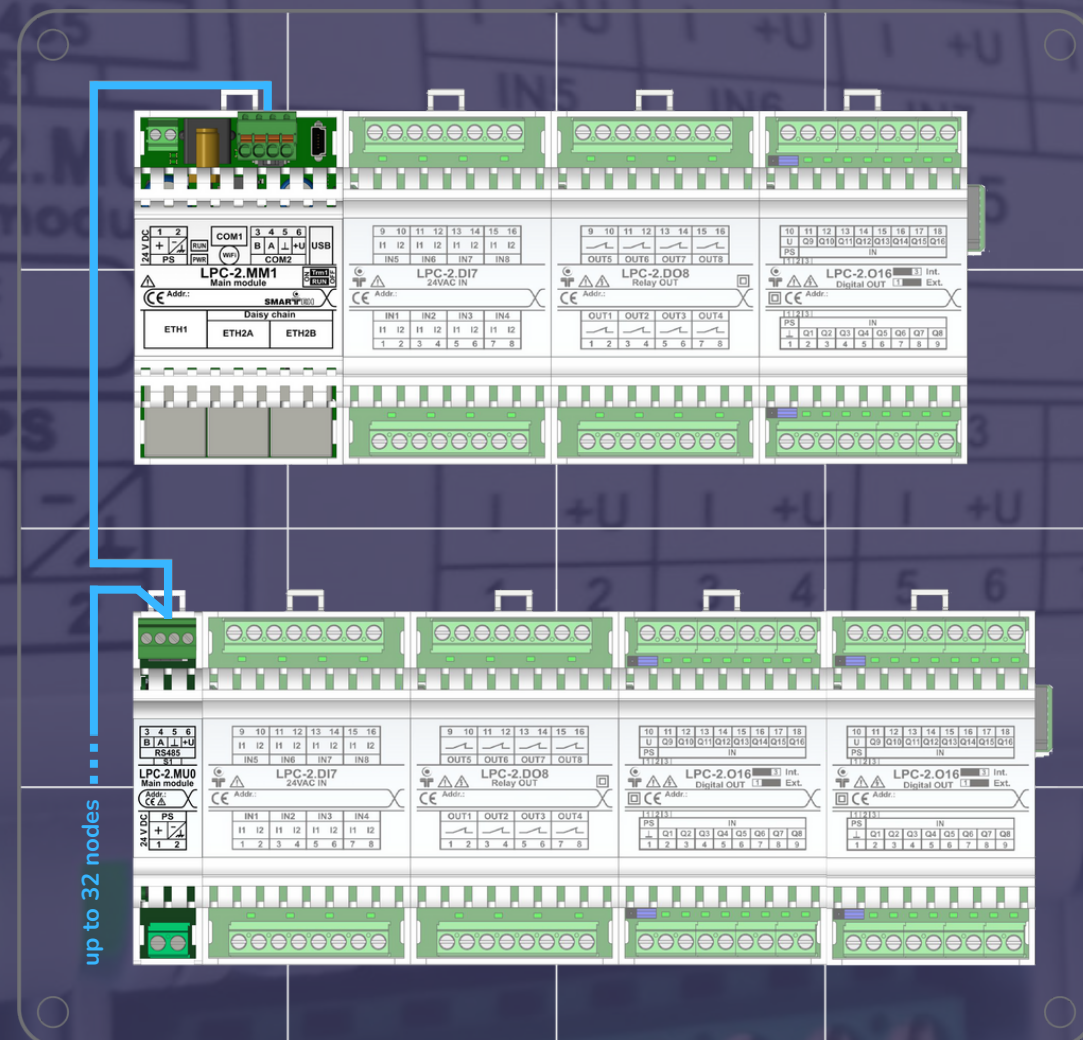


Figure 3: Example of expansion for small spaces

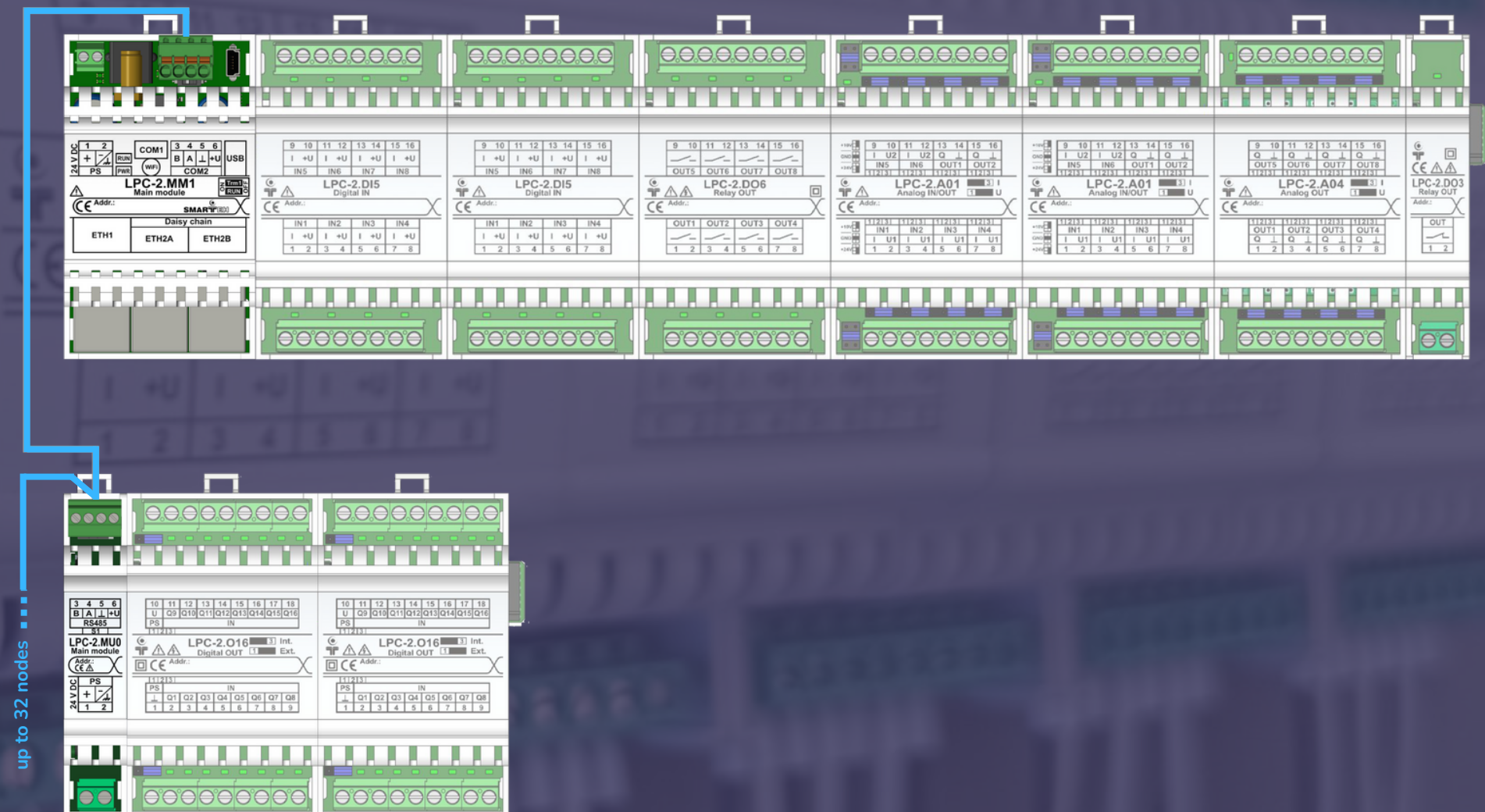


Figure 4: Example of expansion for > 7 LPC-2 I/O modules



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LPC-2.MU0 REMOTE I/O MAIN MODULE CONFIGURATION TOOL

SmarteH LPC-2.MU0 Remote I/O Main module, Modbus RTU Configuration tool is designed to generate Modbus RTU registers for selected Smarteh LPC-2 I/O modules connected to the LPC-2.MU0 Remote I/O Main module, Modbus RTU:

[LINK FOR DOWNLOAD](#)

Step 1: Set the LPC-2.MU0 I/O module configuration

- Select LPC-2 I/O modules from the drop-down list of available LPC-2 I/O modules in cells **F10:L10**

The LPC-2.MU0 module configuration can include up to Smarteh 7 LPC-2 I/O modules.

If not all 7 LPC-2 I/O modules are used in the configuration, set unused slots to **"NOT USED"**.

- Once the configuration is set, click the **"CONFIGURE"** button to generate a list of all available Modbus RTU registers and their associated properties for the current configuration.

Address	TagName	Variable	Description	Min Raw	Max Raw	Min Val	Max Val	Eng. Unit	Type	Item	Preset/Initial Value
30014	MB_IR_14	MB_MU0_Fwver	FW version	0	65535	0	65535		UINT	Value	
40409	MB_IR_409	MB_MU0_ModulSelPos_1	Module selector for I2C position 1, Retain parameter	0	22				UINT	Parameter	19
40410	MB_IR_410	MB_MU0_ModulSelPos_2	Module selector for I2C position 2, Retain parameter	0	22				UINT	Parameter	1
40411	MB_IR_411	MB_MU0_ModulSelPos_3	Module selector for I2C position 3, Retain parameter	0	22				UINT	Parameter	22
40412	MB_IR_412	MB_MU0_ModulSelPos_4	Module selector for I2C position 4, Retain parameter	0	22				UINT	Parameter	13
40413	MB_IR_413	MB_MU0_ModulSelPos_5	Module selector for I2C position 5, Retain parameter	0	22				UINT	Parameter	6
40414	MB_IR_414	MB_MU0_ModulSelPos_6	Module selector for I2C position 6, Retain parameter	0	22				UINT	Parameter	3
40415	MB_IR_415	MB_MU0_ModulSelPos_7	Module selector for I2C position 7, Retain parameter	0	22				UINT	Parameter	15
40418	MB_IR_418	MB_MU0_commErrorI2CDisableTimeo	I2C disable timeout in case of modbus communication error, Retain parameter 0 → Function disabled 1 → 10000 → 1.10000 s	0	10000	0	10000	s	UINT	Parameter	
40419	MB_IR_419	MB_MU0_EnableRS485PullUpDown	Enable pull-up & pull-down resistors on RS-485 A-B lines, Retain parameter 0 → Disabled resistors 1 → Enabled resistors	0	1	Disabled resistors	Enabled resistors		UINT	Parameter	
40801	MB_IR_801	MB_MU0_SlaveID	Slave address for modbus communication, Modbus parameter 0 → 115k2 (default) 1 → 4k8 2 → 9k6	1	247	1	247		UINT	Parameter	

Step 1: Set the LPC-2.MU0 I/O module configuration



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LPC-2.MU0 REMOTE I/O MAIN MODULE CONFIGURATION TOOL

Step 2: Export the LPC-2.MU0 I/O module configuration to .PDF and/or .XLSx file

Once the LPC-2.MU0 I/O module configuration is set, click the **"CONFIGURE"** button to generate a list of all available Modbus RTU registers and their associated properties for the current configuration.

- Use the **"EXPORT TO PDF"** and/or **"EXPORT TO XLSX"** buttons to export the configuration and its Modbus registers to a new file. The exported file will be ready for printing or further processing.

Note: The configuration must be set before exporting to ensure that the correct Modbus RTU registers are included.

- Click the **"RESET CONFIGURATION"** button to clear all Modbus RTU registers and reset the configuration, i.e. before creating a new one.

The screenshot displays the 'Smarteh LPC-2.MU0 Remote IO Main module, Modbus RTU Configuration tool' interface. A 'Save PDF As' dialog box is open, showing the file path 'This PC > Local Disk (C:) > Users > Domen > Desktop > LPC-2.MU0'. The file name is 'Smarteh_LPC2_MU0_R01_R02_A05_VV4_DL2_DO6_I16.pdf'. Below the dialog, a table of Modbus RTU registers is visible, listing parameters such as 'Module selector for I2C position 3, Retain parameter', 'I2C disable timeout in case of modbus communication error, Retain parameter', and 'Slave address for modbus communication, Modbus parameter'.

Max Row	Min Val	Max Val	Eng. Unit	Type	Item	Preset/Initial Value
65535	0	65535		UINT	Value	
22				UINT	Parameter	19
22				UINT	Parameter	1
22				UINT	Parameter	22
22				UINT	Parameter	13
22				UINT	Parameter	6
22				UINT	Parameter	3
22				UINT	Parameter	15
10000	0	10000	s	UINT	Parameter	
1	Disabled resistors	Enabled resistors		UINT	Parameter	
247	1	247		UINT	Parameter	

Step 2: Export the LPC-2.MU0 I/O module configuration to .PDF and/or .XLSx file



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LPC-2.MU0 REMOTE I/O MAIN MODULE CONFIGURATION TOOL

Step 3: PLC programming

Incorporate the Modbus RTU registers generated for the LPC-2.MU0 module into your PLC logic using the Smarteh IDE or any other compatible Modbus RTU Master device control system.

The screenshot displays the Smarteh IDE interface for configuring the LPC-2.MU0 module. The Project tree on the left shows the configuration structure, including the 'Communication' section. The Communication table at the top lists the following registers:

#	Name	Class	Type	Location	Initial Value	Option	Documentation
83	BUTTON_EXT2_STATUS	Local	HMI_UINT				0 - ID not set; 1 - ID setted, needs restart; 2 ID setted, module restarted, 3 -
84	BUTTON_EXT3_STATUS	Local	HMI_UINT				0 - ID not set; 1 - ID setted, needs restart; 2 ID setted, module restarted, 3 -
85	MAINBIGCABBINET	Local	HMI_BOOL				
86	MAINSMALLCABBINET	Local	HMI_BOOL				
87	MAINRESETCABBINET	Local	HMI_BOOL				
88	ASSIGN_Main_Request1	Local	WORD	%MW5.0.7.20			
89	ASSIGN_Main_Pos1	Local	WORD	%MW5.0.7.22			
90	ASSIGN_Main_Pos2	Local	WORD	%MW5.0.7.23			

The ladder logic editor at the bottom shows the following code:

```
288 IF SETIDEXT1 THEN
289   Local_Default_Set_ID := 2;
290   Local_Default_Confirm_ID := 9088;
291 END_IF;
292
293 (*Set ID Extension2*)
294 IF SETIDEXT2 THEN
295   Local_Default_Set_ID := 3;
296   Local_Default_Confirm_ID := 9088;
297 END_IF;
298
299 (*Set ID Extension3*)
300 IF SETIDEXT3 THEN
301   Local_Default_Set_ID := 4;
302   Local_Default_Confirm_ID := 9088;
303 END_IF;
304
305 (*Assine modules Communication*)
306 IF MAINBIGCABBINET THEN
307   ASSIGN_Main_Pos1 := 22; (*A05*)
308   ASSIGN_Main_Pos2 := 22; (*A05*)
309   ASSIGN_Main_Pos3 := 3; (*DO6*)
310   ASSIGN_Main_Pos4 := 3; (*DO6*)
311   ASSIGN_Main_Pos5 := 3; (*DO6*)
312   ASSIGN_Main_Confirm := 9055;
313   CALIBRATEDMAIN := 1;
314
315 ELSIF MAINSMALLCABBINET THEN
316   ASSIGN_Main_Pos1 := 22; (*A05*)
317   ASSIGN_Main_Pos2 := 3; (*DO6*)
318   ASSIGN_Main_Pos3 := 3; (*DO6*)
```

Step 3: PLC programming



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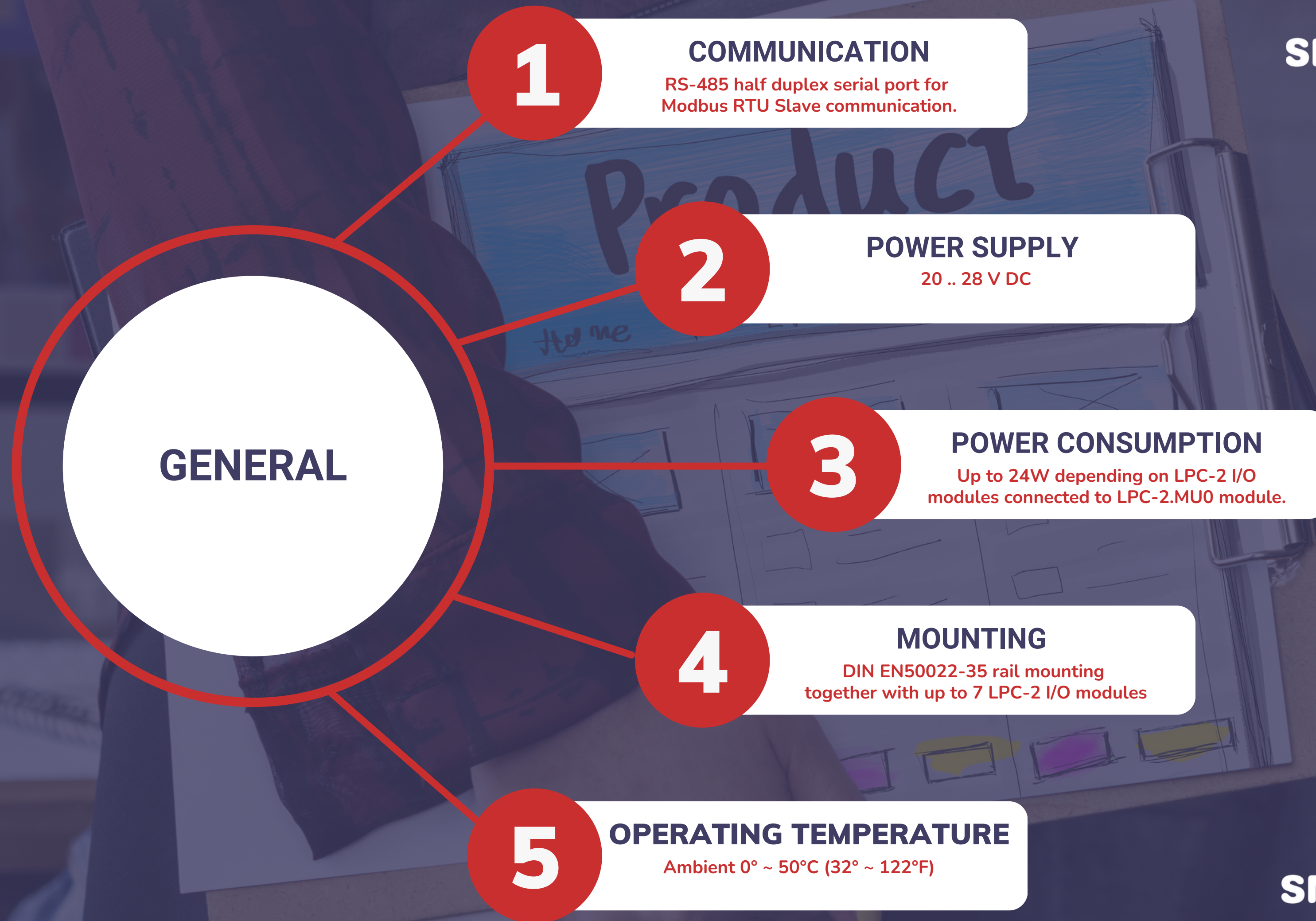


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A photograph of a modern, two-story office building with a light-colored facade and large windows. The SMARTTEH logo is mounted on the upper part of the building. In the foreground, there is a row of small, conical evergreen trees. To the left, a white car is partially visible behind a fence. The background shows a clear blue sky and some distant hills.

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