# SMART.MER/2 – signal merger with probe guard function


## Buy this item at:

https://www.topcom.cz/store

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https://www.ebay.com/str/cncprobes


## Description:

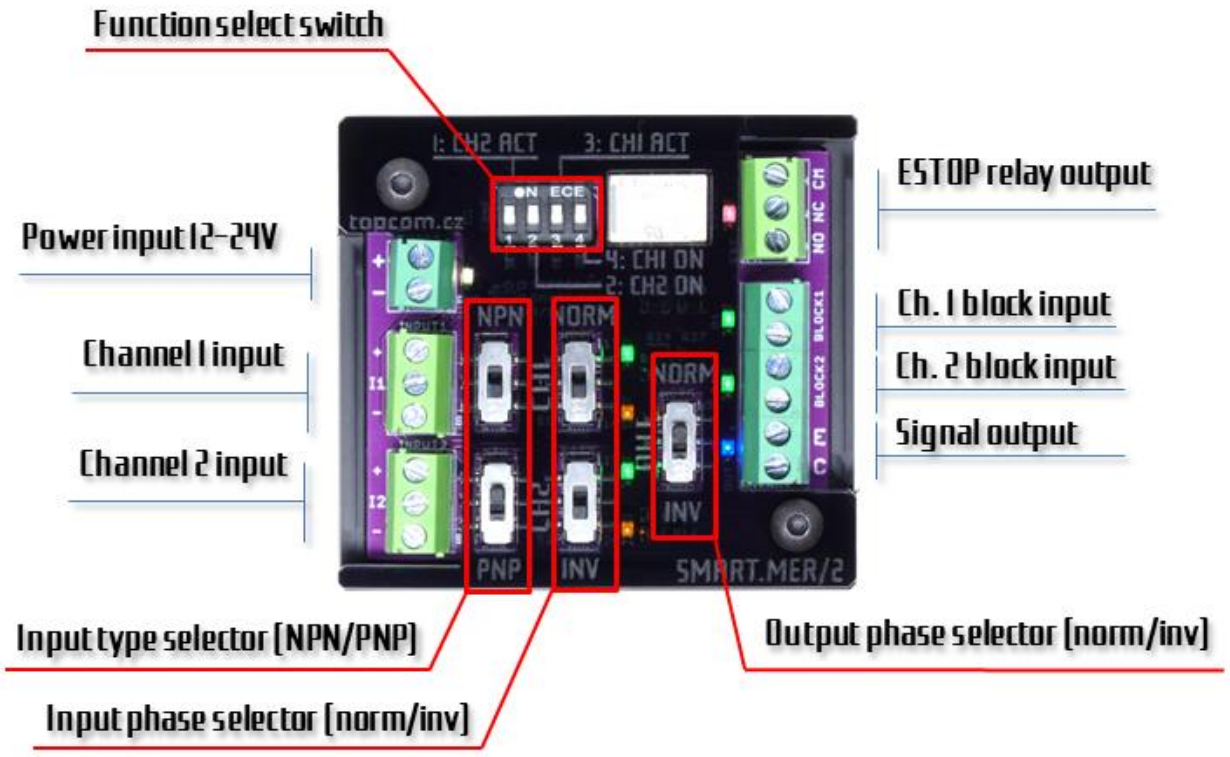
SMART.MER/2 is a device, allows merging 2 different signals to one output signal. Input channels can be configured differently according the sensor type.

SMART.MER/2 is able to generate ESTOP signal, when connected probe is triggered in the unexpected moment. It can protect a probe from damage.

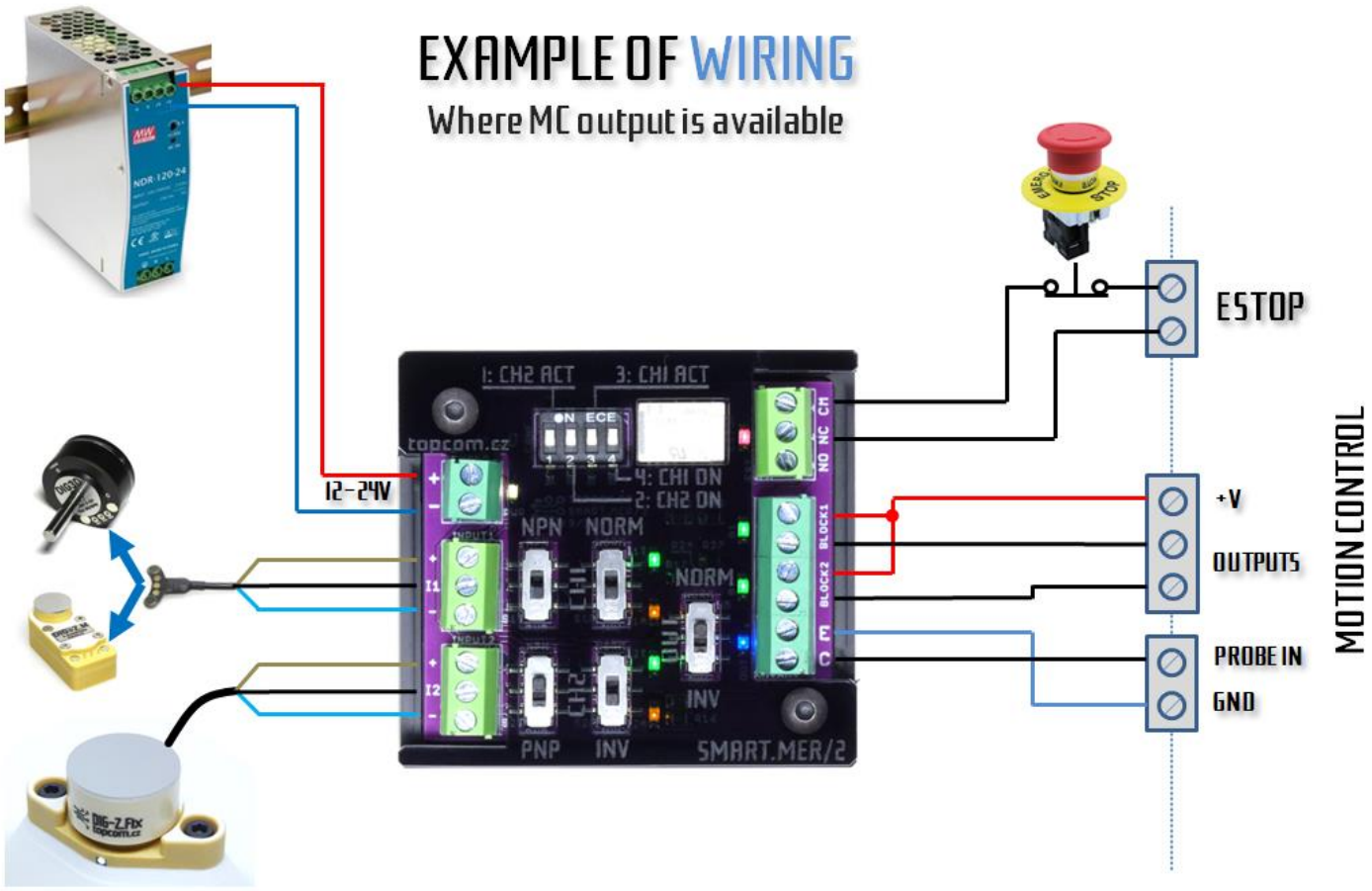
## Main features:

| POWER | |
|---|---|
| Power voltage (Vcc) | 12-24V DC |
| Power consumption | <100mA |
| SIGNAL INPUTS | |
| Input current | 4.5mA @ Vcc=12V |
| | 9.5mA @ Vcc=24V |
| Input polarity | NPN/PNP |
| Input phase | NORMal/INVerted |
| FUNCTION | |
| Merging function | IN1 or IN2 |
| SIGNAL OUTPUT | |
| Output type | Opto-isolated transistor |
| Output voltage | 24V max. |
| Output current | 20mA max. |
| Output phase | NORMal/INVerted |
| Transitional ON time | <20us |
| Transitional OFF time | <500us |
| ESTOP OUTPUT | |
| Output type | Relay |
| Output voltage | 50V max. |
| Output current | 100mA max. |
| BLOCK INPUT | |
| Input voltage | 5-24V |
| Input polarity | any |
| DIMENSION | |
| Width x Height | 50x34mm |

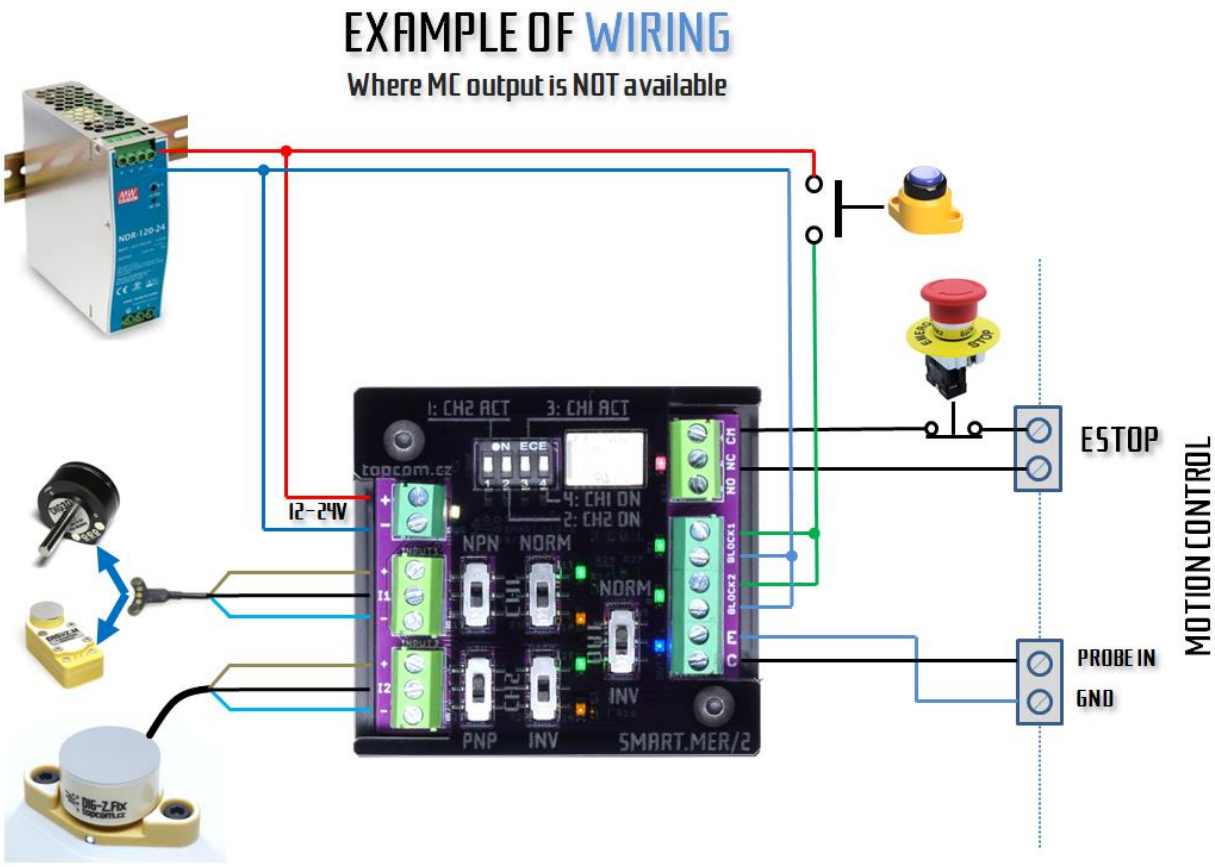
## Description:




- Power input: 12-24V/100mA max power input
- Channel 1, 2 input: signal input for a sensor connection
- ESTOP relay output: dry contact – ESTOP circuit connection
- Channel 1, 2 block input: inputs block guard function independently for both input channels
- Signal output: optically-isolated transistor output of the merged signal
- Function select switch: enable/disable the guard function and probe detect function for both channels
- Input type selector: allows setup the input polarity (NPN/PNP) for both channels independently
- Input phase selector: allows setup the input phase (normal/inverted) for both channels independently
- Output phase selector: sets the output phase (normal/inverted)



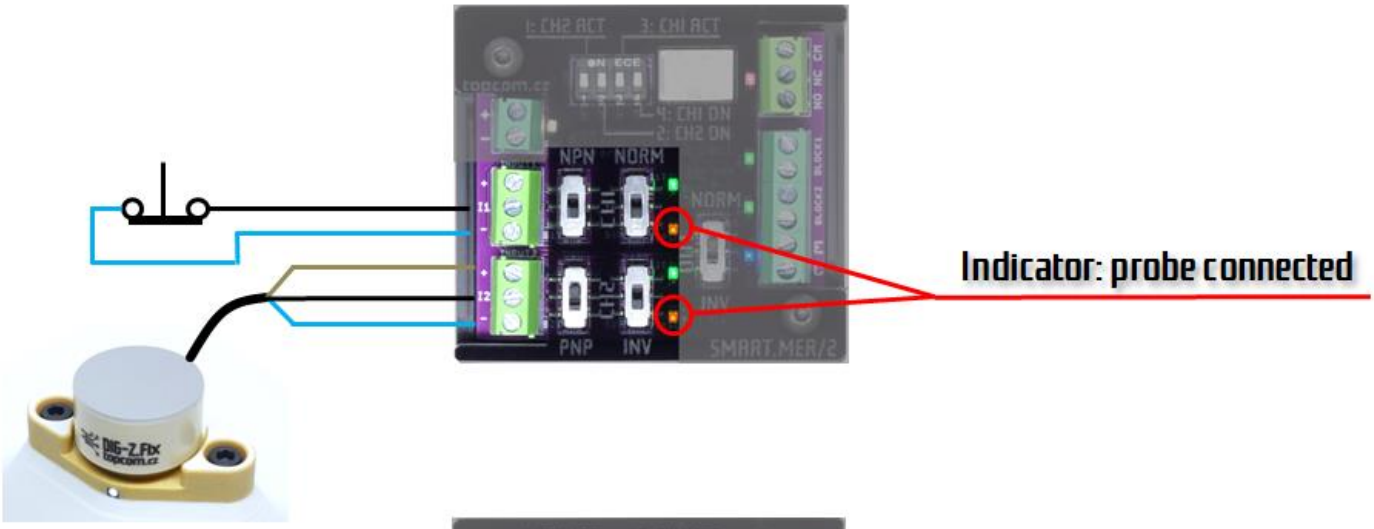

Typical wiring when outputs from a motion control are available. Some of motion control software (like MACH3, MACH4 etc.) allow modification of a probing script. Free motion control board outputs can be connected to SMART.MER/2 block inputs, to activate guard function block by a script command.

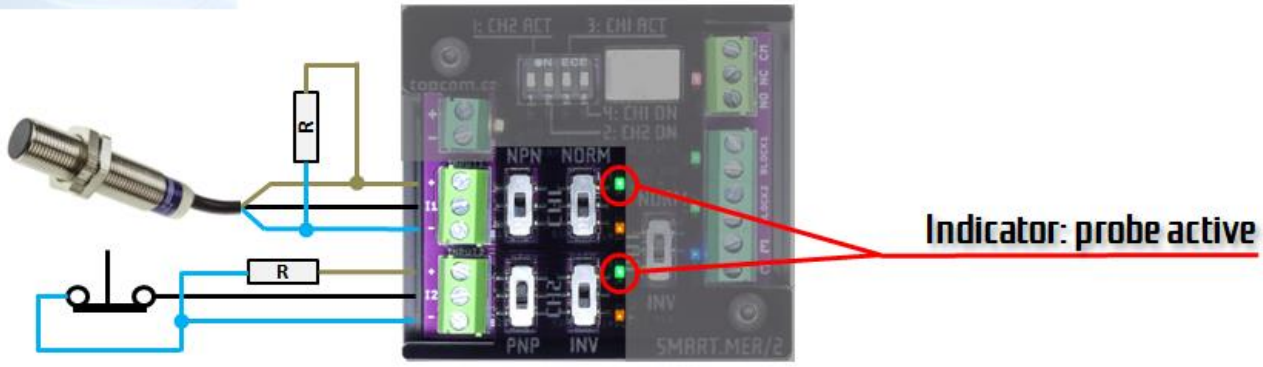



If there is no free output on a motion control board or it is not possible to modify the probing script in the motion software, block inputs should be activated by a button.

Button is pressed manually when probing is allowed. It blocks the guard function during probing process.

## Input channels:




- **Input terminal:**
  **+** … sensor power
  **In** … input clamp
  **-** … sensor GND

- **Input type switch:**
  **NPN** … input is configured for NPN output from a sensor (switching to -)
  **PNP** … input is configured for PNP output from a sensor (switching to +)

- **Input phase:**

  **NORM** … channel is active, if input is activated (for NO sensors)
  **INV** … channel is active, if input is inactive (for NC sensors)

- **Indicator – probe active:**

  GREEN LED is lighting, when channel is active.
  Any active channel activates the output (OR function).

- **Indicator – probe connected:**

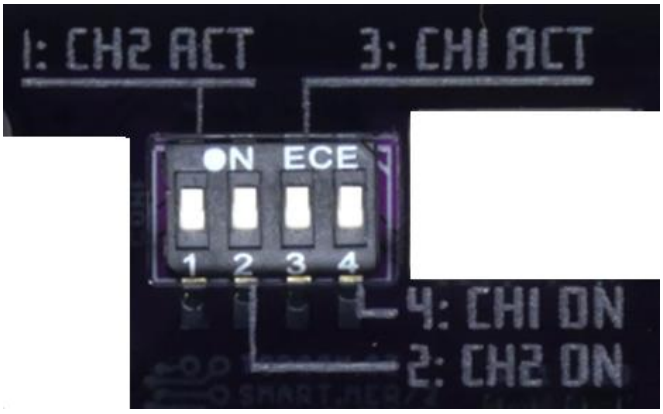
  YELLOW LED is lighting, when a probe is connected.
  Probe connection is detected, when a current consumption is higher than 8mA.

**If you need to connect passive switch and want to use „probe detection“ function, it is possible to simulate sensor power consumption by a resistor connected in between +power line and GND.**

**Resistor value should be:**

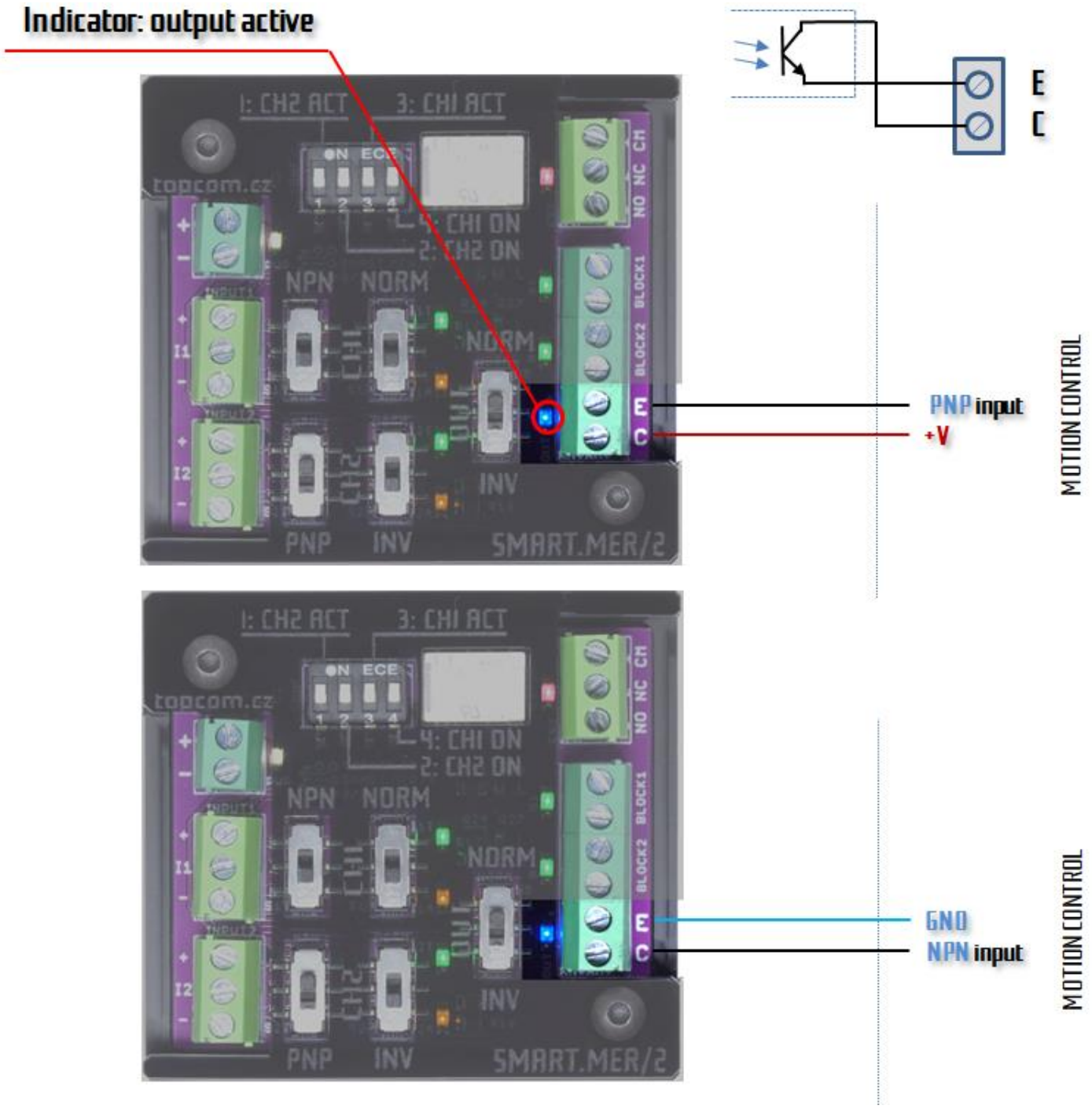
- **2,4kOhm for 24V power supply**
- **1,2kOhm for 12V power supply**

## Function configuration switch:




1: **CH2 ACT**: ON – channel 2 is always ON, OFF – channel 2 uses probe detection function
2: **CH2 ON**: ON – channels 2 generated ESTOP, OFF – probe guard is disabled for channel 2
3: **CH1 ACT**: ON – channel 1 is always ON, OFF – channel 1 uses probe detection function
4: **CH1 ON**: ON – channels 1 generated ESTOP, OFF – probe guard is disabled for channel 1

## Signal output:



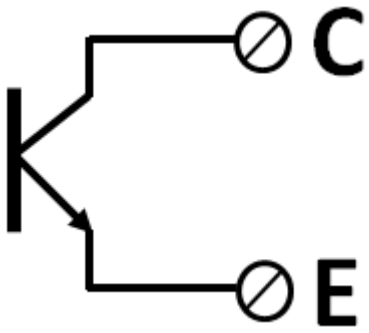

- **Output phase:**

  **NORM** … output is active, if any input channel is activated
  **INV** … output is active, if all input channels are inactive

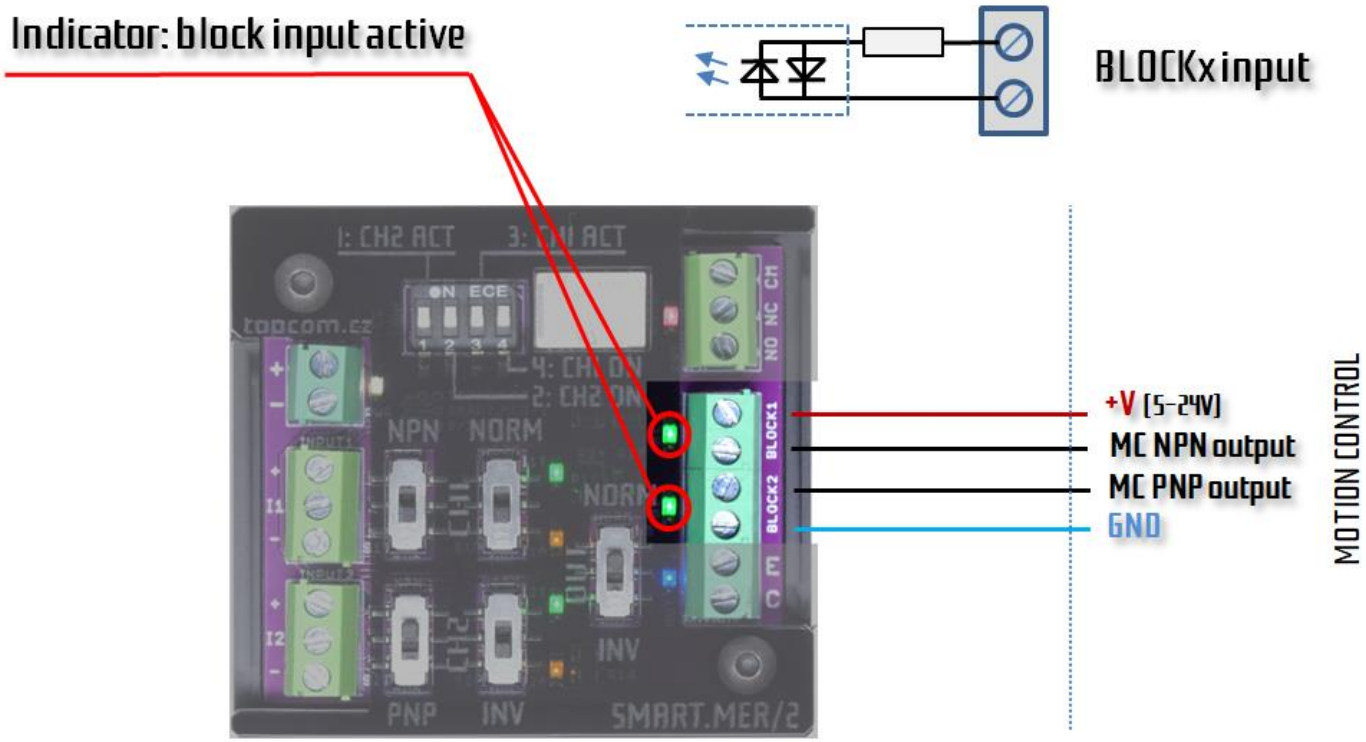
- **Status indicator:**

  LED is lighting, when output is active.

- **Output terminal:**

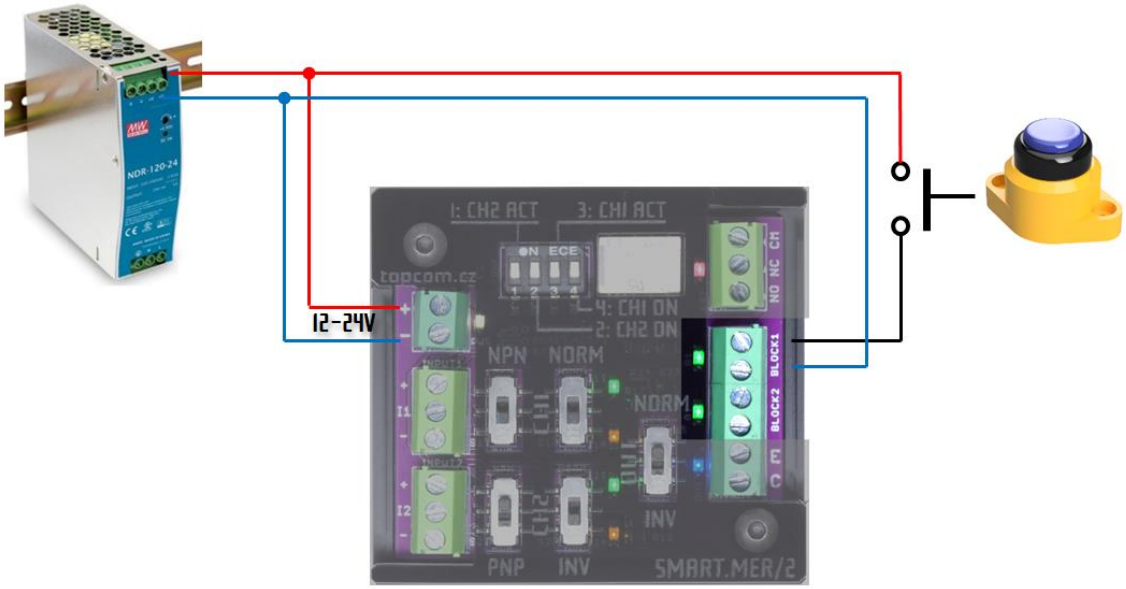


## Block inputs:



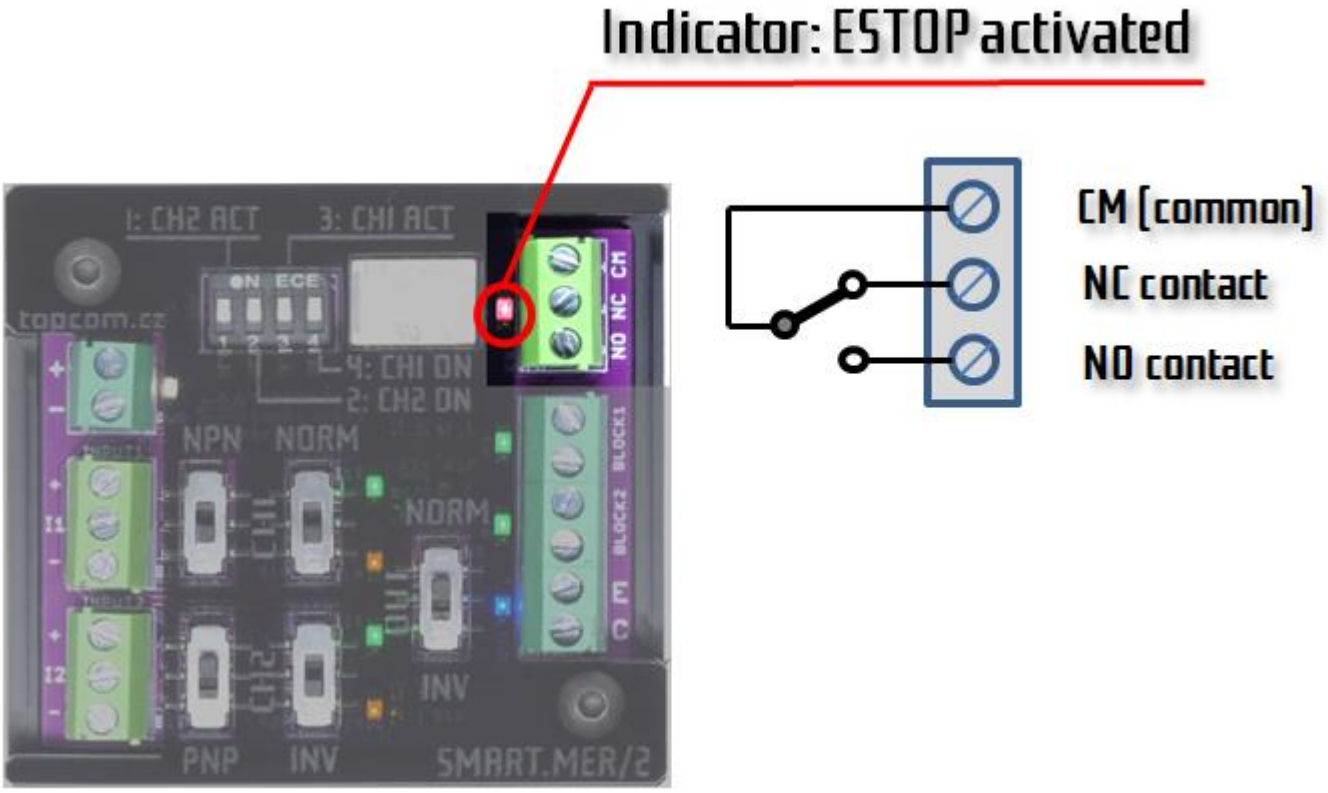

Block1, Block2 inputs are used for blocking of the probe guard function.

Both inputs are potential-free, activated by applied voltage in between 5-24V, in any direction.



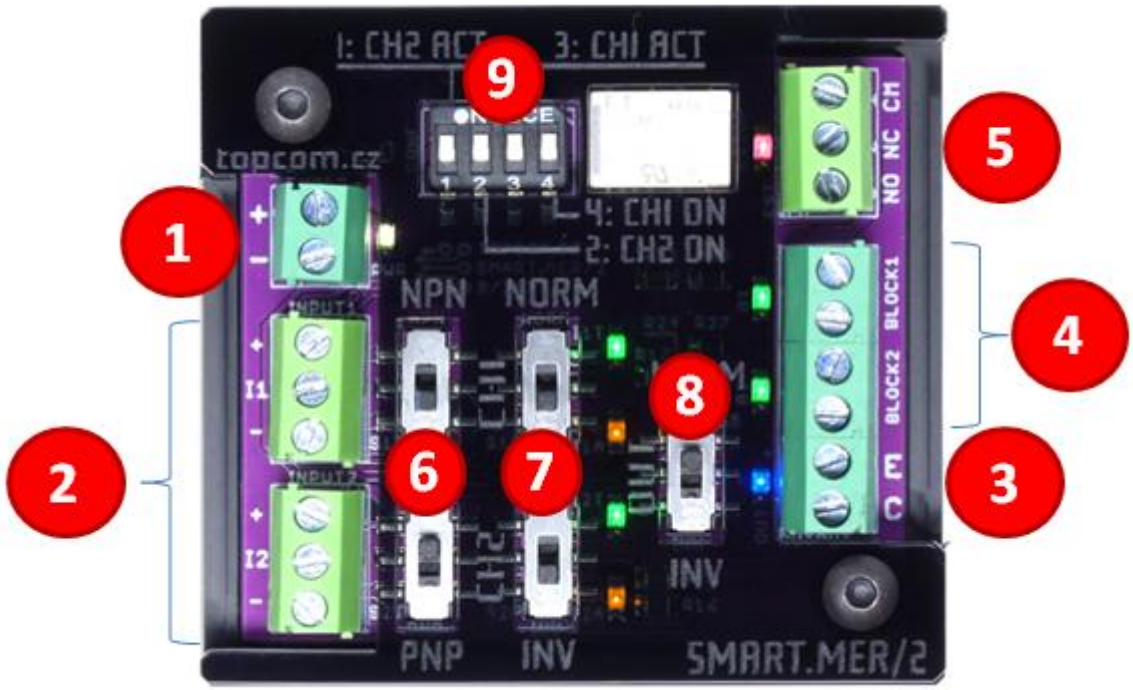

If a motion control output is not available, block input can be driver also by NO switch.

**ESTOP output:**




**ESTOP output is potential-free contact and must be connected to estop circuit of a machine.**

## Board setup procedure:




1. Connect the power source (12-24V).
2. Connect the sensors or switches to the inputs.
3. Connect the output to the motion control board.
4. Connect the block inputs to the motion control board outputs, or to the button.
5. Connect ESTOP output to the e-stop circuit of your machine.
6. Set the correct input type for all inputs (NPN/PNP) by IxT switch:
   - If the input type is set correctly, input channel reacts to the sensor triggering.
   - Input channel status is indicated by corresponding input LED.
7. Set the correct input signal phase by IxP switch:
   - Input signal phase is set correctly, if triggered sensor makes input channel active and vice versa.
   - Unused inputs have to be se to “NORM”
8. Set the output phase.
9. Set the function switch.

**It is recommended to use the output in NORM output phase, because of faster reaction time to input activation.**

**Use the NORM output phase settings if possible.**