# Electrical Protection Devices

Magnetothermic Breakers and Fuses

# Magnetothermic Circuit Breakers

Magnetothermic circuit breakers are electrical protection devices designed to interrupt the circuit in case of overcurrent or short circuit.

They detect abnormal electrical conditions and trip to disconnect the circuit.

Components:

- Thermal unit: responds to prolonged overcurrent.
- Magnetic unit: responds to short-circuit currents.
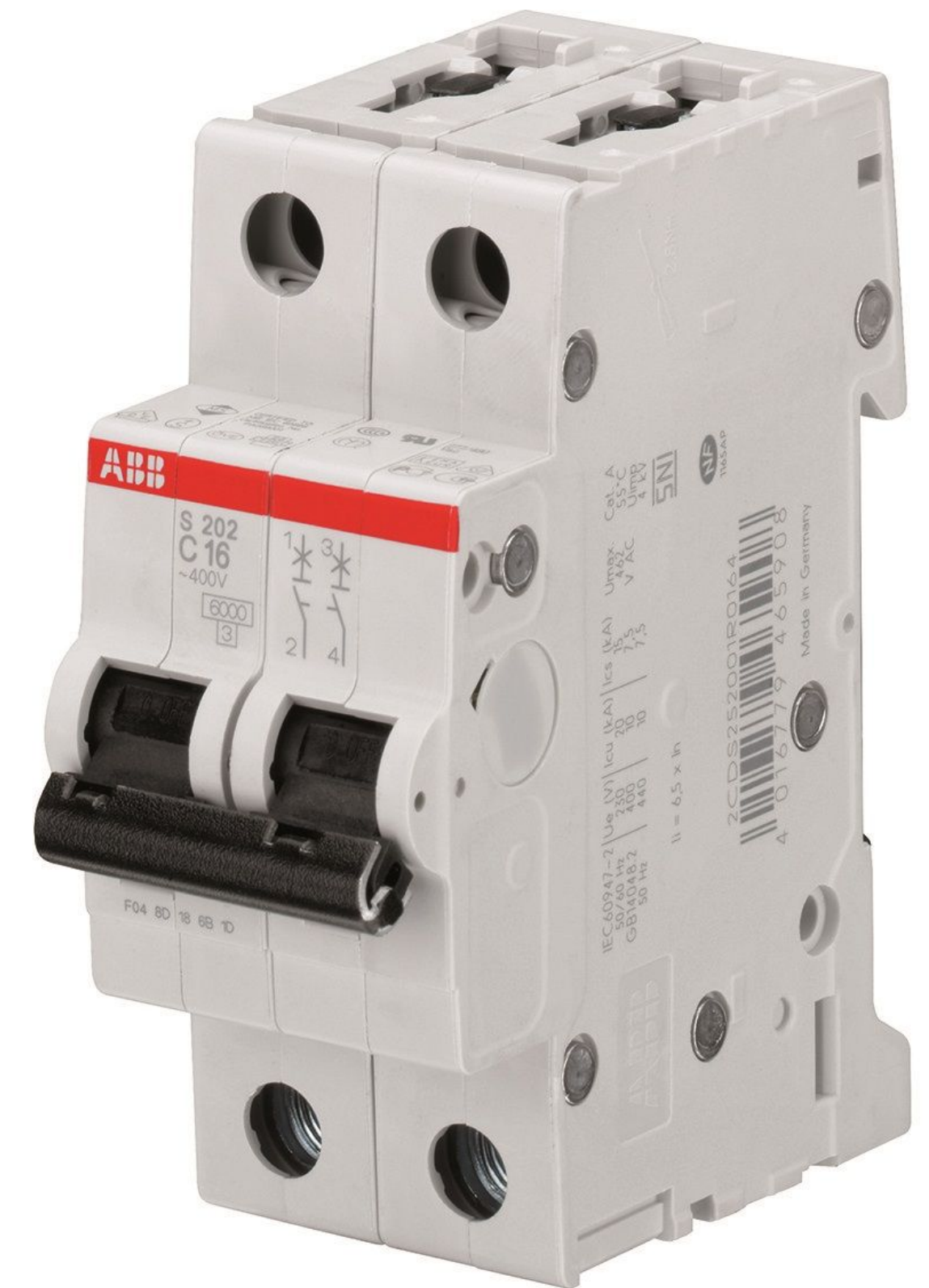
# Electrical Fuses

Fuses are protective devices that contain a metal strip or wire which melts when excessive current flows through it, breaking the circuit.

They detect abnormal electrical conditions and trip to disconnect the circuit.

When current exceeds the rated value, the fuse element melts, opening the circuit and preventing damage.

# Magnetothermic Breakers vs. Fuses - 1

Functionality:

- Magnetothermic breakers can be reset manually, whereas fuses typically need to be replaced after tripping.
- Breakers offer better protection against overcurrents as they can trip on both overloads and short circuits.

# Magnetothermic Breakers vs. Fuses - 2

Cost:

- Breakers are initially more expensive but can be more cost-effective in the long run due to their resettable nature.
- Fuses are cheaper initially but require replacement after each trip.

# Magnetothermic Breakers vs. Fuses - 3

Suitability:

- Breakers are preferred for applications where frequent switching are required.
- Fuses are suitable for simpler applications where cost is a significant factor.

# Breakers response time
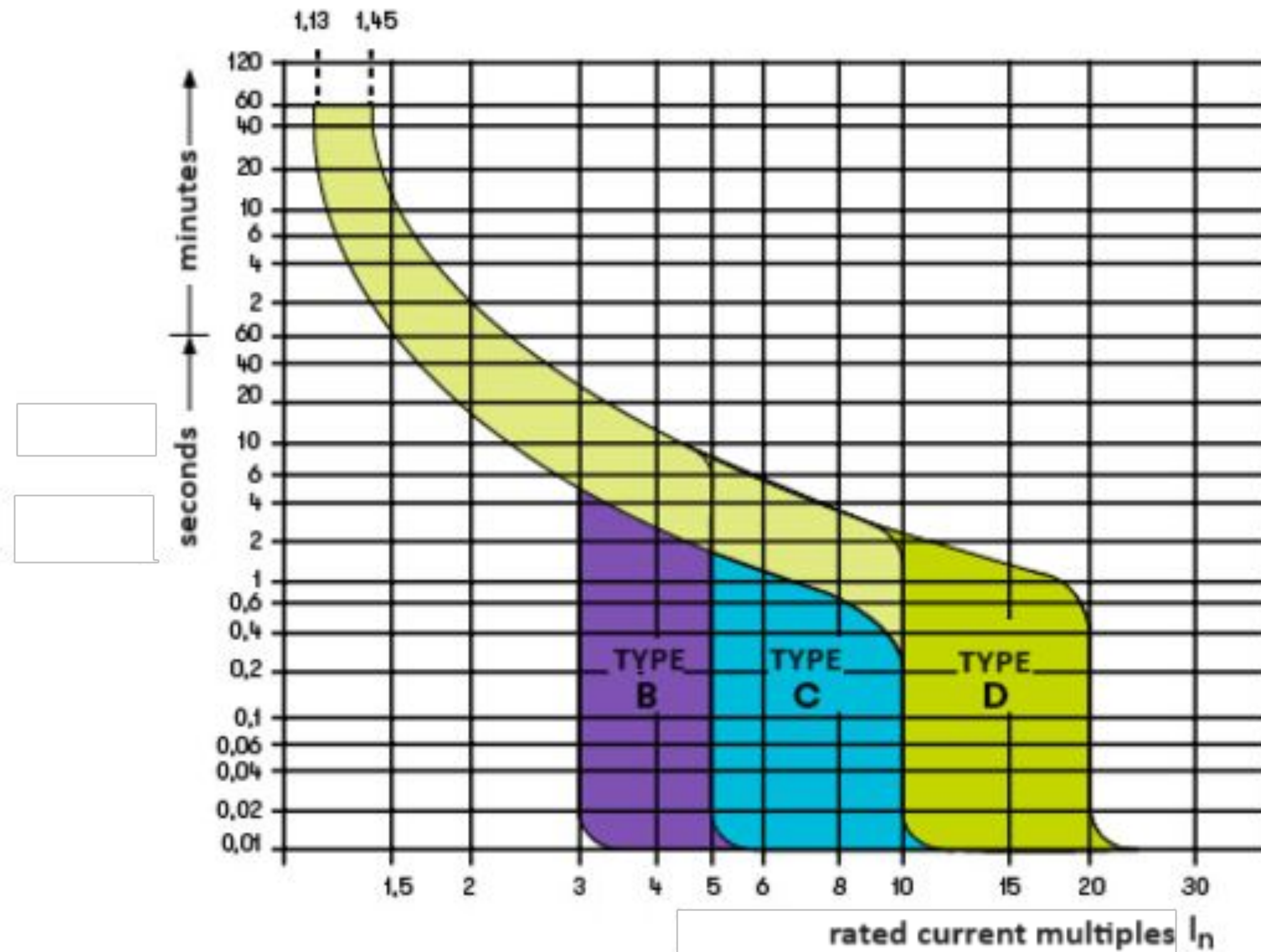
# Discussion topic #1

Take the photos you've taken of your electrical panel.

What circuit breakers have you installed?

# Exercises

Calculate the response time of the circuit breaker in the following cases:

| CASE | Magnetothermic size | Current |
|------|---------------------|---------|
| 1 | C10 | 20 A |
| 2 | B16 | 150 A |
| 3 | C16 | 150 A |
| 4 | D16 | 150 A |
| 5 | C25 | 2000 A |

# Discussion topic #2

"Are you able to deduce, from the outcomes of the exercises done, what changes between types B-C-D?"