3. Power electronics and cabinet features

3.1. Overview

The ACS1000 drive is a general-purpose frequency converter for the control of standard induction motors.

For information on the power and voltage range of the drive, see the Technical specifications and the rating plate of the drive.

The following sections provide an overview of:

– Drive topology and main features

– Available main and auxiliary power configurations

– Power electronic components of the drive

– Cooling system

– Cabinet features such as the grounding switch and the electro-mechanical door interlock

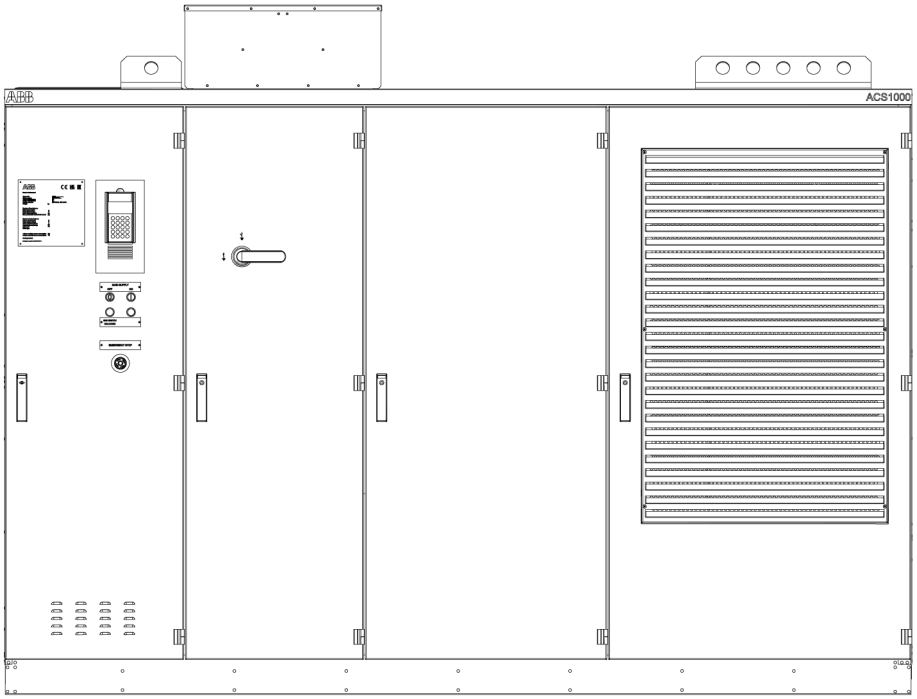
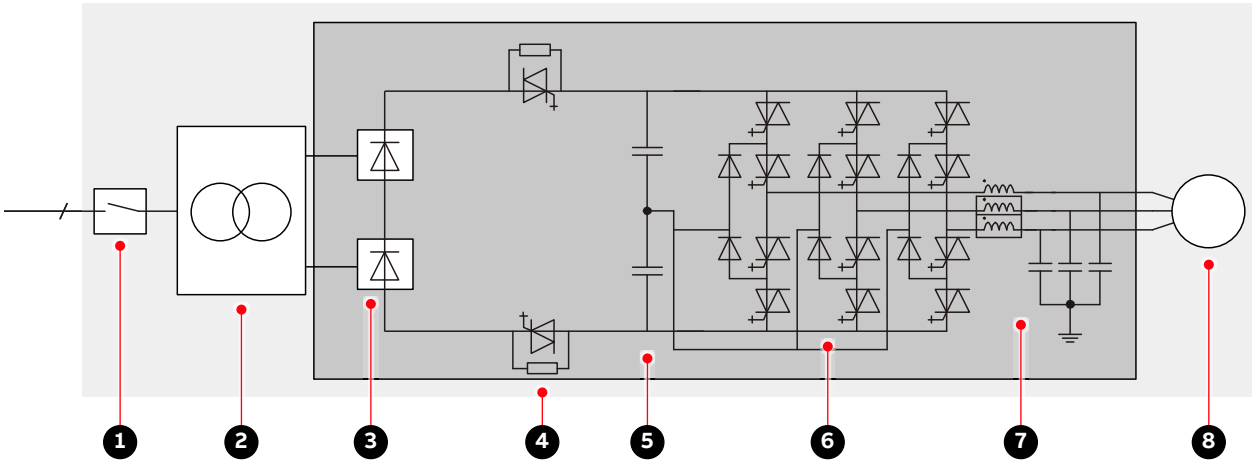
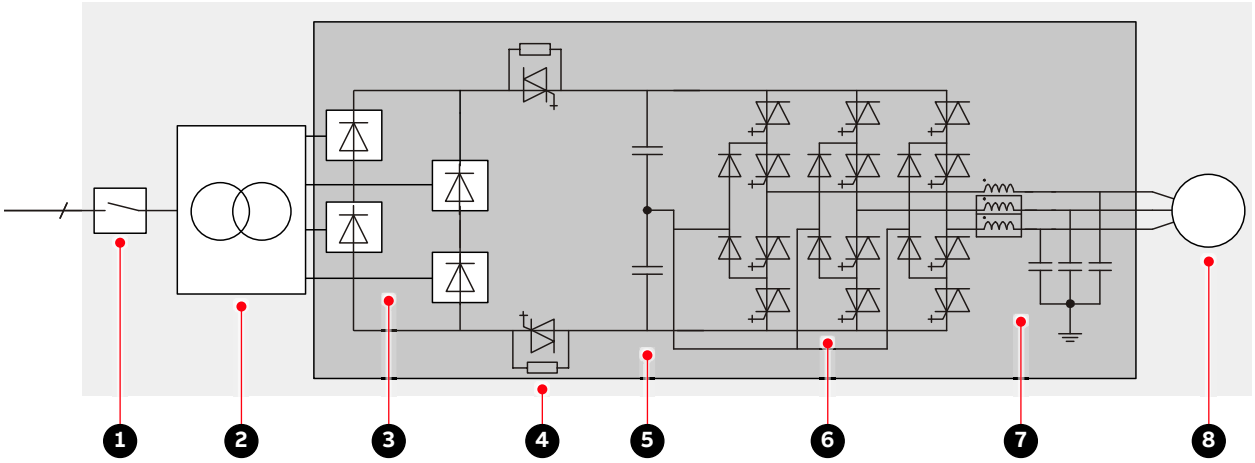


Figure 5 – ACS1000 air-cooled

3.2. Drive topology



a) 12-pulse rectifier



b) 24-pulse rectifier

Key

1. Medium voltage switchgear, including main circuit breaker and transformer protection
2. Transformer
3. Rectifier
4. Protection IGCTs
5. DC link
6. Inverter
7. Filter
8. Motor

Figure 6 – Block diagrams of an ACS1000A

The drive system consists of the following main components:

– **Main circuit breaker (MCB)**: see 2.4 Main circuit breaker protection device on page 24.

– **Transformer:** see the Transformer specification.

– **Drive**

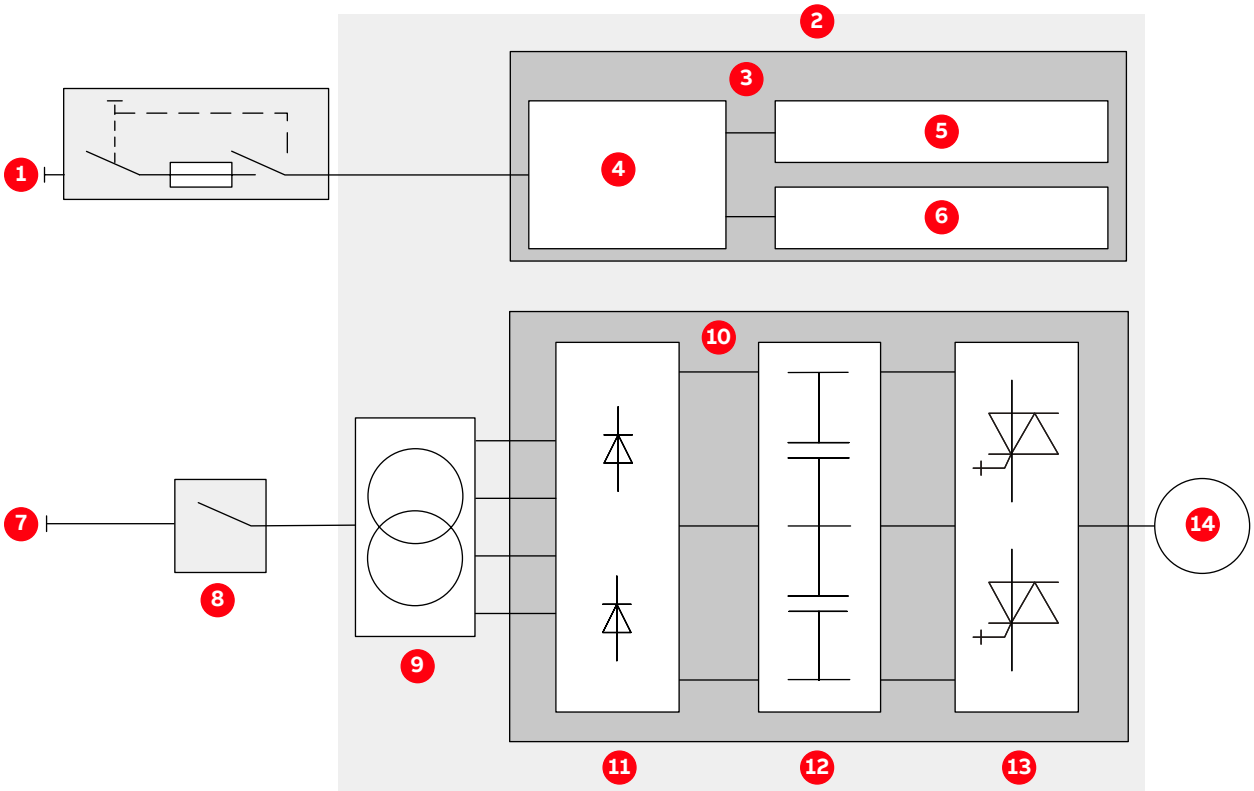
– **Asynchronous motor:** see the motor specification.

3.3. Power supply configurations

The drive requires 2 independent power supplies:

– Main power supply for the power electronic components

– Auxiliary power supply for the control and cooling system



Key

9. Auxiliary power supply
10. ACS1000A
11. Control and cooling system
12. Auxiliary power distribution
13. Cooling system
14. Control system
15. Main power supply
16. MCB
17. Transformer
18. Power electronic components
19. Rectifier
20. DC link
21. Inverter
22. Motor

Figure 7 – Drive overview with power supplies

3.3.1. Main power supply configurations

The drive is connected to the main power supply via a three-winding oil or dry-type transformer.

3.3.2. Auxiliary power supply configurations

The total auxiliary power demand of the drive includes:

– Auxiliary power for the cooling system

– Auxiliary power for the control hardware and the gate units which are used to trigger the power semiconductors

The total auxiliary power can be fed to the drive in the following ways:

– Through a common power supply
  - The total auxiliary power is supplied to the drive by a three-phase AC power supply.
  - If the power supply is interrupted, drive internal batteries provide a backup for the control system, thus enabling the drive to ride-through and/or to perform a controlled shutdown.

– Through separate power supplies
  - The auxiliary power is supplied to the drive by a three-phase AC power supply and by an UPS to a separate one-phase AC or DC input.
  - Feeding the control power separately by an UPS has the advantage that the main control hardware will remain energized, the full ride-through capabilities of the drive can be used, and the communication to a higher-level control system will not be lost in the event of an auxiliary power outage.

IMPORTANT! The power feed for the auxiliary supply must be protected with a suitable circuit protection rated for the inrush current.

For more information on the auxiliary power interface of the drive, see “Appendix D - Wiring diagrams”. For information on the rated voltage(s) and current(s), see the rating plate of the drive.