

The IEC 62290-1 responsibility matrix, with what each grade means for staffing, and which systems actually run at each level.

What each grade means

| Grade | IEC Name                       | On Board  | In Practice                                                                                                                           |
|-------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
| GoA 0 | On-sight operation             | Driver    | The driver drives by line of sight, as on a street tram. No automatic protection of the movement.                                     |
| GoA 1 | Non-automated train operation  | Driver    | The driver drives; ATP supervises and intervenes. The baseline for any protected railway.                                             |
| GoA 2 | Semi-automated train operation | Driver    | ATO starts and stops the train inside the ATP envelope; the driver closes the doors and owns disruption handling. <b>The US norm.</b> |
| GoA 3 | Driverless train operation     | Attendant | No driver. A member of staff rides the train to manage disruption and evacuation.                                                     |
| GoA 4 | Unattended train operation     | Nobody    | No operating staff required on board. Disruption and evacuation fall to the control center and to automation.                         |

IEC 62290-1 responsibility matrix

| Function                       | GoA 0  | GoA 1 | GoA 2     | GoA 3      | GoA 4      |
|--------------------------------|--------|-------|-----------|------------|------------|
| Setting train in motion        | D      | D     | D         | Auto       | Auto       |
| Stopping train                 | D      | D     | D / ATP   | Auto / ATP | Auto / ATP |
| Door closure                   | D      | D     | Auto      | Auto       | Auto       |
| Obstacle / collision detection | Manual | ATP   | ATP / ATO | Auto       | Auto       |
| Operation during disruption    | D      | D     | D         | A          | C / Auto   |
| Passenger evacuation           | D      | D     | D         | A          | C / Auto   |

D DRIVER    A ATTENDANT ON BOARD    AUTO AUTOMATION (ATP / ATO)    C CENTRAL OPERATIONS CENTER    ATP AUTOMATIC TRAIN PROTECTION

Who runs at each grade

GoA 1–2 covers the large majority of US CBTC deployments, including NYCT’s converted lines and BART’s modernization: automation drives, the driver stays. GoA 3 keeps an attendant on board while removing the driving task, and is usually a stepping stone rather than an end state. GoA 4 runs on Paris Métro Line 14 (October 1998, the first modern metro at this grade), Copenhagen’s driverless lines, a segment of Singapore’s East Coast Line, JFK AirTrain (2003) and Honolulu Skyline (2023).

Specify the grade, not the adjective. “Automatic operation” and “driverless” mean different things to every stakeholder in the room. A GoA level plus an operating window — “GoA 3 with on-train staff at peak, unattended off-peak” — is unambiguous, and maps directly onto the six rows above. Note that many GoA 2 systems let the driver command a stop while ATP retains override authority.