# Summary table: IT & DK

**Increasing time response**

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| **Increasing time response** |  | | **ITALY** | **DENMARK** | |
| **DK1** | **DK2** |
| Ultra-fast response | | FRU (fast reserve unit) |  | FFR (fast frequency reserve) |
| Response   * Activation in 300 ms * Full power 1 s | Response (possibility to choose between these options)   * Activation in 1.3 s for 49.7 Hz threshold * Activation in 1.0 s for 49.6 Hz threshold * Activation in 0.7 s for 49.5 Hz threshold |
| Frequency deviation:   * 47.5 – 51.5 Hz * Deadband allowed (0-500 mHz, Te | Frequency deviation:   * 49.5/49.6/49.7 Hz thresholds. Activation when the threshold is crossed |
| Other   * Symmetrical regulation * Regulation must be maintained for 30 s, followed by a linear de-ramp (up to 900 s) | Other   * Regulation must be maintained for at least 5 seconds, followed by max. deactivation of 20%/s, or 30 s where no deactivation requirements are present * Reserve must be restored 15 min after activation |
| Primary reserve | FCR  FCR | Response   * ½ Power in 15 s * Full P in 30 s | Response   * ½ Power in 15 s, then full P in 30 s * Minimum linear response * Start-up delay: 2 s\* |  |
| Frequency deviation   * 47.5 – 51.5 Hz * Deadband allowed: +/- 10 mHz (hydroelectric), +/- 20 mHz (GT, CCGT) * Droop: 4% (hydroelectric), 5% (CCGT) | Frequency deviation   * Up to +/- 200 mHz * Deadband allowed: +/- 20 mHz |
| Other   * Reserve a minimum of 1.5% of efficient power * Regulation able to be maintained for minimum 15 min | Other   * Regulation able to be maintained for minimum 4 h |
| FCR – N |  |  | Response   * 63% in 60s, 95% in 3 min. * Minimum linear response * Start-up delay: 2.5 s |
| Frequency deviation   * Up to +/- 100 mHz * No deadband allowed |
| Other   * Regulation able to be maintained continuously * LER\*\* requirements apply |
| FCR – D (up/down) |  |  | Response\*\*\*   * Response in 2.5 s * Power: supply 86% of response in 7.5 s * Energy: supply energy equal to [3.2 s times sold power] in 7.5 s |
| Frequency deviation   * 49.9 – 49.5 Hz (up) * 50.1 – 50.5 Hz (down) |
| Other   * LER\*\* requirements apply |
| A-FRR (A-secondary) | | * P gradient not less than variation speed of signal by Terna | Response   * Full P in 15 min | Response   * Full P in 5 min |
| Frequency deviation   * Symmetrical reserve | Frequency deviation   * Symmetrical reserve | Frequency deviation   * Asymmetrical reserve (up/down regulation reserves procured as separate products) |
| Other   * Reserved power: +/- 15% Pmax (hydroelectric), max[+/- 10MW; +/-6% Pmax] (thermoelectric). To be considered as extra to primary reserve. * Regulation able to be maintained for minimum 2 h | Other   * Regulation able to be maintained continuously * Signal from Energinet | Other   * Regulation able to be maintained continuously * Signal from Energinet |

**LEGEND:**

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: Not present

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: Pilot project

Note: The table exclusively presents requirements arising from tender conditions. Technical specifications and requirements are intentionally excluded from this table for the sake of clarity and focus.

\* The delay is intended as maximum allowed delay at start-up, but the response must then be within the permissible area.

\*\* Units with Limited Energy Reservoirs: units that cannot supply full energy supply for four consecutive hours (FCR-N) or for two consecutive hours (FCR-D).

* 20% of capacity must be reserved for the service. The 20% cannot be sold on the market.
* Must have storage capacity of min. 1 hour (FCR-N) or 20 minutes (FCR-D) to handle long-lasting deviations.

\*\*\* Distinction between dynamic reserves and static reserves. The former need to supply inverse power at both activation and deactivation, while the latter only at activation. Static reserves need also to deactivate within 15 min.