

**FACT SHEET**

# ***FAST START***

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# 1. Concept

All Geoclima chillers can be configured with “Unit Fast Start” function enabled. This function allows quick unit restart after power failure provided control system remains powered during power outage.

## 2. Details

### 2.1 Hardware requirements

Unit must be ordered with “Fast Start” option which provides phase/mains monitoring relay to detect stable presence of main power supply.

Control system must be separately powered from external continuous supply or a backup supply must be selected for on-board installation: Ultracap module or classic lead-acid rechargeable battery UPS are available as options.

Maximum power loss duration is related to backup supply selection: Ultracap modules are available for 10 minutes (please note that Ultracap module count is limited by electrical panel size and also by the absorption of the auxiliary circuit which is powered) while Lead-Acid battery UPS are available with duration up to 1h30m.

### 2.2 Principle of operation

Turbocor compressors, if installed, are configured for Fast Start functionality.

Controller detects loss of power thru the monitoring relay and triggers “Unit Fast Start” Alarm. At power restore, it initiates a specific sequence:

- Unit is “locked” and all alarms are reset
- Unit is restarted following standard procedure (water valves, pumps, etc) and cooling demand is calculated depending on the duration of power outage.

- » A: quick (configurable time). Unit will resume with same cooling demand that was present before power failure. Quick mode can be disabled, forcing
- » B: short (configurable time and capacity). Unit will restart with fixed capacity



- » C: long, t > 600s. Unit will restart using standard procedure (basic PID or ECC, early capacity control)
- If unit is equipped with Turbocor compressors, a specific control sequence is performed to achieve the quickest restart timing
- Transition to “special” demand to standard PID control is performed smoothly.

*Note: ECC, early capacity control, is a load estimation based on the differential between LWT (leaving water temperature = chilled water outlet) setpoint and PWT (Plant Water temperature, plant supply temperature) compared to the nominal DeltaT of the unit.*

### 2.3 Performance summary

Up to 20 fast-starts per hour are available with Turbocor compressors. If compressors are allowed to restart ( > 25 seconds of power presence after blackout), it is recommended to run compressors for at least 1 minute before next cutting power again (eg: transfer back from genset to grid).

Up to 11 fast-start per hour are available with other kind of compressors without VSD/VFD (after 2 restarts, the controller will guarantee minimum time between 2 starts as per compressor manufacturer specification) while up to 12 fast-starts per hour are achievable with VSD/VFD.

### 3. Turbocor chillers

|   | Power outage time  |   |
|---|--------------------|---|
|   | Blackout (> 2 sec) | Brownout (< 2 sec)                      |
| Starts per hour   | 20                 | 20                                      |
| Chiller at >90% capacity time after power restoration (depending on spare capacity) | Approx. 180 s      | Approx. 35 s (compressor reset) + 180 s |

### 4. Other compressor technologies

| BITZER SCREW  | Power outage time            |                               |
|---|------------------------------|-------------------------------|
|   | Step / Stepless              | VSD / VFD                     |
| Starts per hour   | 4<br>Min. time ON: 5 minutes | 12<br>Min. time ON: 5 minutes |
| Chiller at >90% capacity time after power restoration (depending on spare capacity) | Approx. 200 s                | Approx. 120 - 140 s           |

| FRASCOLD SCREW  | Power outage time            |  |
|---|------------------------------|--|
|   |                              |  |
| Starts per hour   | 6<br>Min. time ON: 5 minutes |  |
| Chiller at >90% capacity time after power restoration (depending on spare capacity) | Approx. 200 s                |  |

| RECIPROCATING   | Power outage time            |  |
|-----------------|------------------------------|--|
|                 |                              |  |
| Starts per hour | 6<br>Min. time ON: 5 minutes |  |

| SCROLL          | Power outage time                         |  |
|-----------------|---|--|
|                 |   |  |
| Starts per hour | 11<br>Min. time between starts: 5 minutes |  |



For contacts and information, please visit

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