DNV·GL

# COMPONENT CERTIFICATE

| Certificate No.: | Issued: | Valid until: |
|---|---|---|
| CC-GCC-TR8-07703-0 | 2021-06-11 | 2026-06-10 |

Issued for:

## Basler AVR of type DECS-250 and DECS-150

Specified in Annex 2

Issued to:

## Basler Electric Company

12570 State Route 143
HIGHLAND IL 62249-1074
United States

According to:

**VDE-AR-N 4110:2018-11 Technical requirements for the connection and operation of customer installations to the medium voltage network**

**FGW TG8:2019-02 Technical Guidelines for Power Generating Units, Systems and Storage Systems as well as for their Components, Part 8**

Based on the documents:

| | |
|---|---|
| CR-GCC-TR8-07703-A065-0 | Certification report: Model validation GCC, dated 2021-06-11 |
| CR-GCC-TR8-07703-A066-0 | Certification report: Fault Ride-Through, dated 2021-06-11 |
| CR-GCC-TR8-07703-A067-0 | Certification report: Control behavior and other grid code requirements, dated 2021-06-11 |

AVR of type DECS-250 and DECS-150 comply with the requirements of VDE-AR-N 4110:2018-11 and the complementary documents stated in Annex 1 provided the conditions of Annex 1 are considered at project level. The simulation model and the measurement reports of the type tests are cited in Annex 3.

Changes of the system design, software or the manufacturer's quality system are to be approved by DNV GL.

**Hamburg, 2021-06-11**

**Für DNV GL Renewables Certification**

**Dr. Bente Vestergaard**
Director and Service Line Leader Type and Component Certification

DAkkS Deutsche Akkreditierungsstelle D-ZE-11053-01-00

By DAkkS according DIN EN IEC/ISO 17065 accredited Certification Body for products. The accreditation is valid for the fields of certification listed in the certificate.

**Hamburg, 2021-06-11**

**Für DNV GL Renewables Certification**

i.A. S. Ben Saad

**Sofien Ben Saad**
Project Manager

**Conditions and assessment criteria**

## 1 Conditions

- Changes to the system design, software, simulation model or the manufacturer's quality system are to be approved by DNV GL.
- The parameters of the AVR are summarized in the Instruction Manuals provided by the manufacturer. The specified "default values" do not automatically meet the requirements according to the guidelines mentioned in Annex 1 section 2. If necessary, the settings must be adjusted and checked on a project level.
- The parameters for the AVR provide the setting for the reactive power control and FRT behaviour. The specified "default values" do not automatically meet the requirements according to the guidelines mentioned in Annex 1 section 2. If necessary, the settings must be adjusted and checked on a project level.
- The validity of this certificate requires that the manufacturer maintains and upholds a quality management system for its manufacturing facilities that is in accordance with ISO 9001.
- The default parameters of the simulation model do not automatically meet the requirements according to the guidelines mentioned in Annex 1 section 2. If necessary, the settings must be adjusted and checked on project level.
- Changes of the simulation model, system design (as stated in the certification reports CR-GCC-TR8-07703-A066 and CR-GCC-TR8-07703-A067), software or the manufacturer's quality system are to be approved by DNV GL.

**2 The assessment criteria and normative references for this certificate are:**

/A/ VDE-AR-N 4110:2018-11, Technische Regeln für den Anschluss von Kundenanlagen an das Mittelspannungsnetz und deren Betrieb (TAR Mittelspannung), VDE Verband der Elektrotechnik Elektronik Informationstechnik e.V., vom November 2018
(VDE-AR-N 4110 Technical requirements for the connection and operation of customer installations to the medium voltage network (TAR medium voltage), in the following: VDE-AR-N 4110)

/B/ Technische Richtlinie für Erzeugungseinheiten, -anlagen und Speicher sowie für deren Komponenten, Teil 3 (TR3): Bestimmung der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie für deren Komponenten am Mittel-, Hoch- und Höchstspannungsnetz, Fördergesellschaft Windenergie und andere Erneuerbare Energien (FGW), Revision 25, vom 01.09.2018
(Technical Guidelines for Power Generating Units, Systems and Storage Systems as well as for their Components, Part 3 (TG3): Determination of the Electrical Characteristics of Power Generating Units and Systems, Storage Systems as well for their Components in Medium., High- and Extra-High Voltage Grids (in the following: FGW TG3)

/C/ Technische Richtlinie für Erzeugungseinheiten, -anlagen und Speicher sowie für deren Komponenten, Teil 8 (TR8): Zertifizierung der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie für deren Komponenten am Stromnetz, Fördergesellschaft Windenergie und andere Erneuerbare Energien (FGW), Revision 9, vom 01.02.2019
(Technical Guidelines for Power Generating Units, Systems and Storage Systems as well as for their Components, Part 8 (TG8): Certification of the Electrical Characteristics of Power Generating Units and Systems, Storage Systems as well as for their Components on the grid (in the following: FGW TG8)

/D/ Technische Richtlinie für Erzeugungseinheiten und -anlagen, Teil 4 (TR4): Anforderungen an Modellierung und Validierung von Simulationsmodellen der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie deren Komponenten, Fördergesellschaft Windenergie und andere Erneuerbare Energien (FGW), Revision 9, vom 01.02.2019
(Technical Guidelines for Power Generating Units and Systems, Part 4 (TG4): Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems, Storage Systems as well as their Components (in the following: FGW TG4)

**Description and technical data of the component**

## 1 Description of the component

Basler AVR of type DECS-250 and DECS-150 are intended for synchronous generator or synchronous motor applications. They control the machine output through the application of regulated DC excitation power to the exciter field. The level of excitation power is based on the monitored voltage and current, and a regulation setpoint established by the user. The type DECS-250 and DECS-150 have a different range of typical generators the AVR is used for.

The quite extensive tables on parameters and setting ranges can be found in the detailed manuals, which are therefore to be considered as an appendix to the certification report (CR-GCC-TR8-07703-A067-0).

The electrical data of Basler AVR of type DECS-250 and DECS-150 are summarized in the following section.

## 2 Technical data and main components

### 2.1 General data

| Type | DECS-250 | DECS-150 |
|---|---|---|
| Range of typically generators the AVR is used for: | 300 kW- 50 MW | 150 kW- 2MW |
| Aux. supply AC Nominal voltage: | 56-70, 100-139, 190-277 Vac | 100 -139 Vac or 190-277 Vac |
| DC nominal voltage (min/ max): | 125 or 250 Vdc | 125 or 250 Vdc |
| Desired Nominal Excitation Power Voltage | 32 Vdc or 63 Vdc or 125 Vdc | 63 Vdc or 125 Vdc |
| Machine frequency Measurement range f: | 50 or 60Hz | 50 or 60Hz |
| Measuring voltage: | 100/120 Vac ±10%<br>200/240 Vac ±10%<br>400/480 Vac ±10%<br>600 Vac ±10% | 100/120 Vac ±10%<br>200/240 Vac ±10%<br>400/480 Vac ±10%<br>600 Vac ±10% |
| Measuring current: | 1 or 5 Aac nominal | 1 or 5 Aac nominal |
| Software version:*) | 1.06.YY | 2.04.YY |

*) The firmware is H.XX.YY where H is the hardware compatibility. XX is feature compatibility (in this case adding the German Grid code features incremented this number). YY is minor updates for cosmetic, error correction, and other reasons. The manufacturer confirms that changes to the last two digits of the software, marked with "YY", are only minor changes with no influence on the electrical behaviour. All other changes are checked and confirmed by DNV GL.

## 2.2 Operation Power

### 2.2.1 Operation Power DECS 250

| Excitation Power | 32 Vdc | 63 Vdc | 125 Vdc |
|---|---|---|---|
| Input Power configuration | 1- or 3-phase | 1- or 3-phase | 1- or 3-phase |
| Nominal Input Voltage | 60 Vac | 120 Vac | 240 Vac |
| Full Load Continuous Voltage | 32 Vdc | 63 Vdc | 125 Vdc |
| Full Load Continuous Current | 15 Adc (20 Adc up to 55°C (131°F)) | | |
| Minimum Residual Voltage for Buildup | 6 Vac | | |
| Operating Power Input Burden at 15 Adc Excitation Output | 780 VA | 1,570 VA | 3,070 VA |
| Operating Temperature at 15 Adc Excitation Output | –40 to +70°C (–40 to +158°F) | | |
| Operating Power Input Burden at 20 Adc Excitation Output | 1,070 VA | 2,100 VA | 4,170 VA |
| Operating Temperature at 20 Adc Excitation Output | –40 to +55°C (–40 to +131°F) | | |

### 2.2.2 Operation Power DECS 150

| Excitation Power | 63 Vdc | 125 Vdc |
|---|---|---|
| Input Power configuration | 1- or 3-phase | 1- or 3-phase |
| Nominal Input Voltage | 120 Vac/125 Vdc | 240 Vac/250 Vdc |
| Full Load Continuous Voltage | 63 Vdc | 125 Vdc |
| Full Load Continuous Current at 70°C Ambient Temperature | 7A | |
| Full Load Continuous Current at 55°C Ambient Temperature | 10 A | |
| Minimum Residual Voltage for Buildup | 6 Vac | |
| Operating Power Input Burden at 7 Adc Excitation Output | 698 VA<br>540 W | 1,610 VA<br>1,025 W |
| Operating Temperature at 10 Adc Excitation Output | 980 VA<br>770 W | 2,248 VA<br>1,475 W |
| Operating Power Input Burden at 7 Adc Excitation Output | –40 to +70°C (–40 to +158°F) | |
| Operating Temperature at 10 Adc Excitation Output | –40 to +55°C (–40 to +131°F) | |

## 2.3 Generator and Bus Voltage Sensing

| DECS-250 | DECS-150 |
|---|---|
| Type: 1-phase or 3-phase–3-wire | Type: 1-phase or 3-phase–3-wire |
| Burden: <1 VA per phase | Burden: <1 VA per phase |
| Terminals: | Terminals: |
| Generator Voltage Sensing: E1, E2, E3 | Generator Voltage Sensing: E1, E2, E3 |
| Bus Voltage Sensing: B1, B2, B3 | Bus Voltage Sensing: B1, B2, B3 |
| Voltage Nominal Input Range: | Nominal Input Voltage Range: |
| 100 to 600 Vac, ±10% | 100 to 600 Vac ±10% |
| **Generator Current Sensing** | |
| *Configuration:.*4 inputs: A-, B-, C-phase, and cross-current compensation CT input | *Configuration:* 4 inputs: A-, B-, C-phase, and cross-current compensation CT input |
| *Type:* 1-phase (B-phase), 1-phase with cross-current compensation, 3-phase, 3-phase with cross-current compensation | *Type*: 1-phase (B-phase), 1-phase with cross-current compensation, 3-phase, 3-phase with cross-current compensation |
| *Range:* 1 Aac or 5 Aac nominal | *Range*: 1 Aac or 5 Aac nominal |
| *Frequency:* 50/60 Hz | *Frequency*: 50/60 Hz |
| *Burden:* | *Burden* |
| 1 Aac Sensing: <5 VA | 1 Aac Sensing: <0.1 VA |
| 5 Aac Sensing: <10 VA | 5 Aac Sensing: <0.3 VA |
| *Terminals:* | *Terminals* |
| A-Phase: CTA+, CTA– | A-Phase: IA+, IA– |
| B-Phase: CTB+, CTB– | B-Phase: IB+, IB– |
| C-Phase: CTC+, CTC– | C-Phase: IC+, IC– |
| Cross-Current Compensation: CCCT+, CCCT– | Cross-Current Compensation: CC+, CC– |
| **Accessory Inputs** | |
| *Current Input* | *Current Input* |
| Range: 4 to 20 mAdc | Range: 4 to 20 mAdc |
| Burden: Approximately 500 Ω | Burden: Approximately 150Ω |
| Terminals: I+, I– | Terminals: I+, I– |
| *Voltage Input* | *Voltage Input* |
| Range: –10 to +10 Vdc | Range: –10 to +10 Vdc |
| Burden: >20 kΩ | Burden: Approximately 100 kΩ |
| Terminals: V+, V– | Terminals: V+, V– |
| **Metering Accuracy** | |
| Generator Voltage (each phase and average): ±1% of rated | - |
| Bus Voltage: ±1% of rated | |
| Generator and Bus Frequency: ±0.1 Hz of rated | |
| Generator Line Current: ±1% of rated | |
| Generator Apparent, Active, and Reactive Power: ±1% of rated | |
| Power Factor: ±0.02 | |
| Field Current and Voltage: 1% of rated | |
| Accessory Input: ±1% of rated | |

## 2.4 Contact In- and outputs

| DECS-250 | DECS-150 |
|---|---|
| **Contact Inputs** | |
| Type: Dry contact, accept PLC open-collector outputs<br>Interrogation Voltage: 12 Vdc<br>Terminals:<br>Start: START, COM A<br>Stop: STOP, COM A<br>14 x Programmable Input: IN, COM A/B | Type: Dry contact<br>Interrogation Voltage: 12 Vdc<br>Terminals:<br>8 x Programmable Input: IN, COM |
| **Contact Outputs** | |
| Make and Break Ratings (Resistive)<br>24 Vdc: 7.0 Adc; 48 Vdc: 0.7 Adc; 125 Vdc: 0.2 Adc<br>120/240 Vac: 7.0 Aac<br>Carry Ratings (Resistive)<br>24/48/125 Vdc: 7.0 Adc<br>120/240 Vac: 7.0 Aac | General Purpose Rating: 7 A, 24 Vdc/240 Vac<br>Pilot Duty Rating: 2 A, 240 Vac (The load must be in parallel with a diode rated at least three times the coil current and three times the coil voltage.) |
| *Terminal Assignments*<br>Watchdog: WTCHD1, WTCHD, WTCHD2<br>11 x Relay Output : RLY , RLY | *Terminal Assignments*<br>Watchdog: WD1, WD2, WD3<br>Relay Output 1: OC1, OC1<br>Relay Output 2: OC2, OC2 |

## 2.5 Field Power Output

| DECS-250 | DECS-150 |
|---|---|
| Continuous Rating: 15 Adc (20 Adc up to 55°C (131°F))<br>Terminals: F+, F–<br>**Minimum 10-Second Forcing Output Rating**<br>60 Vac Input: 50 Vdc, 30 Adc<br>120 Vac Input: 100 Vdc, 30 Adc<br>240 Vac Input: 200 Vdc, 30 Adc<br>**Minimum Field Resistance**<br>32 Vdc Application: 2.13 Ω (1.6 Ω for 20 Adc up to 55°C (131°F))<br>63 Vdc Application: 4.20 Ω (3.15 Ω for 20 Adc up to 55°C (131°F))<br>125 Vdc Application: 8.33 Ω (6.25 Ω for 20 Adc up to 55°C (131°F)) | Continuous Rating: 7 Adc (70°C ambient) or 10 Adc (55°C ambient)<br>Terminals: F+, F–<br>**Minimum 10-Second Forcing Output Rating**<br>120 Vac Input: 100 Vdc, 11 Adc<br>240 Vac Input: 200 Vdc, 11 Adc<br>**Minimum Field Resistance**<br>63 Vdc Application: 9 Ω<br>125 Vdc Application:18 Ω |

## 2.6 Communication Ports

**DECS-250**

**Universal Serial Bus (USB)**
Interface: USB type B port
Location: Front panel

**RS-232**
Type: RS-232 (for external autotracking)
Interface: DB-9 connector
Location: Right side panel

**RS-485**
Type: RS-485, half duplex
Interface: Spring type terminals
Location: Left side panel
Terminals: RS-485 A, B, C

**Ethernet, Copper (style xxxxx1x)**
Type: 100Base-T copper
Interface: RJ45 jack
Location: Right side panel

**Ethernet, Fiber Optic (style xxxxx2x)**
Type: 100Base-FX, multimode
Interface: ST type connectors for RX and TX bnc style male connectors
Maximum Length (Half-Duplex): 1,310 ft. (399 m)
Maximum Length (Full-Duplex):6,600 ft. (2,011 m)
Location: Right side panel

**Controller Area Network (CAN)**
Type: SAE J1939 message protocol
Interface: Spring (style xxxSxxx) or compression (style xxxCxxx) type terminals
Location: Right side panel
Terminals: CAN 1 H, L, SH
CAN 2 H, L, SH
Differential Bus Voltage: 1.5 to 3 Vdc
Maximum Voltage: –32 to +32 Vdc
Communication Rate: 250 kb/s

**DECS-150**

**Universal Serial Bus (USB)**
Interface: USB type B port
Location: Front panel (style xxS2V) or Rear panel (style xxS1V)

**Ethernet**
Type 10BASE-T/100BASE-TX copper
Interface: RJ45 jack
Location: Rear panel

**Controller Area Network (CAN)**
Type SAE J1939 message protocol
Interface: Spring type terminals
Location: Rear panel
Terminals: CAN 2 H, L, SH
Communication Rate: 250 kb/s

## 2.7 Regulation

### DECS-250

**FCR Operating Mode**
Setpoint Range: 0 to 18 Adc, in increments of 0.1%
Regulation Accuracy: ±1.0% of the nominal value for 10% of the power input voltage
change or 20% of the field resistance change. Otherwise, ±5.0%

**FVR Operating Mode**
Setpoint Range: 0 to 270 Vdc, in increments of 0.1%
Regulation Accuracy: ±1.0% of the nominal value for 10% of the power input voltage
change or 20% of the field resistance change. Otherwise, ±5.0%

**AVR Operating Mode**
Setpoint Range: 70 to 120% of rated generator voltage, in increments of 0.1%
Regulation Accuracy: ±0.25% over load range at rated PF with constant generator
frequency and ambient temperature
Steady-State Stability: ±0.25% at rated PF with constant generator frequency and ambient temperature
Temperature Drift: ±0.5% between 0 and 40°C at constant load and generator
frequency

**Var Operating Mode**
Setpoint Range: –100% (leading) to +100% (lagging) of the generator nominal
apparent power in increments of 0.1%
Regulation Accuracy: ±2.0% of the nominal generator

**Power Factor Operating Mode**
Setpoint Range: 0.5 to 1.0 (lagging) and –0.5 to -1.0 (leading), in increments of 0.005
Regulation Accuracy: ±0.02 PF of the PF setpoint for the real power between 10 and 100% at the rated frequency

### DECS-150

**FCR Operating Mode**
Setpoint Range: 0 to 7 Adc (70°C ambient) or 0 to 10 Adc (55°C ambient) in 0.1 Adc increments
Regulation Accuracy: ±5.0%

**AVR Operating Mode**
Setpoint Range: 70 to 120% of rated machine voltage, in increments of 0.1%
Regulation Accuracy: ±0.25% over load range at rated PF with constant machine
frequency and ambient temperature
Steady-State Stability: ±0.25% at rated PF with constant machine frequency and ambient temperature
Temperature Drift: ±0.5% between 0 and 40°C at constant load and machine frequency

**Var Operating Mode**
Setpoint Range: −100% (leading) to +100% (lagging) of the machine nominal
apparent power in increments of 0.1%
Regulation Accuracy: ±2.0% of the nominal machine apparent power rating at the rated machine frequency

**Power Factor Operating Mode**
Setpoint Range: 0.5 to 1.0 (lagging) and −0.5 to −1.0 (leading), in increments of 0.01
Regulation Accuracy: ±0.02 PF of the PF setpoint for the real power between 10 and 100% at the rated frequency

## 2.8 Overexcitation Limiting

| DECS-250 | DECS-150 |
|---|---|
| **Off-Line Overexcitation Limiting** | |
| **High Current Level**<br>*Pickup*<br>Range: 0 to 40 Adc<br>Increment: 0.1 Adc<br>*Time*<br>Range: 0 to 10 s<br>Increment: 1 s | **High Current Level**<br>*Pickup*<br>Range 0 to 11 Adc (70°C ambient) or 0 to 14 Adc (55°C ambient)<br>Increment: 0.01 Adc<br>*Time*<br>Range: 0 to 10 s<br>Increment: 1 s |
| **Low Current Level**<br>*Pickup*<br>Range: 0 to 20 Adc<br>Increment: 0.1 Adc | **Low Current Level**<br>*Pickup*<br>Range 0 to 7 Adc (70°C ambient) or 0 to 10 Adc (55°C ambient)<br>Increment: 0.01 Adc |
| **On-Line Overexcitation Limiting** | |
| **High Current Level**<br>*Pickup*<br>Range: 0 to 40 Adc<br>Increment: 0.1 Adc<br>*Time*<br>Range: 0 to 10 s<br>Increment: 1 s | **High Current Level**<br>*Pickup*<br>Range 0 to 11 Adc (70°C ambient) or 0 to 14 Adc (55°C ambient)<br>Increment: 0.01 Adc<br>*Time*<br>Range: 0 to 10 s<br>Increment: 1 s |
| **Medium Current Level**<br>*Pickup*<br>Range: 0 to 30 Adc<br>Increment: 0.1 Adc<br>*Time*<br>Range: 0 to 120 s<br>Increment: 1 s | |
| **Low Current Level**<br>*Pickup*<br>Range: 0 to 20 Adc<br>Increment: 0.1 Adc | **Low Current Level**<br>*Pickup*<br>Range 0 to 7 Adc (70°C ambient) or 0 to 10 Adc (55°C ambient)<br>Increment: 0.01 Adc |

## 2.9 Environment

| DECS-250 | DECS-150 |
|---|---|
| **Temperature**<br>Operating Range: –40 to +70°C (–40 to +158°F)<br>Storage Range: –40 to +85°C (–40 to +185°F) | **Temperature**<br>Operating Range:<br>7 Adc Continuous: –40 to +70°C (–40 to +158°F)<br>10 Adc Continuous: –40 to +55°C (–40 to +131°F)<br>Storage Range: –40 to +85°C (–40 to +185°F) |
| **Humidity**<br>MIL-STD-705B, Method 711-1C | **Humidity**<br>Complies with MIL-STD-705B, Method 711-1C |
| **Salt Fog**<br>MIL-STD-810E, Method 509.3 | **Salt Fog**<br>Complies with IEC 60068-2-11 |

**Type tests and validated simulation model**

## 1 Type tests of the component

The measurements were performed on a Basler AVR of type DECS-250 and DECS-150 at customer facilities in in Highland IL, United States. The components and the software versions are described in Annex 2 of this certificate.

The measurement results are documented in the following measurement reports. Specific results can be found in the certification reports CR-GCC-TR8-07703-A067-0 and CR-GCC-TR8-07703-A066-0 also providing details on the assessment.

| Measurement report no. | Extract no. | Content |
|---|---|---|
| 10200683-A-1-A | - | Control behaviour |
| 10200683-A-2-A | - | Fault ride-through tests |
| 10200683-A-3-A | - | Fault ride-through tests |

All tests according to FGW TG3 /B/ were assessed according to FGW TG8 /C/ and in compliance with VDE-AR-N 4110 /A/.

## 2 Validated simulation model of the component

The validated simulation model of the component is contained in the following tables. In order to identify the file of the simulation model clearly, a check sum (MD5) is used.

The following table gives an overview of the open model and open library assessed.

| File name | Check sum (MD5) |
|---|---|
| Basler_FRT_modelDNV_2019faster.slx 1) | 48FC259032D4DB51FE95908AED03DD08 |
| PowerControlExport2019b.slx 2) | 38BD834A88BEF2CEE6F0AEA2C0E90665 |
| DECS250_2019b.slx | FD1DDAE90A7CDF21B68E8B1F335EDF51 |
| basler_blocks_2019b.slx | D34087903C5668350F25979F0B53387E |
| basler_blocks_DNV_2019b.slx | 65FF25E4E1FB60024C9FF63403960330 |

1) only the interconnection within the Subsystem "AVR" excluding the Exciter is validated, the functional part is within the libraries

2) Used for assessment, not within the certification scope

Basler Electric Company has provided protected models as listed in the table below, which do include the same libraries used for model validation. Those files may also be used.

| File name | Check sum (MD5) |
|---|---|
| AVR.slxp | 4A35924B0055FE1CDA0C9D4C96392FCA |
| FreqComp.slxp | 7F7E2AA8BB26969DA154159049D22CDF |
| Load_Compensation.slxp | D35FBD92F6E21FAEC999E1683E30A689 |
| LVRT.slxp | B98048A288A8B587D66BC59B63950646 |
| PSS.slx | 9879BD74F752180087629432C91EE103 |
| SoftStart.slxp | 0F66E5DD022AD7BBF13EB605578CF446 |
| UEL.slxp | 5308865F016AC547ED0FCB9F8C5EE3A7 |
| UFLimiter.slxp | 03954A12D9C5D1773B665D4A9DF3DE6A |
| VarController.slxp | AC5EBFC04622397E6B60D39AD188DA85 |

This simulation model was validated according to FGW TG4 /D/. Further explanations to the simulation model are contained in the certification report CR-GCC-TR8-07703-A065-0.