ACF-10-600 Inverter System

AC Induction
Fan Cooled
1,000V Class
400A Continuous—600A Peak Current

Features

- AC Induction Motor Controller with Auxiliary Inverter
- Built in Dump Chopper (Regen Protection Module)
- Built in DC bus voltage Pre-charge
- Encoder feedback
- Variable Switching Frequency—increases with motor RPM (2 to 9kHz — double edge PWM)
- Smart OV, UV and Temperature Based Power Limiting
- Discontinuous Pulse Width Modulation (DPWM)
- Adaptive Torque Control—no look-up tables required
- CAN-bus Control and Diagnostics
- IP66 rated enclosure
- Also available for PM Motor systems

System Specifications

Description	Specification		
	Min	Nom	Max
DC Bus Voltage (VDC)	200	1000	1100
Control Power	18	24	36
Weight lb [kg]	-	325 [147.4]	-
Ambient Operating Temperature Range (°C)	-20		60

Traction Inverter Specifications

Description	Specification		
	Min	Nom	Max
Output Voltage (VAC RMS)	0	500	0.7 x DC Input Voltage AC_{RMS}
Continuous Output Current (A AC RMS)	-	330	400
Short-time Output Current (A AC RMS) (1 minute)	-	500	600
Frequency Range (Hz)	0	60	200

Dump Chopper Specifications

Description	Specification		
	Min	Nom	Max
Output Voltage (VDC)	0	-	DC Input Voltage
Continuous Output Current (A DC)	-	80	100
Short-time Output Current (A DC) (1 minute)	-	160	200

Auxiliary Inverter Specifications

Description	Specification		
	Min	Nom	Max
Output Voltage (VAC RMS)	0	240	0.7 x DC Input Voltage AC_{RMS}
Continuous Output Current (A AC RMS)	-	30	<106
Short-time Output Current (A AC RMS) (1 minute)	-	110	<106
Frequency Range (Hz)	0	60	200

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Controller Description

The AFC-10-600 system consists of a traction inverter controller, a DC dump chopper controller, and an auxiliary inverter controller.

Traction Inverter

The traction inverter is designed to control an induction motor with an encoder-based speed sensor. It is a power converter designed to operate over a DC bus voltage range of 200V to 1100V. The traction inverter features an advanced control algorithm capable of operating near the breakdown torque of the motor.

The motor stator current is controlled by applying pulses of the DC bus voltage directly to the T1, T2, and T3 terminals. The pulse widths and the polarity of the pulses are varied in accordance with the voltage required by each terminal. This requirement is determined by high-speed current regulators which continuously seek to maintain the output current levels required to maintain the motor flux at the correct level and motor torque at a level consistent with the traction reference. The mean current drawn from the DC bus is proportional to the average duty cycle of the pulses as well as the power factor of the stator current. This means that the controller can supply the stator with a very large amount of current at low speed while consuming a relatively small amount of current from the DC bus. The motor controller also requires a position feedback signal from an encoder. Its purpose is to detect the change in rotor position used by the current regulators to position the stator current pattern to produce the correct flux and torque.

The traction controller can also operate very effectively as a dynamic brake down to very low speeds. It achieves this by rearranging the current pattern in the stator so that negative torque is produced. This change occurs as a seamless transition when the polarity of the traction reference is reversed.

DC Dump Chopper

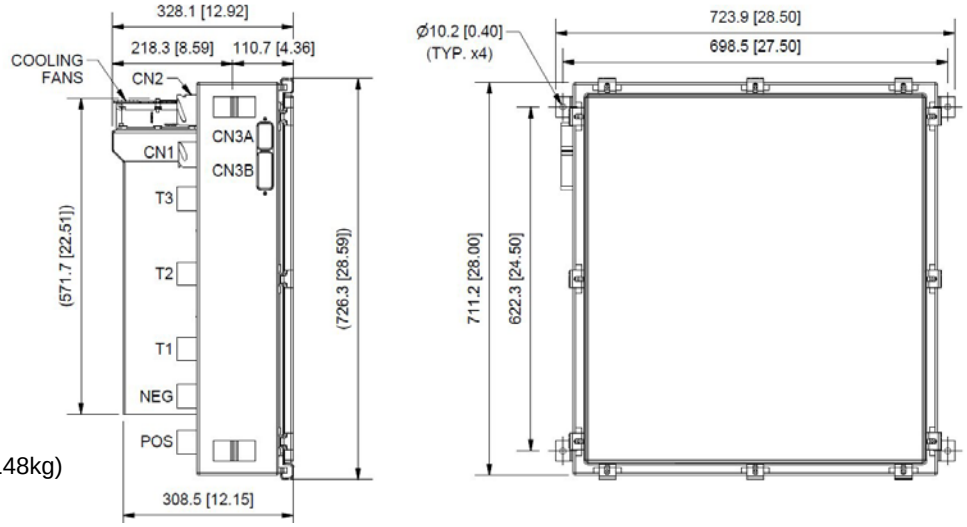
Energy recovered from the traction motor during dynamic braking is returned to the DC bus.

If a traction battery is used and is susceptible to charge, most of the braking energy will automatically be recovered in the form of opportunity battery charging, once the auxiliary load demand is met.

When the DC bus voltage exceeds the Dump Chopper Voltage or Current Threshold, the DC Dump Chopper applies pulses of the DC bus voltage directly to the CN2 terminal. The Dump Chopper dissipates excessive energy into a load such as a power brake resistor grid (not included with the controller) to reduce the DC bus voltage and DC bus current to normal levels

3-Phase Auxiliary Inverter

The 3-phase auxiliary supply inverter, when enabled, applies pulses of the DC bus voltage directly to the CN1 terminals. The pulse width and the polarity of the pulses are varied in accordance with the voltage required by each terminal. This requirement is determined by the Auxiliary Frequency Reference and the Volts-per-Hertz (V/f) profile. The 3-Phase auxiliary supply may be used to operate 3-phase blower motors and fans if rated properly, but since the 3-phase AC output waveform is pulses of the DC bus voltage, the output at the CN1 terminal may need to be filtered externally to supply other types of loads.



Weight: 325lb (148kg)