AXPERT - *i-Sine*
ACTIVE FRONT - END CONVERTER

AMTECH
AMTECH ELECTRONICS (INDIA) LTD.
DRIVE FOR SUCCESS

Active Front-end Converter is an IGBT based AC to DC converter. It keeps supply side power factor to unity and supply current sinusoidal. AFC also regenerates the excessive power from DC link capacitor to grid side and so it is also popularly known as Regenerative Unit. A single unit of high capacity can also be used for multiple VFD (Variable Frequency Drive) of low capacity having common DC bus configuration.

Six pulse diode rectifier bridge is a basic building block of many products such as UPS, battery chargers, VFDs, DC drives etc., known as non-linear loads. They generate about 70...120 % current harmonic distortion at the input.

AFC reduces the current harmonic distortion level to < 5 %. It is a high quality product and meets the international power quality standards such as IEEE 519-2014.

AFC Benefits

- Feeds back the excess power to grid from regenerative loads, connected at the VFD output
- Reduces total harmonic distortion to draw sine wave current from the utility
- Stabilizes output DC voltage against mains and load fluctuations
- Improves power factor to unity
- Compatible with any VFD, useful in common DC applications

Target Applications

- Centrifuges
- Cranes and hoists
- Un-winders
- Paper machines
- Regenerative application
- Roller tables
- Test jigs for dynamometers, gears and motor test benches

"Feeds back excess power with improved quality"

Standard Specifications

Electrical																		
Input voltage/ frequency	380, 400, **415**, 440, 460, 480 VAC (-10 %, +5 %), 3-Phase, 3-Wire, 50 Hz (60 Hz optional) (±5 %)																	
Output voltage	600, 610, **620**, 660, 690, 720 VDC (according to input voltage), (+2 %)																	
AMT-AFC-XXX-4	018	022	030	037	045	055	075	090	110	132	160	200	250	315	355	400	450	500
Converter capacity (kVA)	22	25	36	43	50	61	83	101	122	144	176	219	273	341	388	438	492	546
Max. continuous rated current (A)	30	35	50	60	70	85	115	140	170	200	245	305	380	475	540	610	685	760
AFC current for 60 second (A)	36	42	60	72	84	102	138	168	204	240	294	366	456	570	648	732	822	912
Applicable VFD capacity (kW)	18.5	22	30	37	45	55	75	90	110	132	160	200	250	315	355	400	450	500
Weight (kg/lb)	50/110	52/114	55/121	55/121	60/132	65/143	195/430	210/463	225/496	250/551	300/661	335/738	360/794	410/904	Consult factory			
Frame size	A						B								Consult factory			
Control functions*																		
Control mode & method	Constant Voltage & Hysteresis current control																	
Input current distortion (% THD)	Less than 5 % (at 100 % load)																	
Input power factor	0.99 (at 100 % load & nominal voltage), better than 0.95 (at load of more than 30 %)																	
Regeneration mode	Yes (Automatic)																	
Max. switching frequency	5 kHz																	
Efficiency	Approx. 98 %																	
Operation specifications																		
Digital inputs	5-Programmable sequence inputs, sink / source and Active Close / Active Open selectable																	
Digital outputs	4-Programmable sequence outputs, open collector type																	
Potential free contacts	3-programmable relays:	1-NO, 1-NC for 5 A @ 240 Vac Programmable between 12 different options																
Programmable analog outputs	2-Programmable analog outputs AO1 & AO2: Voltage (0...10) V / Current (4...20) mA with settable Gain, Bias, Min. and Max. scaling																	
Soft-charge	Through resistor within 5 sec.																	
Auto start	Yes, AFC can start at power ON condition in local and serial mode.																	
Auto restart	Adjustable up to ten times for fault like Over current fault, Timed over current fault, Adjustable over current fault, DC bus over voltage fault, DC bus under voltage fault, Earth fault, Temperature fault, External fault, R-Phase Temp Fault, Y-Phase Temp Fault, B-Phase Temp Fault.																	
Display indications																		
Display and keypad module	Digital Operation Panel 128 x 64 Graphical LCD with white back light LED, 8-Key keypad, 3-Status indicating LED for Run, Stop and Fault; Real Time Clock.																	
	V_{LL}, THD_V, THD_A, Line Frequency, DC bus voltage, PF, DPF, kW, kWH import, kWH export, kWH net, kVA, kVAR, Source side current for each phase																	
Communication																		
Network connectivity	RS-485 for PC interface with Modbus-RTU protocol and Wi-Fi connectivity as standard. (DeviceNet, Profibus DP (Slave), CANopen, Ethernet, ControlNet are optional)																	
Protective specifications																		
Protective function	Over current						DC bus under voltage						External fault					
	Adjustable over current						Over temperature						Charging fault					
	Timed over current						Phase loss						EEPROM fault					
	DC bus over voltage						Ground fault											
Fault history	Last 20 faults with status at time fault occurred stored in memory																	
Electronic thermal overload	120 % Overload for 60 Seconds																	
Environment																		
Installation location	Indoor																	
Type of cooling	Forced Air Cooling																	
Ambient temperature	-15...45 °C (5...113 °F)																	
Storage temperature	-20...70 °C (-4...158 °F)																	
Audible noise	≤ 72 db @ 1.0 m (3 ft)																	
Altitude (above sea level)	1000 m (3300 ft) without derating, derate 1 % per 100 m (330 ft) above 1000 m (3300 ft)																	
Model derating with temperature	Above 45 °C (113 °F), derate the output current by 3 % /1 °C (1.8 °F) Maximum up to 55 °C (131 °F) temperature																	
Relative humidity	0...95 % max non condensing																	
Mechanical specifications																		
Color	RAL 7035 (for Frame B)																	
Dimensions in mm [inch] (W X D X H)	A = 310 X 360 X 900 [12.2 X 14.2 X 35.4], IP 00, Wall mounting B = 600 X 600 X 1995 [23.6 X 23.6 X 78.6], IP 31, Floor mounting																	
Reference standard																		
Harmonic	IEEE 519-2014, G5/4-1, GB/T 14549-93, IEC 61000-3-2, IEC 61000-3-4, IEC 61000-3-12																	
Safety	IEC 50178																	

* All performance specifications are valid at nominal ratings. Consult AMTECH for high power rating and line supply voltages 575 V or 690 V.

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