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 519-1992.

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

"Feeds back excess power with improved quality"

Standard Specifications

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	**045**	**055**	**075**	**090**	**110**	**132**	**160**	**200**	**250**	**315**
Converter Capacity (kVA)	45	55	75	90	110	132	160	200	250	315
Max. Continuous Rated Current (A)	70	84	115	137	170	200	245	304	380	475
AFC Current for 60 Seconds (A)	84	101	138	164	204	240	294	365	456	570
Applicable VFD Rating (kW)	45	55	75	90	110	132	160	200	250	315
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 more than 30% load)									
	Programmable between 0.95 leading to 0.95 lagging									
Regeneration mode	Yes (Automatic)									
Max. switching frequency	5 kHz									
Efficiency	Approx. 98%									
Mechanical Specifications										
Color	RAL 7035									
Protection class	IP 31									
Dimensions in mm [inch] (W x D x H)	500 x 370 x 1200 [19.7 x 14.6 x 47.2]		600 x 600 x 2000 [23.6 x 23.6 x 78.7]			800 x 600 x 2000 [31.5 x 23.6 x 78.7]		800 x 800 x 2000 [31.5 x 31.5 x 78.7]		
Weight in kg [lb]	130 [287]	150 [331]	300 [661]	330 [728]	400 [882]	450 [992]	475 [1047]	600 [1323]	680 [1500]	750 [1654]
Installation	Wall/Floor mounting		Floor mounting							
Operation Specifications										
Digital inputs	5-Programmable sequence inputs, sink/source changeable									
Digital outputs	4-Programmable sequence outputs, open collector type									
Potential free contacts	3-Programmable relays:		1-NO, 1-NC for 2A @ 240 VAC							
			Programmable between 10 different options							
Programmable analog outputs	2-Programmable analog current outputs IO1 & IO2: 4 ~ 20 mA									
Soft-charge	Within 5 seconds									
Auto start	Yes, AFC can start at power ON condition in local and serial mode									
Auto restart	Adjustable up to ten times for faults 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 temperature fault, Y-phase temperature fault, B-phase temperature fault									
Display Indications										
Display and keypad module	Total 80-Characters, 4-Line LCD panel, 8-Key keypad, 3-Status indicating LED for Run, Stop and Fault									
	V_{L-L}, THD_i, THD_v, 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 as standard, optional Profibus, Ethernet									
Protective Specifications										
Protective functions	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 ten faults stored in non-volatile memory with status at the time of fault									
Electronic thermal overload	120% overload for 60 seconds									
Environment										
Installation location	Indoor									
Type of cooling	Forced air cooling									
Ambient temperature	0°C (32°F) ~ 45°C (113°F), derate the output current by 3% /1°C (1.8°F) above 45°C (113°F), maximum up to 55°C (131°F) temperature									
Storage temperature	-20°C (-4°F) ~ 70°C (158°F)									
Audible noise	≤ 72 dB @1.0 m (3 ft)									
Altitude (above sea level)	1000 m (3300 ft) without derating, above this derate by 1% per 100 m (330 ft)									
Relative humidity	0 ~ 95% max non condensing									
Reference Standard										
Harmonic	IEEE 519-1992, G5/4-1, GB/T 14549-93, IEC 61000-3-2, IEC 61000-3-4									
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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