



Test Report: VFD-200C-230

200W General type Variable Frequency Drive with PFC function

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

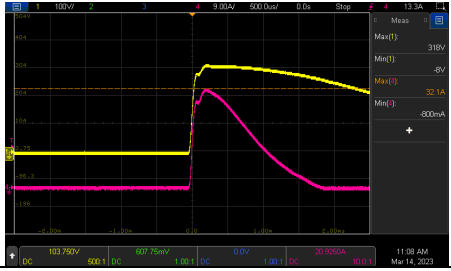
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	VOLTAGE RANGE(UVW)	3 ψ 0~240VAC Three phase line-to-line 0~240V, suit for 200-240V class motor	I/P : 90VAC 230VAC 264VAC O/P : 0~240VAC PWM Freq.:15KHz Ta : 25°C	V@ min load 0V~281.7V / 0.1A @ I/P = 90Vac 0V~281.8V / 0.1A @ I/P = 230Vac 0V~281.8V / 0.1A @ I/P = 264Vac V@ Derating load 28.5V~280.7V / derating load@ I/P = 90Vac 28.3V~280.8V / derating load @ I/P = 230Vac 28.6V~280.6V / derating load @ I/P = 264Vac
2	RATED CURRENT (A)	0.8A	I/P : 90VAC 230VAC 264VAC O/P : Rated output current PWM Freq.:15KHz Ta : 25°C	0.8A@90Vac 0.8A@230Vac 0.8A@264Vac
3	PEAK CURRENT	1.6A	I/P : 230 VAC O/P : 1.6A PWM Freq.:15KHz Ta : 25°C	TEST : OK
4	EFFICIENCY(Typ.)	92%	I/P : 230 VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	Eff : 92.09%
5	DC BUS VOLTAGE	DC BUS:380V \pm 5V DC BUS VOLTAGE SENSOR:2.5 \pm 0.05V	I/P : 230 VAC O/P: Rated output current PWM Freq.:15KHz Ta : 25°C	377.8V@DC BUS VOLTAGE SENSOR : 2.4935V

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED INPUT VOLTAGE	90VAC~264VAC	I/P : 87V~267V O/P : Full load PWM Freq.:15KHz Ta : 25°C	TEST : 83.6 V~267V
			I/P : HIGH-LINE+10V=274V O/P : FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON : 30 Sec OFF : 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK

2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 90 VAC ~264 VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	TEST : OK
3	POWER FACTOR (Typ.)	0.93/ 230VAC 0.99/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	PF = 0.9549@230Vac PF = 0.9946@115Vac
4	RATED INPUT CURRENT	230V/1.1 A 115V/2 A	I/P : (1) 230 VAC (2) 115 VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	1.07A@230Vac 1.95A @115Vac
5	INRUSH CURRENT(Typ.)	230V/50A COLD START	I/P : 230 VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	I = 32.1A/230V T50=740us/230V 
6	Leakage current	<2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	0.432mA

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	SHORT PROTECTION	SHORT ANY TWO PHASE OUTPUT 1 HOUR NO DAMAGE Protection type : Shut down o/p voltage, re-power on to recover Inverter fault signal(Short circuit/OCP, PIN7 of CN93). TTL input: Normal: High(>3V); Abnormal: Low(<0.5V)	I/P : 264VAC I/P : 90VAC O/P : Short Any Two Phase Output Ta : 25°C	Test Result : O/P shut down PROTECTION TYPE : re-power on FAULT SIGNAL Normal:3.46V Abnormal:0V
2	OVER TEMPERATURE PROTECTION	Protection type : auto-recovery Built-in 10KΩNTC for sensing IGBTs operating temperature. (TSM2A103F34D1R (Thinking Electronic), PIN2 of CN93)	I/P : 264VAC I/P : 90VAC O/P : Full load PWM Freq.:15KHz Ta : 25°C	Test Result : O/P shut down Protection type : Auto-Recovery

3	OVER LOAD PROTECTION	Protection type : Shut down o/p voltage, re-power on to recover Built-in 100mΩ low-side shunt resistor (each phase), (PIN4~6 of CN93)	I/P : 230 VAC O/P : max. current@rated motor speed Ta : 25°C	Test Result : 200% OK · 250.2% shut down PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
4	OVER VOLTAGE PROTECTION	When the voltage of the DC bus exceed 420V, the PWM input signal must shut down for protection.	I/P : 230 VAC O/P: Rated output current PWM Freq.:15KHz Ta : 25°C	TEST shut down for protection re-power on

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	VCC	15V / 0.1A Rippl:1000mVp-p	I/P : 230 VAC O/P: Full load PWM Freq.:15KHz Ta : 25°C	14.66V / 441mV p-p

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 · Q2 Rated : 11A/ 600 V	I/P : High-Line +3V =267 V AC ON/OFF O/P : (1)Full Load (2)Output Short (UVW) (3)0%→400% Load Ta:25°C	(1) 432V (2) 432V (3) 429V
2	P.F.C DIODE	D6 Rated : 25A/650V	I/P : High-Line +3V =267 V AC ON/OFF O/P : (1)Full Load (2)Output Short (UVW) Ta:25°C	(1) 392V (2) 403V
3	IGBT	Q901(High side)/Q904(Low side) Rated : 6A/600V	AC ON/OFF I/P : High-Line +3V =267 V O/P : (1)Full Load (2)Output Short (UVW) (3)0%→400% Load. (4) NO LOAD Ta:25°C	VCE (Q901) (1) 411V (2) 411V (3) 406V (4) 386V VCE (Q904) (1) 404V (2) 404V (3) 404V (4) 389V

4	Input Capacitor Voltage	C5 Rated: 120 μ /420V	I/P : High-Line +3V =267V O/P : (1)Full Load input on/off (2)Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta : 25°C	(1) 397V (2) 377V (3) 394V (4) 397V
5	Control IC Voltage Test	PFC IC U1 Rated : 10.5V~ 25V	AC ON/OFF I/P : High-Line +3V =267 V O/P : (1)FULL LOAD (2) Output Short (UVW) (3)0~200% (4)O.V.P. (5)NO LOAD Ta : 25°C	(1) 15.0V (2) 15.0V (3) 15.0V (4) 15.0V (5) 15.0V
		O/P IC U901 Rated : 13V~ 17.5 V	AC ON/OFF I/P : High-Line +3V =267 V O/P : (1)FULL LOAD (2) Output Short (UVW) (3) 0~200% (4)O.V.P. (5)NO LOAD Ta : 25°C	(1) 15.9V (2) 16.0V (3) 15.9V (4) 16.0V (5) 15.6V
		PRIMARY VCC U932 Rated : 600V	AC ON/OFF I/P : High-Line +3V =267 V AC ON/OFF O/P : (1)Full Load (2)Output Short (UVW) Ta : 25°C	(1) 423V (2) 420V

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-FG : 2KVAC/min	I/P-FG : 2.4 KVAC/min Ta : 25°C	I/P-FG : 3.29mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-FG : 500VDC>100M Ω	I/P-FG : 600 VDC Ta : 25°C	I/P-FG : 48G Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	40A / 2min Ta : 25°C	3m Ω

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 ■ CLASS A	I/P : 230VAC/50HZ O/P : motor Ta : 25°C	■ PASS □ FAIL
2	CONDUCTION	■ EN55032 □ EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : motor Ta : 25°C	Test by certified Lab
3	RADIATION	■ EN55032 □ EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : motor Ta : 25°C	Test by certified Lab
4	E.S.D	EN61000-4-2 ■ INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : motor Ta : 25°C	■ CRITERIA A □ CRITERIA B
5	E.F.T	EN61000-4-4 ■ INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : motor Ta : 25°C	■ CRITERIA A □ CRITERIA B
6	SURGE	IEC61000-4-5 ■ LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	■ CRITERIA A □ CRITERIA B
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : VFD-200C-230 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C		

		NO	Position	ROOM AMBIENT Ta= 25 °C	HIGH AMBIENT Ta= 50 °C
		1	LF1	54.8°C	76.3°C
		2	ZNR1	55.3°C	76.0°C
		3	C11	58.1°C	78.5°C
		4	RTH3	87.4°C	102.5°C
		5	BD1	52.7°C	73.8°C
		6	R6	60.1°C	81.6°C
		7	C933	56.5°C	78.1°C
		8	C5	55.2°C	76.7°C
		9	L931	59.7°C	81.4°C
		10	C934	53.0°C	75.7°C
		11	D931	61.9°C	83.4°C
		12	Q903	57.1°C	80.0°C
		13	Q902	59.5°C	82.8°C
		14	Q906	61.3°C	84.3°C
		15	Q901	55.7°C	78.6°C
		16	Q905	60.1°C	83.1°C
		17	Q904	58.4°C	81.2°C
		18	RTH4	50.5°C	73.1°C
		19	U901	48.3°C	70.4°C
		20	U1	53.5°C	74.7°C
		21	Q1	57.5°C	78.9°C
		22	D6	50.0°C	71.4°C
		23	U903	47.9°C	69.7°C
		24	Q2	55.4°C	76.9°C
		25	U932	55.4°C	77.4°C
		26	D932	53.3°C	74.6°C
		27	R914	57.6°C	79.7°C
		28	L2	59.6°C	80.4°C
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/100VAC O/P : 100%LOAD Ta= -35°C	TEST : OK
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C/95 %R.H NO DAMAGE		I/P : 272 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK
4	STORAGE TEMPERATURE TEST	-40~85°C		1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC	
5	THERMAL SHOCK TEST	-30~50°C		1. Thermal shock Temperature : -35°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	

6	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C
7	CAPACITOR LIFE CYCLE	SUPPOSE C933 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 288400HRS (2) 64531HRS (3) 83997HRS (4) 109283HRS
8	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	Yuwei	Liutt	Wangdz

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