

DOBLE F6150SV TECHNICAL SPECIFICATIONS

The F6150sv line of Power System Simulators is designed for simulation tests on relay and protection schemes. There are four distinct models for your specific testing needs. The F6150sv premier model features a total of 12 sources at maximum power output.

CONVERTIBLE AMPLIFIERS				
Current Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
6 X 0.5, 1.0 A (L-N)	6 X 0.354, 0.707 A	6 X 75 VA / 75 W	0.0001 A	0.0001 A
3 X 0.5, 1.0, 2.0 A (L-N)	3 X 0.354, 0.707, 1.41 A	3 X 150 VA / 150 W	0.0001 A	0.0001 A
1 X 1.5, 3.0, 6.0 A (L-N) S1 S2 S3	1 X 1.06, 2.12, 4.24 A S1 S2 S3	1 X 450 VA / 450 W S1 S2 S3	0.001 A	0.001 A
Current Transient Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
6 X 0.75, 1.5 A (L-N)	6 X 0.53, 1.06 A	6 X 97.5 VA / 97.5 W	0.0001 A	0.0001 A
3 X 0.75, 1.5, 3.0 A (L-N)	3 X 0.53, 1.06, 2.12 A	3 X 195 VA / 195 W	0.0001 A	(0.0001 A) @ 0.53, 1.06 A (0.001 A) @ 2.12 A
1 X 2.25, 4.5, 9.0 A (L-N) S1 S2 S3	1 X 1.59, 3.18, 6.36 A S1 S2 S3	1 X 585 VA / 585 W S1 S2 S3	0.001 A	0.001 A
Voltage Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
6 X 75, 150 V (L-N)	6 X 106, 212 V	6 X 75 VA / 75 W	0.01 V	(0.01 V) @ 106 V (0.1 V) @ 212 V
3 X 75, 150, 300 V (L-N)	3 X 106, 212, 424 V	3 X 150 VA / 150 W	0.01 V	(0.01 V) @ 106 V (0.1 V) @ 212, 424 V
1 X 150, 300, 600 V (L-L) S1 & S2	1 X 212, 424, 848 V S1 & S2	1 X 300 VA / 300 W S1 & S2	0.01 V	0.1 V
CURRENT AMPLIFIERS				
Conventional Mode				
AC RMS Ranges	DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
6 X 7.5, 15, (30)* A (L-N)	6 X 5.0, 10.0, (20.0)* A	6 X 75 VA / 75 W; (6 X 112.5 VA / 112.5 W)*	0.001 A	(0.001) A @ 5.0 A (0.01) A @ 10.0, (20.0)* A
3 X 7.5, 15, 30, (60)* A (L-N)	3 X 5.0, 10.0, 20.0, (40.0)* A	3 X 150 VA / 150 W; (3 X 225 VA / 225 W)*	(0.001) A @ 7.5, 15.0, 30 A (0.01) @ (60)* A	(0.001) A @ 5.0 A (0.01) A @ 10.0, 20.0, (40.0)* A
1 X 7.5, 15, 22.5, 45, 90, (180)* A (L-N) S1 S2 S3	1 X 5.0, 10.0, 15.0, 30, 60, (120)* A S1 S2 S3	1 X 450 VA / 450 W; (1 X 675 VA / 675 W)* S1 S2 S3	(0.001) A @ 7.5, 15.0, 22.5 A (0.01) A @ 45, 90, (180)* A	(0.001) A @ 5.83 A (0.01) A @ 10.0, 20, 30, 60, (120)* A
Enhanced Mode (F6005 Option)				
AC RMS Ranges	DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
6 X 8.75, 17.5, (35)** A (L-N)	6 X 5.83, 11.7, (23.3)** A	6 X 87.5 VA / 87.5 W; (6 X 131.25 VA / 131.25 W)**	0.001 A	(0.001) A @ 5.83 A (0.01) A @ 11.6, (23.3)** A
3 X 8.75, 17.5, 35, (70)** A (L-N)	3 X 5.83, 11.7, 23.3, (46.6)** A	3 X 175 VA / 175 W; (3 X 262.5 VA / 262.5 W)**	(0.001) A @ 8.75, 17.5, 35 A (0.01) @ (70)** A	(0.001) A @ 5.83 A (0.01) A @ 11.7, 23.3, (46.6)** A
1 X 8.75, 17.5, 26.25, 52.5, 105, (210)** A (L-N) S1 S2 S3	1 X 5.83, 11.7, 17.5, 35, 70, (140)** A S1 S2 S3	1 X 525 VA / 525 W; (1 X 787.5 VA / 787.5 W)** S1 S2 S3	(0.001) A @ 8.75, 17.5, 26.25 A (0.01) A @ 52.5, 105, (210)** A	(0.001) A @ 5.83 A (0.01) A @ 11.7, 23.3, 35, 70, (140)** A

* Transient Mode max duration 90 cycles

**F6005 is required; max duration of 45 seconds

Please Note: All AC values valid for capacitive, inductive and resistive loads.

DOBLE F6150SV-SGD TECHNICAL SPECIFICATIONS

F6150sv-SGD is the distribution model, which features a total of 8 sources for compliance testing needs.

CONVERTIBLE AMPLIFIERS				
Current Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
4 X 0.5, 1.0 (L-N)	4 X 0.354, 0.707 A	4 X 75 VA / 75 W	0.0001 A	0.0001 A
4 X 0.5, 1.0 A (L-N)	2 X 0.354, 0.707, 1.41 A	2 X 150 VA / 150 W	(0.0001 A) @ 0.5, 1.0 A (0.001 A) @ 2.0 A	(0.0001 A) @ 0.354, 0.707 A (0.001 A) @ 1.41 A
1 X 1.0, 2.0, 4.0 A (L-N) S1 S2	1 X 0.707, 1.41, 2.82 A S1 S2	1 X 300 VA / 300 W S1 S2	(0.0001 A) @ 1.0 A (0.001 A) @ 2.0, 4.0 A	(0.0001 A) @ 0.707 A (0.001 A) @ 1.41, 2.82 A
Current Transient Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
4 X 0.75, 1.5 A (L-N)	4 X 0.354, 0.707 A	4 X 97.5 VA / 97.5 W	0.0001 A	0.0001 A
2 X 0.75, 1.5, 3.0 A (L-N)	2 X 0.354, 0.707, 1.41 A	2 X 195 VA / 195 W	(0.0001 A) @ 0.75 A (0.001 A) @ 1.5, 3.0 A	(0.0001 A) @ 0.53 A (0.001 A) @ 1.06, 2.12 A
1 X 1.5, 3.0, 6.0 A (L-N) S1 S2	1 X 0.707, 1.41, 2.82 A S1 S2	1 X 390 VA / 390 W S1 S2	0.001 A	0.001 A
Voltage Mode				
Convertible Source AC RMS Ranges	Convertible Source DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
4 X 75, 150 V (L-N)	4 X 106, 212 V	4 X 75 VA / 75 W	0.01 V	(0.01 V) @ 106 V (0.1 V) @ 212 V
2 X 75, 150, 300 V (L-N)	2 X 106, 212, 424 V	2 X 150 VA / 150 W	0.01 V	(0.01 V) @ 106 V, 212 V (0.1 V) @ 424 V
1 X 150, 300, 600 V (L-L) S1 & S2	1 X 212, 424, 848 V S1 & S2	1 X 300 VA / 300 W S1 & S2	0.01 V	0.1 V
CURRENT AMPLIFIERS				
Conventional Mode				
AC RMS Ranges	DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
4 X 7.5, 15, (30)* A (L-N)	4 X 5.0, 10.0, (20.0)* A	4 X 75 VA / 75 W; (4 X 112.5 VA / 112.5 W)*	0.001 A	(0.001) A @ 5.0 A (0.01) A @ 10.0, (20.0)* A
2 X 7.5, 15, 30, (60)* A (L-N)	2 X 5.0, 10.0, 20.0, (40.0)* A	2 X 150 VA / 150 W; (2 X 225 VA / 225 W)*	(0.001) A @ 7.5, 15.0 A (0.01) @ 30, (60)* A	(0.001) A @ 5.0 A (0.01) A @ 10.0, 20.0, (40.0)* A
1 X 7.5, 15, 30, 60 (120)* A (L-N) S1 S2	1 X 5.0, 10.0, 20, 40, (80)* A S1 S2	1 X 300 VA / 450 W; (1 X 450 VA / 450 W)* S1 S2	(0.001) A @ 7.5, 15.0 A (0.01) A @ 30, 60, (120)* A	(0.001) A @ 5.0 A (0.01) A @ 10.0, 20, 40, (80)* A
Enhanced Mode				
AC RMS Ranges	DC Ranges	Power	Resolution @ AC RMS Ranges	Resolution DC Ranges
4 X 8.75, 17.5, (35)** A (L-N)	4 X 5.83, 11.7, (23.3)** A	4 X 87.5 VA / 87.5 W; (4 X 131.25 VA / 131.25 W)**	0.001 A	(0.001) A @ 5.83 A (0.01) A @ 11.6, (23.3)** A
2 X 8.75, 17.5, 35, (70)** A (L-N)	2 X 5.83, 11.7, 23.3, (46.7)** A	2 X 175 VA / 175 W; (2 X 262.5 VA / 262.5 W)**	(0.001) A @ 8.75, 17.5 A (0.01) @ 35, (70)** A	(0.001) A @ 5.83 A (0.01) A @ 11.7, 23.3, (46.7)** A
1 X 8.75, 17.5, 35, 70, (140)** A (L-N) S1 S2	1 X 5.83, 11.7, 23.3, 46.7 (93.2)** A S1 S2	1 X 350 VA / 350 W; (1 X 525 VA / 525 W)** S1 S2	(0.001) A @ 8.75, 17.5 A (0.01) A @ 35, 70, (140)** A	(0.001) A @ 5.83 A (0.01) A @ 11.7, 23.3, 46.7 (93.3)** A

* Transient Mode max duration 90 cycles

**F6005 is required; max duration of 45 seconds

Please Note: All AC values valid for capacitive, inductive and resistive loads.

DOBLE F6150sv-IEC TECHNICAL SPECIFICATIONS

The F6150sv-IEC model has no analog source outputs. It can be used for IEC 61850 Station and Process Bus testing compliant with 9-2LE. Its low level source mode is used to control the F5850 IntelliRupter® testing interface.

LOW LEVEL SOURCE PARAMETER RANGES

	Voltage Mode	Current Mode	Transient Mode
Convertible Amplifier Sources	6.7 VRMS	4.5 VRMS	6.7 VRMS
Current Amplifier Sources	N/A	3.38 VRMS (3.48 VRMS for enhanced ratings)	6.7 VRMS (6.96 VRMS for enhanced ratings)

LOW LEVEL SOURCE ACCURACIES

Output signal accuracy	± 0.25% OF READING
Source impedance	50 Ω

Please refer to the F6 Hardware User Guide for output scaling and range details.



DOBLE F6150sv TECHNICAL SPECIFICATIONS

LOGIC INPUTS (VOLTAGE OR CONTACT SENSE)		
	Isolated Inputs	Paired Inputs
Inputs	2 (First Strike)	3 Pairs (6)
Voltage Sense	250 V RMS AC / 300 V dc	250 V RMS AC / 300 V dc
Open Circuit Test Voltage	12 V dc	4 V dc
Short Circuit Test Current	20 mA dc	>50 mA dc
Response Time	0.1 msec max pickup / dropout	0.1 msec max pickup / dropout
Input Impedance	150KΩ	150KΩ
Isolation	±500 V peak	±500 V peak

LOGIC OUTPUTS		
	FET (High Speed Electronic)	Relay
Number	4	4
Isolation Voltage	±500 V peak	±500 V peak
Response Time	0.1msec pick up / dropout	<10 msec pick up / dropout
Maximum (Make/Break Current)	0.5 amps	(Breaking cap AC: 2000 VA with Vmax 250 V, Imax 8 A) (Breaking cap DC: 50 W with Vmax 300 V, Imax 8 A)
Input Voltage	250 V RMS	250 V RMS

VARIABLE OUTPUT BATTERY SIMULATOR	
Range	6 - 300 V dc
Resolution	0.3 V
Power	90 W, 1.5 A max
50/60 Hz Ripple	<0.2% of Range
Accuracy	<±5%

METERING FUNCTIONS	
DC Meter Inputs	
Input Range	0 - ±10 V dc / 0 - ±20 mA dc
Typical	<0.003%
Guaranteed	<0.05%
AC Sources	
Typical	<0.02% of metering loads
Logic Input As Counters	
Frequency	10 kHz
Pulse width	>175 µsec

ANALOG INPUT MEASUREMENT AIM	
Recording	8 external Analog or Digital Signals
Internal Source recording	12 Sources
Ranges	250 mV, 2.5 V, 25 V, 250 V RMS
Bandwidth	DC, 0-5kHz
Input Impedance	150KΩ
Max Input Voltage	250 V RMS AC / 300 V dc
Isolation	±500 V peak channel to channel

Accuracy	
Typical	±0.06%
Maximum	±0.15%

AC AMPLITUDE ACCURACY @ 50-60 HZ @ 20° - 30° C		
	Typical	Guaranteed
	0.02% of reading + .01% of range	0.09% of reading + .04% of range

CONVERTIBLE SOURCE IN CURRENT MODE @ 20° - 30° C	
Guaranteed	
	<0.5%

TIMERS AND TRIGGERS	
Timers Number	8
Max Recording Time	<24 Hours
Accuracy	±0.0005% of reading, ±50 µsec
Resolution	100 µsec

PHASE ANGLE @ 50/60 HZ		
Range	Accuracy	Resolution
±360° - 0°	± 0.25°	± 0.1°

DISTORTION @ 50/60 HZ V & I SOURCES TOTAL HARMONIC DISTORTION (THD)	
Typical	Guaranteed
<0.02%	<0.1%

FREQUENCY		
Bandwidth	Range	Resolution
DC - 3kHz at Full Power	DC, 0.1 Hz - 2.0 kHz Continuous Full Load	0.001 Hz
Accuracy		
Typical	@ 20° - 30° C	@ 0° - 50° C
0.5 ppm	1.5 ppm	10 ppm

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GENERAL SPECIFICATIONS	
Enclosure	High-impact, molded, flame-retardant ABS-meets National Safe Transit Association testing specification No.1A for immunity to severe shock and vibration
Mechanical	IEC 60068-2-27 Shock (15g/11ms, half sine) IEC 60068-2-6 Vibration (10-150 Hz, 20m/s ²) IEC 60068-2-6 Drop Test
Weight	42lb, 19.05kg (front cover and strap included)
Dimensions	15 X 9.5 X 18 in 38 X 24 X 45.7 cm
Calibration	Certification traceable to N.I.S.T. standards
Environmental	IEC 60068-2-2 Dry Heat (+85°C storage; + 50°C Rating Operating), IEC 60068-2-1 Cold [-50°C storage; 0°C operating], IEC 60068-2-30 Damp Heat (+55°C, 6 cycles, 95% humidity), NEMA Enclosure Rating Type 1 IEC Enclosure IP20
EMC Emissions	FCC 47 CFR Part 15 Class A (USA), EN55011:1998/A1:1999/ A2:2002 Group 1 Class A ISM(EU), AS/NZS CISPR 11:2004 Class A ISM (Australia), ICES-001 Issue 3 ISM (Canada)
EMC Immunity	EN 61000-6-2:2005; IEC 61000-4-2/3/4/5/6/11
Quality Assurance Management System	Third Party certification to ISO 9001:2000
Humidity	Up to 95% relative humidity, non-condensing
Electrostatic Discharge Immunity	IEC 801-2 I.E.C. performance level 1 @ 10kV: normal performance within specifications. I.E.C. performance level 2 @ 20kV: no permanent damage
Surge Withstand Capability	ANSI/IEEE c37.90. The simulator functions as a source during surge withstand capability tests, when the ANSI/IEEE specified isolating circuit is interposed between the simulator and the test relay
Line Power Supply	105-264 V, 47-63 Hz
Safety	EN 61010-1; UL 61010-1; CSA 27.2 # 61010-1
IEC 61850 GOOSE	Certified by KEMA as being compliant with IEC61850 protocol (IEC 61850-7-2 and 8-1)
IEC 61850 Sample Values (Publishing)	80 samples per cycles for nominal frequencies 50Hz and 60Hz using GPS time synchronized signals
Communication Interfaces (Ethernet, Wi-Fi, USB)	Ethernet or USB control to PC, Wi-Fi (802.11 B+G bands, 30 - 80ft, 9 - 24m) Station bus Ethernet interface: two redundant RJ45s at 100MBps Process bus Ethernet interface: one redundant RJ45 at 1GBPS and MTRJ (optical fiber) at 100 BaseFX



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