

XFR

Voltage Range
0-7.5 VDC to
0-600 VDC

Current Range
0-300 A to
0-2 A



The XFR Series is "today's technology". Zero voltage, or "soft" switching, provides significant benefits. Switching transients are virtually eliminated and noise performance is closer to linear levels. Efficiency is increased, heat generation is decreased, and stress on the switching transistors is reduced – improving reliability (MTBF). Unlike most competitors' products, the XFR Series generates full power at full rated current over its total operating range of 0 to 50° C without derating. Also the XFRs were designed with excellent thermal management, unlike competitive products, so they can be stacked in rack mounts without leaving ventilation space between units. The low thermal generation and high efficiency of "soft" switching technology allows Xantrex to package **1200 watts in a 1.75-inch** (1 U) high, 19-inch rack mount chassis, **20% more power** than any competitive product in the same size package. Both the 1200 watt and 2800 watt models are the **smart choice** for research, product development, and production test applications such as R&D, magnet control, product design, ATE, process control, electroplating, and burn-in. The unique features of the XFR make it the best choice for **OEM** applications where high power and wide adjustment of output voltage or current is required in a full 19-inch rack package.

XFER

Nineteen 1200 and 2800 watt models

Zero voltage ("soft") switching for high efficiency and low noise

Analog programming standard, optional ISOL (isolated programming card) option

Optional internal 16-bit GPIB (IEEE-488) and RS-232 control interface cards

Constant voltage or constant current operation with automatic crossover and mode indication

LabView® and LabWindows® (National Instruments) drivers

OVP, current limit, thermal protection

Standby mode

Front panel button preview of voltage, current, OVP

Remote/local modes

Remote sense, 5 V line loss compensation

CE, CSA, UL approvals



Electrical Specifications¹ for the XFR2.8 kW Series (Specifications are subject to change without notice.)

Model	XFR 7.5-300	XFR 12-220	XFR 20-130	XFR 40-70	XFR 60-46	XFR 100-28	XFR 150-18	XFR 300-9	XFR 600-4
Output Ratings:									
Output Voltage	0-7.5 V	0-12 V	0-20 V	0-40 V	0-60 V	0-100 V	0-150 V	0-300 V	0-600 V
Output Current	0-300 A	0-220 A	0-130 A	0-70 A	0-46 A	0-28 A	0-18 A	0-9 A	0-4 A
Output Power	2250 W	2640 W	2600 W	2800 W	2760 W	2800 W	2700 W	2700 W	2400 W
Line Regulation:²									
Voltage (0.01% of Vmax + 2 mV)	2.75 mV	3.2 mV	4 mV	6 mV	8 mV	12 mV	17 mV	32 mV	62 mV
Current (0.01% of Imax + 2 mA)	32 mA	24 mA	15 mA	9 mA	6.6 mA	4.8 mA	3.8 mA	2.9 mA	2.4 mA
Load Regulation:³									
Voltage (0.02% of Vmax + 5 mV)	6.5 mV	7.4 mV	9 mV	13 mV	17 mV	27 mV	35 mV	65 mV	125 mV
Current (0.02% of Imax + 5 mA)	65 mA	49 mA	31 mA	19 mA	14.2 mA	10.6 mA	8.6 mA	6.8 mA	5.8 mA
Meter Accuracy:									
Voltage (0.5% of Vmax + 1 count)	0.05 V	0.07 V	0.2 V	0.3 V	0.4 V	0.6 V	0.9 V	3 V	4 V
Current (0.5% of Imax + 1 count)	3 A	2 A	0.8 A	0.5 A	0.3 A	0.2 A	0.1 A	0.06 A	0.03 A
Output Noise & Ripple:									
Voltage rms	4 mV	5 mV	6 mV	6 mV	6 mV	12 mV	15 mV	20 mV	35 mV
Voltage p-p (0-20 MHz)	50 mV	50 mV	60 mV	60 mV	60 mV	75 mV	100 mV	120 mV	200 mV
Current rms	400 mA	200 mA	100 mA	50 mA	30 mA	10 mA	5 mA	5 mA	0.7 mA
Drift (8 hours):⁴									
Voltage (0.05% of Vmax)	3.8 mV	6 mV	10 mV	20 mV	30 mV	50 mV	75 mV	150 mV	300 mV
Current (0.05% of Imax)	150 mA	110 mA	65 mA	35 mA	23 mA	14 mA	9 mA	4.5 mA	2 mA
Temperature Coefficient:⁵									
Voltage (0.02% of Vmax/°C)	1.5 mV	2.4 mV	4 mV	8 mV	12 mV	20 mV	30 mV	60 mV	120 mV
Current (0.03% of Imax/°C)	90 mA	70 mA	40 mA	25 mA	15 mA	9 mA	5.5 mA	2.7 mA	1.2 mA
Program Slew Rate:⁶									
Rise Time	100 ms	100 ms	100 ms	100 ms	100 ms	170 ms	170 ms	170 ms	170 ms
Fall Time	100 ms	100 ms	100 ms	100 ms	100 ms	170 ms	170 ms	170 ms	170 ms
OVP Adjustment Range: (5% to 110% of Vmax)									
	0.375-8.25 V	0.6-13.2 V	1-22 V	2-44 V	3-66 V	5-110 V	7.5-165 V	15-330 V	30-660 V
Efficiency:⁷									
	81%	84%	87%	86%	88%	89%	90%	90%	90%

Interface Specifications¹ for the XFR2.8 kW Series with RS-232 or GPIB Interface Installed (Specifications are subject to change without notice.)

Model	XFR 7.5-300	XFR 12-220	XFR 20-130	XFR 40-70	XFR 60-46	XFR 100-28	XFR 150-18	XFR 300-9	XFR 600-4
Program Resolution (16-bit)									
Voltage (mV)	0.13	0.2	0.34	0.67	1.01	1.68	2.52	5.04	10.1
Current (mA)	5.04	3.69	2.18	1.17	0.77	0.47	0.3	0.15	0.07
OVP (mV)	0.13	0.2	0.34	0.67	1.01	1.68	2.52	5.04	10.1
Program Accuracy									
Voltage (mV) (0.2%+10 mV)	25	34	50	90	130	210	310	610	1210
Current (mA) (0.3%+10 mA)	910	670	400	220	148	94	64	37	22
OVP (mV) (0.5%+100 mV)	138	160	200	300	400	600	850	1600	3100
Readback Resolution (16-bit)									
Voltage (mV)	0.13	0.2	0.34	0.67	1.01	1.68	2.52	5.04	10.1
Current (mA)	5.04	3.69	2.18	1.17	0.77	0.47	0.3	0.15	0.07
Readback Accuracy									
Voltage (mV) (0.2%+20 mV)	35	44	60	100	140	220	320	620	1220
Current (mA) (0.3%+20 mA)	920	680	410	230	158	104	74	47	32

¹ Specifications indicate typical performance at 25° C ± 5° C, nominal line input of 208 VAC.

² For input voltage variation over the AC input voltage range, with constant rated load.

³ For 0-100% load variation, with constant nominal line voltage.

⁴ Maximum drift over 8 hours with constant line, load, and temperature, after 30-minute warm-up.

⁵ Change in output per ° C change in ambient temperature, with constant line and load.

⁶ Measured at full rated output with a resistive load.

⁷ Typical efficiency at 200 VAC input and rated output power.

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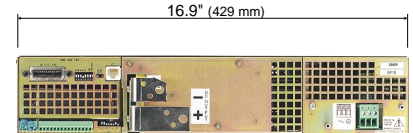
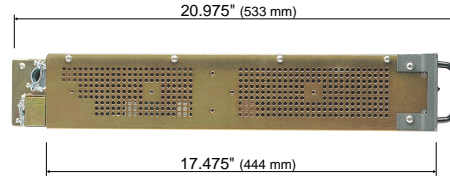
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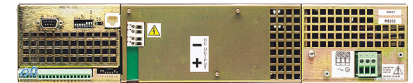
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XANTREX

XFR 2.8 kW



Optional GPIB Interface Card/
Low Voltage Output Connector



Optional RS-232 Interface Card/
High Voltage Output Connector

XFR 2.8 kW General Specifications (Specifications are subject to change without notice.)

Operational AC Input Voltage	190-264 VAC, 1 ϕ (22.6 A @ 208 VAC; 20.5 A @ 230 VAC typical), 47-63 Hz
Switching Frequency	Nominal 31 kHz (62 kHz output ripple)
Time Delay	7 s maximum from power on until output stable
Voltage Mode Transient Response Time	<3 ms for output voltage to recover within 0.5% of its rated voltage after a step change in load current of up to 10% to 90% of rated output
Maximum Voltage Differential	\pm 600 VDC from output to safety ground
Remote Start/Stop and Interlock	2.5-15 V signal or TTL-compatible input, selectable logic
Remote Analog Programming	Voltage and current programming inputs (source must be isolated): 0-5 k, 0-10 k resistances; 0-5 V, 0-10 V (default) voltage sources
Remote Analog Monitoring	Voltage and current monitor outputs 0-5 V, 0-1 0V (default) ranges for 0-100% of output
Remote Programming and Monitoring Accuracy	< \pm 1% of full scale output for the default range
Maximum Remote Sense Line Drop Compensation	5 V/line (Line drop is subtracted from total voltage available at supply output.)
Operating Temperature Range	0 to 50° C
Storage Temperature Range	-20 to 70° C
Humidity Range	30 to 90% RH, non-condensing
Front Panel Voltage and Current Control	10-turn voltage and current potentiometers
Front Panel Voltage Control Resolution	0.02% of maximum voltage
AC Input Connector Type	3-terminal, 34 A/25 0V, wire clamp connector with strain relief cover
Main Output Connector	7.5 to 100 V models: nickel-plated copper bus bars with bus bar cover and strain relief; 150V to 600 V models: 4-terminal, wire clamp connector with cover and strain relief
Weight (one unit)	Approximately 15 kg (33 lb.)
Approvals	CE-marked units meet IEC 1010-1 safety standard and EN50081-2 and EN50082-2 EMC standards. Additional standards: CSA C22.2 No. 1010.1, UL 3111-1, and FCC, part 15, class A EMI standard, CSA certified, UL listed.

Consult the Operating Manual for complete product specifications.

XFR 2.8 kW Options	GPIB-XFR3	GPIB Interface card (16-bit)
	HFS-XFR3	Fiber Optic Serial Interface card (16-bit)
	RS-232-XFR3	RS-232 Interface card (16-bit)
	ISOL-XFR3	ISOL Interface card provides isolated analog control and readback of output voltage and current
	M2	208 VAC three-phase input
	M13	Locking bushings on front panel controls

Contact Xantrex for custom voltage and current combinations and other options.

Electrical Specifications¹ for the XFR 1.2 kW Series (Specifications are subject to change without notice.)

Model	XFR 7.5-140	XFR 12-100	XFR 20-60	XFR 35-35	XFR 40-30	XFR 60-20	XFR 100-12	XFR 150-8	XFR 300-4	XFR 600-2
Output Ratings:										
Output Voltage	0-7.5 V	0-12 V	0-20 V	0-35 V	0-40 V	0-60 V	0-100 V	0-150 V	0-300 V	0-600 V
Output Current	0-140 A	0-100 A	0-60 A	0-35 A	0-30 A	0-20 A	0-12 A	0-8 A	0-4 A	0-2 A
Output Power	1050 W	1200 W	1200 W	1225 W	1200 W	1200 W	1200 W	1200 W	1200 W	1200 W
Line Regulation:²										
Voltage (0.01% of V _{max} +2 mV)	2.75 mV	3.2 mV	4 mV	5.5 mV	6 mV	8 mV	12 mV	17 mV	32 mV	62 mV
Current (0.01% of I _{max} +2 mA)	16 mA	12 mA	8 mA	5.5 mA	5 mA	4 mA	3.2 mA	2.8 mA	2.4 mA	2.2 mA
Load Regulation:³										
Voltage (0.02% of V _{max} +5 mV)	6.5 mV	7.4 mV	9 mV	12 mV	13 mV	17 mV	27 mV	35 mV	65 mV	125 mV
Current (0.02% of I _{max} +5 mA)	33 mA	25 mA	17 mA	12 mA	11 mA	9 mA	7.4 mA	6.6 mA	5.8 mA	5.4 mA
Meter Accuracy:										
Voltage (0.5% of V _{max} +1 count)	0.05 V	0.07 V	0.2 V	0.3 V	0.3 V	0.4 V	0.6 V	0.9 V	3 V	4 V
Current (0.5% of I _{max} +1 count)	0.8 A	0.6 A	0.4 A	0.3 A	0.3 A	0.2 A	0.07 A	0.05 A	0.03 A	0.02 A
Output Noise & Ripple:										
Voltage rms	5 mV	5 mV	5 mV	5 mV	5 mV	5 mV	5 mV	7 mV	10 mV	25 mV
Voltage p-p (0-20 MHz)	40 mV	40 mV	60 mV	60 mV	60 mV	60 mV	60 mV	60 mV	80 mV	140 mV
Current rms ⁴	175 mA	100 mA	85 mA	25 mA	25 mA	10 mA	5 mA	3 mA	2 mA	1 mA
Drift (8 hours):⁵										
Voltage (0.05% of V _{max})	3.8 mV	6 mV	10 mV	17.5 mV	20 mV	30 mV	50 mV	75 mV	150 mV	300 mV
Current (0.05% of I _{max})	70 mA	50 mA	30 mA	17.5 mA	15 mA	10 mA	6 mA	4 mA	2 mA	1 mA
Temperature Coefficient:⁶										
Voltage (0.02% of V _{max} /°C)	1.5 mV	2.4 mV	4 mV	7 mV	8 mV	12 mV	20 mV	30 mV	60 mV	120 mV
Current (0.03% of I _{max} /°C)	42 mA	30 mA	18 mA	10.5 mA	9 mA	6 mA	3.6 mA	2.4 mA	1.2 mA	0.6 mA
Program Slew Rate:⁷										
Rise Time	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	170 ms	170 ms	170 ms	170 ms
Fall Time	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	170 ms	170 ms	170 ms	170 ms
OVP Adjustment Range: (5% to 110% of V _{max})										
	0.375-8.25 V	0.6-13.2 V	1-22 V	1.75-38.5 V	2-44 V	3-66 V	5-110 V	7.5-165 V	15-330 V	30-660 V
Efficiency:⁸										
	80%	82%	84%	84%	84%	84%	84%	87%	86%	85%

Interface Specifications¹ for the XFR 1.2 kW Series with RS-232 or GPIB Interface Installed (Specifications are subject to change without notice.)

Model	XFR 7.5-140	XFR 12-100	XFR 20-60	XFR 35-35	XFR 40-30	XFR 60-20	XFR 100-12	XFR 150-8	XFR 300-4	XFR 600-2
Program Resolution (16-bit)										
Voltage (mV)	0.13	0.2	0.34	0.59	0.67	1.01	1.68	2.52	5.04	10.1
Current (mA)	2.35	1.68	1.01	0.59	0.5	0.34	0.2	0.13	0.07	0.03
OVP (mV)	0.13	0.2	0.34	0.59	0.67	1.01	1.68	2.52	5.04	10.1
Program Accuracy										
Voltage (mV) (0.2%+10 mV)	25	34	50	80	90	130	210	310	610	1210
Current (mA) (0.3%+10 mA)	430	310	190	115	100	70	46	34	22	16
OVP (mV) (0.5%+100 mV)	138	160	200	275	300	400	600	850	1600	3100
Readback Resolution (16-bit)										
Voltage (mV)	0.13	0.2	0.34	0.59	0.67	1.01	1.68	2.52	5.04	10.1
Current (mA)	2.35	1.68	1.01	0.59	0.5	0.34	0.2	0.13	0.07	0.03
Readback Accuracy										
Voltage (mV) (0.2%+20 mV)	35	44	60	90	100	140	220	320	620	1220
Current (mA) (0.3%+20 mA)	440	320	200	125	110	80	56	44	32	26

1 Specifications indicate typical performance at 25° C ± 5° C, nominal line input of 120 VAC.

2 For input voltage variation over the AC input voltage range, with constant rated load.

3 For 0-100% load variation, with constant nominal line voltage.

4 Measured at full rated output with a resistive load.

5 Maximum drift over 8 hours with constant line, load, and temperature, after 30-minute warm-up.

6 Change in output per ° C change in ambient temperature, with constant line and load.

7 Measured with stepped 0-10 V analog programming source and a resistive load.

8 Typical efficiency at 100 VAC input and rated output power.

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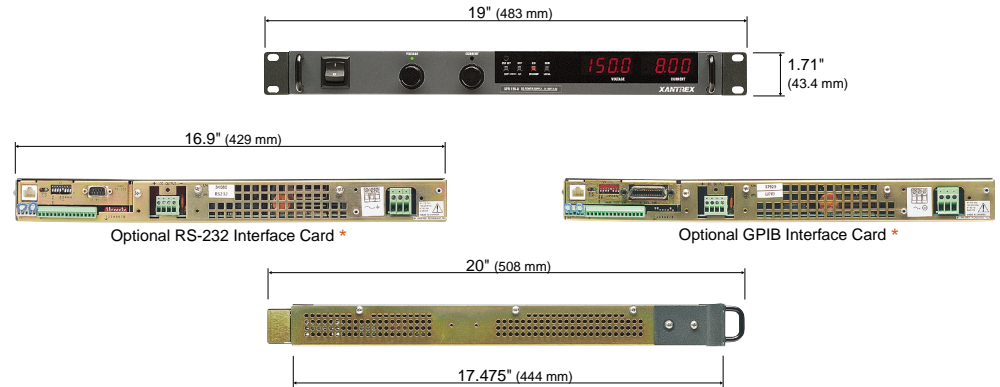
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* High Voltage Output Connectors Shown

XFR 1.2 kW General Specifications (Specifications are subject to change without notice.)

Operational AC Input Voltage	85-130 VAC or 190-264 VAC, 1 ϕ (17 A @ 120 VAC; 8.8 A @ 230 VAC typical), 47-63 Hz. Automatic range detect.
Switching Frequency	Nominal 78 kHz (156 kHz output ripple)
Time Delay	7 s maximum from power on until output stable
Voltage Mode Transient Response Time	<3 ms for output voltage to recover within 0.5% of its rated voltage after a step change in load current of up to 10% to 90% of rated output
Maximum Voltage Differential	\pm 600 VDC from output to safety ground
Remote Start/Stop and Interlock	2.5-15 V signal or TTL-compatible input, selectable logic
Remote Analog Programming	Voltage and current programming inputs (source must be isolated): 0-5 k, 0-10 k resistances; 0-5 V, 0-10 V (default) voltage sources
Remote Analog Monitoring	Voltage and current monitor outputs 0-5 V, 0-10 V (default) ranges for 0-100% of output
Remote Programming and Monitoring Accuracy	< \pm 1% of full scale output for the default range
Maximum Remote Sense Line Drop Compensation	5 V/line (Line drop is subtracted from total voltage available at supply output.)
Operating Temperature Range	0 to 50 $^{\circ}$ C
Storage Temperature Range	-20 to 70 $^{\circ}$ C
Humidity Range	30 to 90% RH, non-condensing
Front Panel Voltage and Current Control	10-turn voltage and current potentiometers
Front Panel Voltage Control Resolution	0.02% of maximum voltage
AC Input Connector Type	3-terminal, 34 A/250 V, wire clamp connector with strain relief cover
Main Output Connector	7.5 to 40 V models: nickel-plated copper bus bars with bus bar shield; 60 V to 600 V models: 4-terminal wire clamp connector with strain relief
Weight (one unit)	Approximately 8.2 kg (18 lb.)
Approvals	CE-marked units meet IEC 1010-1 safety standard and EN50081-2 and EN50082-2 EMC standards. Additional standards: CSA C22.2 No. 1010.1, UL 3111-1, and FCC, part 15, class A EMI standard, CSA certified, UL listed.

Consult the Operating Manual for complete product specifications.

XFR 1.2 kW Options	GPIB-XFR	GPIB Interface card (16-bit)
	RS-232-XFR	RS-232 Interface card (16-bit)
	ISOL-XFR	Isolated Interface card provides isolated analog control and readback of output voltage and current
	M13	Locking bushings on front panel controls

Contact Xantrex for custom voltage and current combinations and other options.