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DC–DC

50–200 Watts

ICH/IFH Series

xppower.com



- 2:1 & 4:1 Input Ranges
- Efficiency up to 90%
- Single Output
- –40 °C to +100 °C Operating Temperature
- Continuous Short Circuit Protection
- Five–sided Metal Case
- 3 Year Warranty

Specification

Input

Input Voltage Range	• See tables
Input Current (no load)	• See tables
Input Reverse Voltage Protection	• None
Input Filter	• Pi network
Undervoltage Lockout	• 2:1 Input Models: 12 Vin, power up 8.8 V, down 8.0 V 24 Vin, power up 17.0 V, down 16.0 V 48 Vin, power up 34.0 V, down 32.5 V 4:1 Input Models: 24 Vin, power up 8.8 V, down 8.0 V 48 Vin, power up 17.0 V, down 16.0 V

Output

Output Voltage Trim	• ±10%
Initial Set Accuracy	• ±1% max (ICH100: ±1.5%)
Line Regulation	• ±0.2% max measured from high line to low line
Load Regulation	• ±0.2% max measured from 0-100% load
Transient Response	• 5% max deviation, recovery to within 1% in 500 µs, 25% step load change
Ripple & Noise	• 3.3 & 5 V models: 100 mV pk-pk 12 & 15 V models: 150 mV pk-pk 24, 28 & 48 V models: 1% max pk-pk ICH50/75 - 3.3 V, 5 V models: 75 mV 12 V, 15 V models: 100 mV 20 MHz bandwidth (see note 3)
Overvoltage Protection	• 115-140%
Short Circuit Protection	• ICH50/75/100W/IFH200-: Trip & restart (hiccup mode) with auto recovery ICH50W/75W/100/150 & IFH200: Current limit, auto recovery
Temperature Coefficient	• ±0.03%/°C
Current Limit	• IFH200: 110-150% nominal output, all other models: 110-160% nominal output
Remote On/Off	• See note 1 & 2
Thermal Shutdown	• ICH50/50W/75/75W/100/150: Thermal shutdown when case temperature reaches 100 °C, auto recovery when case temperature < +60 °C ICH100W/IFH200: Thermal shutdown when case temperature reaches 105 °C, auto recovery when case temperature <+90 °C

General

Efficiency	• See tables
Isolation Voltage	• 1500 VDC Input to Output 1500 VDC Input to Case 1500 VDC Output to Case
Isolation Resistance	• 10^7 ohms min
Switching Frequency	• ICH50/75 12-24V models: 400 kHz typical ICH50/75 48 V models: 300 kHz typical ICH50W/75W: 300 kHz typical ICH100/ICH150: 500 kHz typical ICH100W: 250 kHz typical IFH200: 350 kHz typical
Power Density	• ICH50: 18.3 W/in³ ICH75: 27.4 W/in³ ICH100: 36.6 W/in³ ICH150: 54.8 W/in³ IFH200: 34.8 W/in³
MTBF	• ≥790 kHrs to MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Case Temperature	• -40 °C to +100 °C, see derating curve
Storage Temperature	• ICH50/75: -55 °C to +105 °C ICH100/150 & IFH200: -40 °C to +105 °C
Shock	• 30 g pk, half sine wave for 18 ms, 3 pulses per face, all 6 faces tested on all 3 axes
Vibration	• 5-500 Hz at 3 g, 10 mins per axis

EMC & Safety

Emissions	• EN55032, level A conducted with external components
ESD Immunity	• EN61000-4-2, level 2 Perf Criteria A
EFT/Burst	• EN61000-4-4, level 1, Perf Criteria A
Surge	• EN61000-4-5, installation class 1, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V rms Perf Criteria A
Magnetic Field	• EN61000-4-8, 1 A/m, Perf Criteria A
Safety Approvals	• UL60950-1

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Models and Ratings

ICH/IFH Series XP

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2,5]
			No Load	Full Load		
9-18 VDC (12 V nominal)	3.3 V	10.00 A	50 mA	3525 mA	78%	ICH5012S3V3
	5.0 V	10.00 A	50 mA	5145 mA	81%	ICH5012S05
	12.0 V	4.16 A	50 mA	4950 mA	84%	ICH5012S12
	15.0 V	3.33 A	50 mA	4950 mA	84%	ICH5012S15
	24.0 V	2.08 A	50 mA	4950 mA	84%	ICH5012S24
18-36 VDC (24 V nominal)	3.3 V	10.00 A	50 mA	1740 mA	79%	ICH5024S3V3
	5.0 V	10.00 A	50 mA	2540 mA	82%	ICH5024S05
	12.0 V	4.16 A	50 mA	2450 mA	85%	ICH5024S12
	15.0 V	3.33 A	50 mA	2450 mA	85%	ICH5024S15
	24.0 V	2.08 A	50 mA	2419 mA	86%	ICH5024S24
36-75 VDC (48 V nominal)	3.3 V	10.00 A	50 mA	870 mA	79%	ICH5048S3V3
	5.0 V	10.00 A	50 mA	1250 mA	83%	ICH5048S05
	12.0 V	4.16 A	50 mA	1220 mA	85%	ICH5048S12
	15.0 V	3.33 A	50 mA	1220 mA	85%	ICH5048S15
	24.0 V	2.08 A	50 mA	1209 mA	86%	ICH5048S24

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
9-36 VDC (24 V nominal)	3.3 V	10.00 A	50 mA	1785 mA	77%	ICH5024WS3V3
	5.0 V	10.00 A	50 mA	2570 mA	81%	ICH5024WS05
	12.0 V	4.16 A	50 mA	2510 mA	83%	ICH5024WS12
	15.0 V	3.33 A	50 mA	2510 mA	83%	ICH5024WS15
	24.0 V	2.08 A	50 mA	2510 mA	83%	ICH5024WS24
18-75 VDC (48 V nominal)	3.3 V	10.00 A	50 mA	880 mA	78%	ICH5048WS3V3
	5.0 V	10.00 A	50 mA	1270 mA	82%	ICH5048WS05
	12.0 V	4.16 A	50 mA	1240 mA	84%	ICH5048WS12
	15.0 V	3.33 A	50 mA	1240 mA	84%	ICH5048WS15
	24.0 V	2.08 A	50 mA	1240 mA	84%	ICH5048WS24
	48.0 V	1.04 A	50 mA	1238 mA	84%	ICH5048WS48

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2,5]
			No Load	Full Load		
9-18 VDC (12 V nominal)	3.3 V	15.00 A	50 mA	5290 mA	78%	ICH7512S3V3
	5.0 V	15.00 A	50 mA	7715 mA	81%	ICH7512S05
	12.0 V	6.25 A	50 mA	7440 mA	84%	ICH7512S12
	15.0 V	5.00 A	50 mA	7440 mA	84%	ICH7512S15
	24.0 V	3.13 A	50 mA	7440 mA	84%	ICH7512S24
18-36 VDC (24 V nominal)	3.3 V	15.00 A	50 mA	2610 mA	79%	ICH7524S3V3
	5.0 V	15.00 A	50 mA	3810 mA	82%	ICH7524S05
	12.0 V	6.25 A	50 mA	3675 mA	85%	ICH7524S12
	15.0 V	5.00 A	50 mA	3675 mA	85%	ICH7524S15
	24.0 V	3.13 A	50 mA	3640 mA	86%	ICH7524S24
36-75 VDC (48 V nominal)	3.3 V	15.00 A	50 mA	1305 mA	79%	ICH7548S3V3
	5.0 V	15.00 A	50 mA	1883 mA	83%	ICH7548S05
	12.0 V	6.25 A	50 mA	1838 mA	85%	ICH7548S12
	15.0 V	5.00 A	50 mA	1838 mA	85%	ICH7548S15
	24.0 V	3.13 A	50 mA	1820 mA	86%	ICH7548S24

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
9-36 VDC (24 V nominal)	3.3 V	15.00 A	50 mA	2611 mA	79%	ICH7524WS3V3
	5.0 V	15.00 A	50 mA	3811 mA	82%	ICH7524WS05
	12.0 V	6.25 A	50 mA	3765 mA	83%	ICH7524WS12
	15.0 V	5.00 A	50 mA	3720 mA	84%	ICH7524WS15
	24.0 V	3.12 A	50 mA	3720 mA	84%	ICH7524WS24
18-75 VDC (24 V nominal)	3.3 V	15.00 A	50 mA	1289 mA	80%	ICH7548WS3V3
	5.0 V	15.00 A	50 mA	1883 mA	83%	ICH7548WS05
	12.0 V	6.25 A	50 mA	1860 mA	84%	ICH7548WS12
	15.0 V	5.00 A	50 mA	1838 mA	85%	ICH7548WS15
	24.0 V	3.12 A	50 mA	1835 mA	85%	ICH7548WS24
	48.0 V	1.56 A	50 mA	1860 mA	84%	ICH7548WS48

Models & Ratings

ICH/IFH Series

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
18-36 VDC (24 V nominal)	3.3 V	20.00 A	50 mA	3480 mA	79%	ICH10024S3V3
	5.0 V	20.00 A	50 mA	5020 mA	83%	ICH10024S05
	12.0 V	8.30 A	50 mA	4880 mA	85%	ICH10024S12
	15.0 V	6.70 A	50 mA	4925 mA	85%	ICH10024S15
	24.0 V	4.17 A	50 mA	4905 mA	85%	ICH10024S24
36-75 VDC (48 V nominal)	3.3 V	20.00 A	50 mA	1720 mA	80%	ICH10048S3V3
	5.0 V	20.00 A	50 mA	2480 mA	84%	ICH10048S05
	12.0 V	8.30 A	50 mA	2442 mA	85%	ICH10048S12
	15.0 V	6.70 A	50 mA	2463 mA	85%	ICH10048S15
	24.0 V	4.17 A	50 mA	2463 mA	85%	ICH10048S24

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
9-36 VDC (24 V nominal)	3.3 V	20.00 A	35 mA	3374 mA	81%	ICH10024WS3V3
	5.0 V	20.00 A	35 mA	4990 mA	83%	ICH10024WS05
	12.0 V	8.30 A	35 mA	4902 mA	85%	ICH10024WS12
	15.0 V	6.70 A	35 mA	4817 mA	86%	ICH10024WS15
	24.0 V	4.17 A	35 mA	4849 mA	86%	ICH10024WS24
18-75 VDC (48 V nominal)	3.3 V	20.00 A	30 mA	1708 mA	80%	ICH10048WS3V3
	5.0 V	20.00 A	30 mA	2422 mA	86%	ICH10048WS05
	12.0 V	8.30 A	30 mA	2408 mA	86%	ICH10048WS12
	15.0 V	6.70 A	30 mA	2381 mA	87%	ICH10048WS15
	24.0 V	4.17 A	30 mA	2367 mA	88%	ICH10048WS24

Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
36-75 VDC (48 V nominal)	3.3 V	30.00 A	25 mA	2.60 A	79%	ICH15048S3V3
	5.0 V	30.00 A	25 mA	3.70 A	83%	ICH15048S05
	12.0 V	12.50 A	25 mA	3.60 A	85%	ICH15048S12
	15.0 V	10.00 A	25 mA	3.60 A	85%	ICH15048S15
	24.0 V	6.25 A	25 mA	3.60 A	85%	ICH15048S24

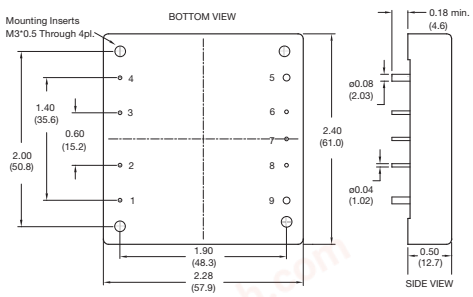
Input Voltage	Output Voltage	Output Current	Input Current[4]		Efficiency	Model Number[2]
			No Load	Full Load		
36-75 VDC (48 V nominal)	3.3 V	40.00 A	25 mA	3.5 A	79%	IFH20048S3V3
	5.0 V	40.00 A	25 mA	5.0 A	83%	IFH20048S05
	12.0 V	17.00 A	25 mA	5.0 A	85%	IFH20048S12
	15.0 V	13.30 A	25 mA	5.0 A	85%	IFH20048S15
	24.0 V	8.33 A	25 mA	5.0 A	85%	IFH20048S24
	28.0 V	7.14 A	25 mA	4.7 A	89%	IFH20048S28
	48.0 V	4.20 A	25 mA	4.7 A	90%	IFH20048S48

Notes

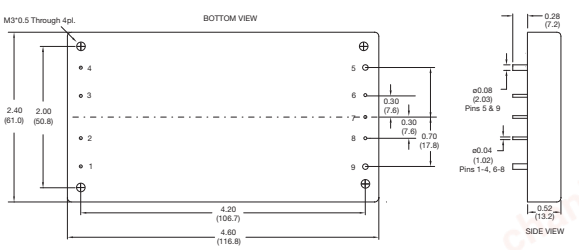
1. Logic compatibility: Module On = Open circuit (or >3.5 VDC for ICH100 W models). Module Off = <0.8 VDC (<1.8 VDC for ICH100 W models).
2. Add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.
3. Ripple & noise is measured with a 10 µF tantalum capacitor and 0.1 µF ceramic capacitor across output.
4. Input current specified at 24 V for 18-36 & 9-36 VDC and 48 V for 36-75 & 18-75 VDC models.
5. For dual output models available, contact sales.

Mechanical Details

ICH50 to ICH150



IFH200



PIN CONNECTIONS	
Pin	Function
1	+Vin
2	On/Off
3	Case*
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

* IFH200: N.C.

Notes

1. All dimensions are in inches (mm)
2. Weight: ICH50: 0.194 lbs (88 g)
   ICH50W: 0.207 lbs (94 g)
   ICH75: 0.202 lbs (92 g)
   ICH75W: 0.207 lbs (94 g)
   ICH100 : 0.209 lbs (95 g)
   ICH150 : 0.220 lbs (100 g)
   IFH200: 0.425 lbs (193 g)
3. Case tolerance: ±0.02 (±0.50)
4. Pin diameter tolerance: ICH series ±0.002 (±0.05), ±0.004 (±0.1),
   IFH series ±0.006 (±0.15)
5. Case Material: ICH50/75/100/150 - Aluminium
   IFH200 - Aluminium baseplate with plastic case
6. Pin pitch tolerance: ±0.01 (±0.25)

Derating Curves

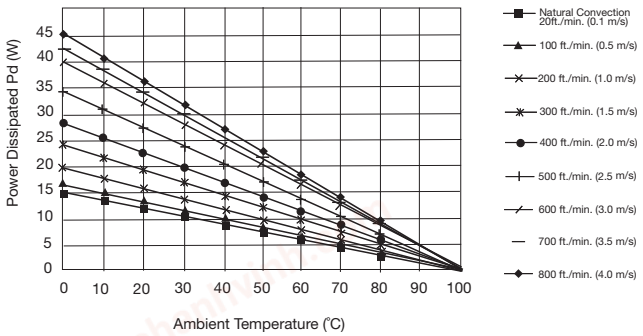
ICH/IFH Series

THERMAL RESISTANCE vs AIR FLOW		
Air Flow Rate	ICH Typical Rca	IFH Typical Rca
Natural Convection 20 ft./min (0.1 m/s)	7.12 °C/W	3.82 °C/W
100 ft./min (0.5 m/s)	6.21 °C/W	3.23 °C/W
200 ft./min (1.0 m/s)	5.17 °C/W	2.71 °C/W
300 ft./min (1.5 m/s)	4.29 °C/W	2.28 °C/W
400 ft./min (2.0 m/s)	3.64 °C/W	1.92 °C/W
500 ft./min (2.5 m/s)	2.96 °C/W	1.68 °C/W
600 ft./min (3.0 m/s)	2.53 °C/W	1.50 °C/W
700 ft./min (3.5 m/s)	2.37 °C/W	1.35 °C/W
800 ft./min (4.0 m/s)	2.19 °C/W	1.23 °C/W

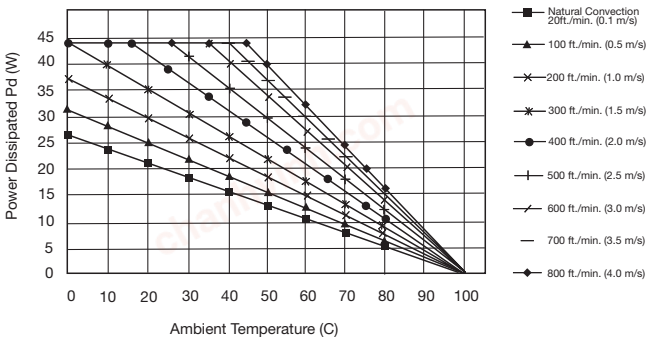
Temperature Rise = Pd x Rca, Where Pd = Pin - Pout or Pout (1-η) / η, Where η= efficiency

Maximum Power Dissipation vs Ambient Temperature and Air Flow (without Heatsink)

ICH50-150S

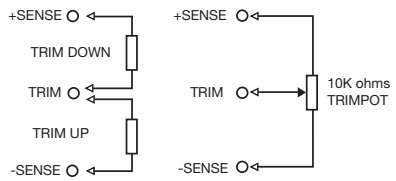


IFH200S



Application Notes

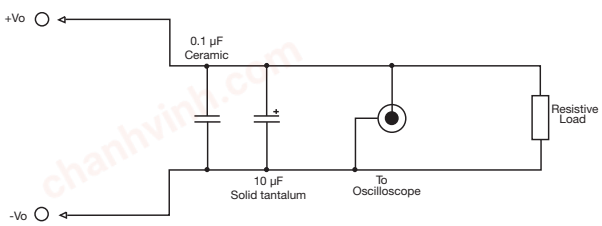
External Output Trimming



LOGIC TABLE		
Logic State (Pin 2)	Positive Logic	Negative Logic (-N)
Logic Low Switch Closed	Module Off	Module On
Logic High Switch Open	Module On	Module Off

Output may be trimmed by ±10% (±5% for dual output models) with a fixed resistor or an external trimpot as shown.
Contact sales for details.

Output Noise



Output noise is measured with a 10 µF tantalum capacitor and 0.1 µF ceramic capacitor across output.
Oscilloscope limited to 20 MHz bandwidth