

Server Power Consumption & Heat Output Estimate

Intel Xeon 6357P / Asus P13R-E platform — idle, average, and maximum load scenarios

Server model number: SR-1X54R-HW-WS

System Configuration

Component	Description
CPU	Intel Xeon 6357P (8-core, LGA1700, 80W TDP)
Motherboard	Asus P13R-E
Memory	2x 16GB DDR5 UDIMM
Storage	2x 500GB SSD (RAID1, Intel RST)
RAID controller	Broadcom / LSI MegaRAID 9361-8i
Backplane	4-port
Power supplies	1x acbel R1BU5301B + 2x acbel R1BA2301B, 300W each (redundant)
Chassis fans	4x 04028DA-12P-AU, 12V / 0.88A, max duty cycle 75%
CPU fan	Dynatron Q7, 12V / 2.0A, max duty cycle 65%

Fan Power Detail

Fan power is estimated using the fan affinity law (P scales with duty^3), with an assumed 30% idle floor and moderate step-up for the average scenario. Maximum duty cycles were provided (75% chassis, 65% CPU).

Fan	Rated Power (100%)	Idle (30%)	Average (45% / 40%)	Max (given)
Chassis fan x1	10.56 W	0.29 W	0.96 W	4.45 W (@75%)
Chassis fans x4 (total)	42.24 W	1.14 W	3.85 W	17.82 W
CPU fan (Dynatron Q7)	24.00 W	0.65 W	1.54 W	6.59 W (@65%)
Fan subtotal	66.24 W	1.79 W	5.38 W	24.41 W

Power Consumption Estimate

Component	Idle	Average	Max
CPU	12 W	40 W	80 W (TDP)
Motherboard baseline (chipset, VRM, BMC, NIC)	25 W	28 W	35 W
RAM (2x 16GB DDR5)	6 W	12 W	14 W
SSDs (2x 870 EVO 500GB)	~0.1 W	4.4 W	7 W
RAID controller (9361-8i)	11 W	14 W	17 W
Backplane	3 W	4 W	5 W
Chassis + CPU fans	1.8 W	5.4 W	24.4 W
DC subtotal	59 W	108 W	182 W
PSU conversion loss	~10 W	~12 W	~16 W
Total AC draw	≈69 W	≈120 W	≈198 W

Heat Output Estimate

Nearly all electrical power drawn by the system converts to heat (including PSU conversion losses), so heat output approximately equals total AC power draw. Conversion: 1 W = 3.412 BTU/hr.

State	Power (AC)	Heat Output
Idle	69 W	235 BTU/hr
Average	120 W	409 BTU/hr
Max	198 W	676 BTU/hr

Assumptions & Notes

- Intel Xeon 6357P is the Xeon 6-series part (8-core, LGA1700, 80W TDP) — compatible with the Asus P13R-E, which officially supports LGA1700 Xeon E-2400 / Xeon 6300-series CPUs.
- “Average” assumes a light-to-moderate mixed workload (occasional CPU activity and storage I/O, not sustained full load).
- Fan power estimated via the fan affinity law ($P \propto \text{duty}^3$); idle assumes a 30% duty floor (typical practical minimum for PWM fan control), average assumes a moderate step-up (45% chassis / 40% CPU), and max uses the provided 75% / 65% duty cycles.
- PSU conversion loss assumes ~85% efficiency at idle (light-load efficiency dip), ~90% at average, ~92% near the typical efficiency peak at higher load, for the redundant acbel 300W supplies.

- RAID controller and SSD figures are based on published/tested figures (LSI 9361-8i stress-test measurement of 16.15W; Samsung 870 EVO 500GB datasheet: idle 30–35mW, active avg 2.0–2.2W, burst max 3.5W).
- Motherboard baseline, backplane, and CPU idle/average figures are estimated from typical values for comparable server hardware, since exact published power specs are not available for the Asus P13R-E, backplane, or CPU idle/loaded states.
- For HVAC or rack cooling capacity planning, size to the Max scenario (or actual measured peak) plus a 15–20% margin, not to the idle or average figures.