Phihong AA240U-59FKEA-R

100 Vac and 230 Vac validation record

One source assembly, sample s_sample1. Tested 15 October 2026.
Record PHI-AC-20261015 | Revision 1.0 | Issued 15 October 2026.

Recorded result	100 Vac	230 Vac
Independent test cases	37 / 37 PASS	37 / 37 PASS
Steady / helper readings	2,568 / 31	2,568 / 31
5 V preflights / PD captures	37 / 37	37 / 37
Voltage / current out-of-band readings	0 / 0	0 / 0
Maximum absolute V / A error	0.719 V / 0.004 A	0.715 V / 0.005 A

All 74 cases completed with measured voltage and load current inside the configured screening limits. Both inputs completed Fixed and AVS 48 V / 5 A current sweeps and 60 s holds, the AVS 36-48-36 V / 5 A sweep, both PPS APDO load sweeps, and six light-load returns to 5 V. No output collapse was detected in the recorded steady samples.

Test conditions

Item	Recorded condition
Source / lead	Phihong AA240U-59FKEA-R, s_sample1 / captive 1.0 m
Connection	SRC - integral captive lead - CY4500-EPR - ASD-PD31; CC2
AC input metadata	100 Vac / 50 Hz; 230 Vac / 50 Hz
Instrument / controller	ASD-PD31 / v5.8.9
Measurement point	ASD-PD31 input, including captive lead, analyzer and connection losses

Acquisition windows (JST, UTC+09:00): 100 Vac 11:17-12:33; 230 Vac 12:38-13:55, 15 October 2026. AC values are configured metadata; no independent AC voltage measurement is included.

PASS here means that the specified sequence and measurement checks completed. This one-unit record does not establish production variation, continuous 240 W endurance, USB-IF conformance or electrical safety certification. Source temperature, AC input power and efficiency were not measured.

Capabilities and coverage

Both discovery snapshots contain the same 10 visible objects. Object 7 is absent from the decoded table; no Object 7 capability was assumed. The two PPS APDOs share a voltage range but have different advertised current limits and were selected separately.

Object	Type	V	A	Raw PDO
1	Fixed	5	3	0x0A81912C
2	Fixed	9	3	0x0002D12C
3	Fixed	15	3	0x0004B12C
4	Fixed	20	5	0x000641F4
5	PPS	5-21	3	0xC1A4323C
6	PPS	5-21	5	0xC1A43264
8	Fixed	28	5	0x0008C1F4
9	Fixed	36	5	0x000B41F4
10	Fixed	48	5	0x000F01F4
11	EPR AVS	15-48	5	0xD3C096F0

Test group	Cases / AC	Evidence IDs
Fixed baseline at 1 A	7	A01-A07 / B01-B07
PPS / AVS baseline at 1 A	3	A08-A10 / B08-B10
Fixed current round trips	7	A11-A17 / B11-B17
PPS / AVS current round trips	9	A18-A26 / B18-B26
AVS upper voltage round trip	1	A27 / B27
60 s holds	4	A28-A31 / B28-B31
Light-load returns to 5 V	6	A32-A37 / B32-B37

Current sweeps use 0.2 A steps from 0.2 A to the bounded PDO limit and back, with three readings per point and a single turnaround point. Fixed 5/9/15 V and PPS Object 5 reach 3 A; the other tested current sweeps reach 5 A. Voltage baselines use 1 V steps and three readings per point. No discovered capability was skipped.

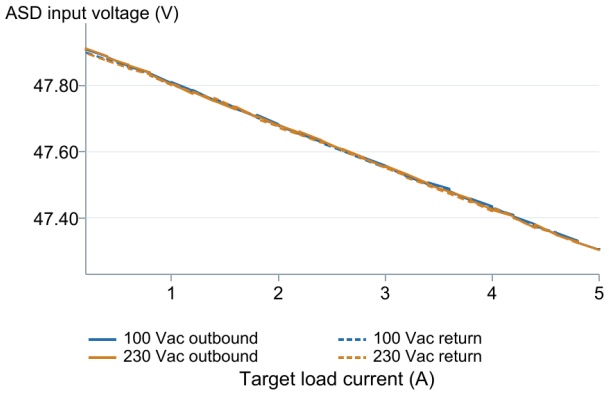
Screening checks: |measured V - target V| <= 1.0 V and |measured A - load target A| <= max(0.05 A, 2%). These are instrument screening settings, not PD specification limits. Each case starts with a measured 5 V / 0.1 A preflight and ends with acknowledged LOAD_OFF plus current <= 0.05 A.

ASD versions, both inputs: type 05.54; power FW 09.18 / HW 05.01; protocol FW 04.77 / HW 04.00; display FW 01.74 / HW 00.02. Full query records accompany the evidence.

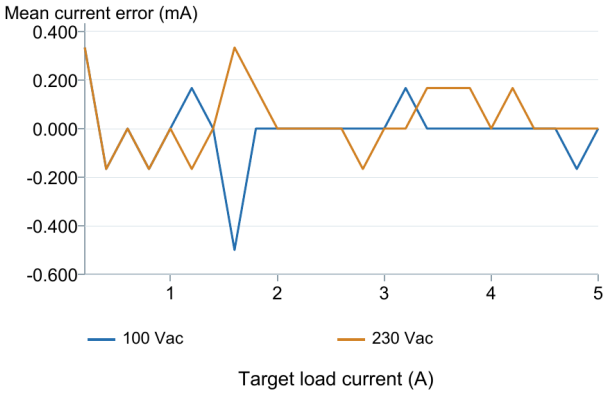
Fixed PDO load behavior

Maximum load point	100 Vac	230 Vac	Evidence
O1 / 5 V / 3 A	4.787-4.790 V 3.000 A	4.785-4.788 V 3.000 A	A11 / B11
O2 / 9 V / 3 A	8.630-8.632 V 3.000 A	8.629-8.631 V 3.000 A	A12 / B12
O3 / 15 V / 3 A	14.624-14.627 V 3.000 A	14.625-14.627 V 3.000 A	A13 / B13
O4 / 20 V / 5 A	19.361-19.363 V 5.000 A	19.354-19.360 V 5.000 A	A14 / B14
O8 / 28 V / 5 A	27.332-27.335 V 5.000 A	27.334-27.338 V 5.000 A	A15 / B15
O9 / 36 V / 5 A	35.312-35.317 V 5.000 A	35.306-35.311 V 5.000-5.001 A	A16 / B16
O10 / 48 V / 5 A	47.304-47.309 V 5.000 A	47.303-47.306 V 5.000 A	A17 / B17

Fixed 48 V current round trip



Fixed 48 V current tracking

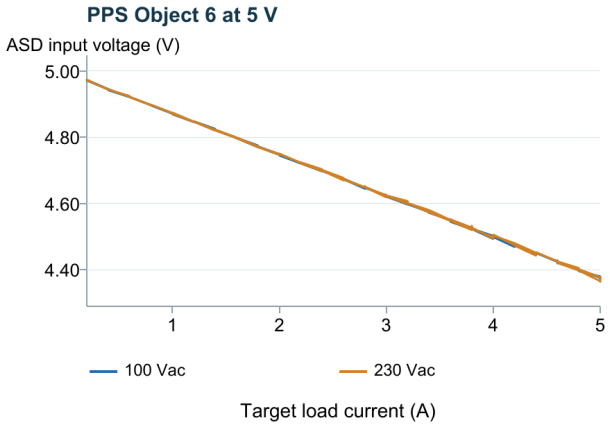


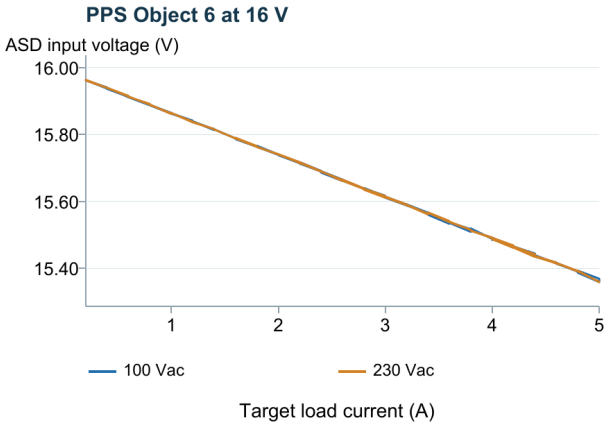
Every tested Fixed PDO completed its outbound and return current points at both inputs. The table shows the three readings at the peak current. Fixed 48 V / 5 A was maintained during the sweep and the separate 60 s hold. Lower ASD voltage at high current includes the complete measurement path and is not a direct measurement of the source connector voltage.

No series-resistance correction was applied to these results. Voltage ranges are the recorded ADC minima and maxima, not confidence intervals or calibrated uncertainty bounds.

PPS APDO load behavior

Maximum load point	100 Vac	230 Vac	Evidence
O5 / 5 V / 3 A	4.624-4.627 V 3.000 A	4.619-4.623 V 3.000 A	A18 / B18
O5 / 16 V / 3 A	15.612-15.615 V 3.000 A	15.613-15.615 V 3.000 A	A19 / B19
O5 / 21 V / 3 A	20.596-20.597 V 3.000 A	20.598-20.599 V 3.000 A	A20 / B20
O6 / 5 V / 5 A	4.372-4.380 V 4.999-5.000 A	4.363-4.378 V 5.000 A	A21 / B21
O6 / 16 V / 5 A	15.359-15.369 V 5.000 A	15.359-15.360 V 5.000 A	A22 / B22
O6 / 21 V / 5 A	20.343-20.350 V 5.000 A	20.347-20.354 V 5.000 A	A23 / B23



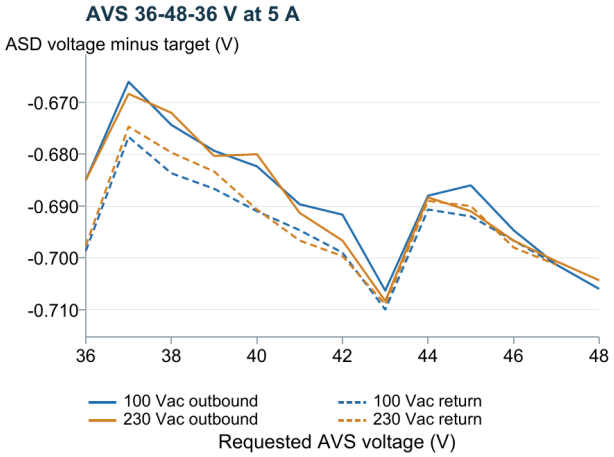


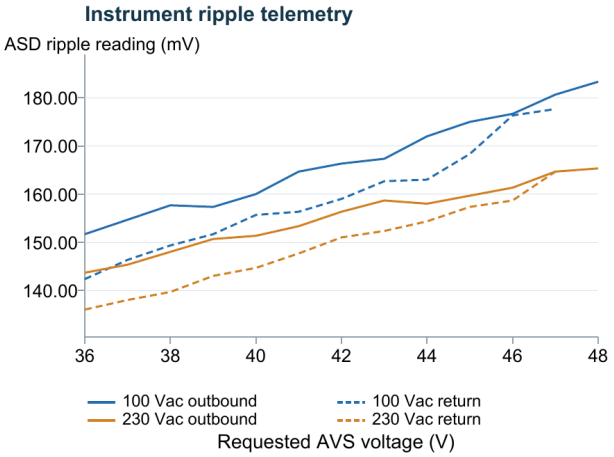
PPS Object 5 completed 5, 16 and 21 V current round trips through its 3 A limit. PPS Object 6 completed the same voltage points through 5 A. The 1 A baseline covered all integer voltages from 5 to 21 V for each object. The separate 21 V holds maintained 3 A and 5 A respectively for a programmed 60 s.

Current tracking was checked against the electronic-load target, independently of PD request current. The packet captures retain the actual Request words, so contract behavior can be reviewed without treating CLI request parameters as proof of transmitted RDO values.

EPR AVS and high-voltage sweep

Maximum load point	100 Vac	230 Vac	Evidence
AVS O11 / 15 V / 5 A	14.373-14.375 V 5.000 A	14.374-14.379 V 5.000 A	A24 / B24
AVS O11 / 16 V / 5 A	15.370-15.378 V 5.000 A	15.376-15.379 V 5.000 A	A25 / B25
AVS O11 / 48 V / 5 A	47.295-47.301 V 5.000 A	47.301-47.303 V 5.000 A	A26 / B26





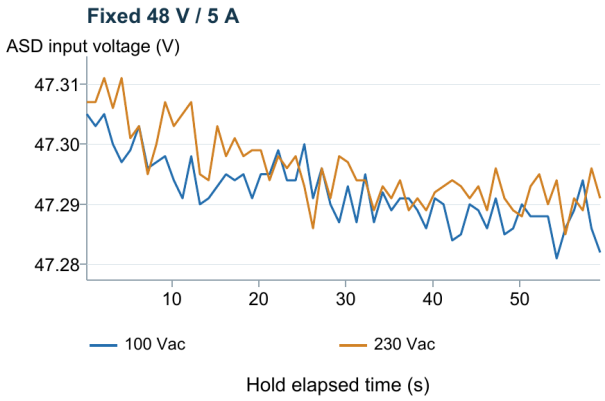
The AVS baseline covered 15-48 V at 1 A. The high-load sweep used 36-48-36 V at 5 A in 1 V steps, with 25 voltage points and 75 steady readings per input. Each point had a configured minimum 5 s dwell after the initial bounded load ramp. The 48 V turnaround was sampled once.

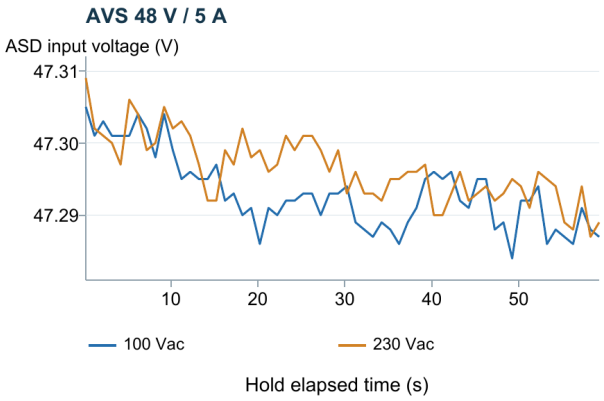
Run	Measured current	Max. |V error|	Ripple readings
100 Vac / A27	5.000 A	0.711 V	141-185 mV
230 Vac / B27	4.999-5.001 A	0.713 V	135-167 mV

Ripple values are ASD-PD31 telemetry only. Measurement bandwidth and a calibrated oscilloscope ripple setup are not established in this record. These readings support comparison within this setup and are not a ripple compliance verdict.

Programmed 60-second holds

Evidence / input	Setpoint	V	A	Mean W	Max mV
A28 / 100 Vac	FIXED O10 48 V / 5 A	47.281-47.305	4.999-5.001	236.462	187
B28 / 230 Vac	FIXED O10 48 V / 5 A	47.285-47.311	4.999-5.000	236.479	168
A29 / 100 Vac	PPS O5 21 V / 3 A	20.591-20.594	3.000	61.777	153
B29 / 230 Vac	PPS O5 21 V / 3 A	20.592-20.597	2.999-3.000	61.781	163
A30 / 100 Vac	PPS O6 21 V / 5 A	20.329-20.350	4.999-5.001	101.697	158
B30 / 230 Vac	PPS O6 21 V / 5 A	20.330-20.351	5.000-5.001	101.707	161
A31 / 100 Vac	AVS O11 48 V / 5 A	47.284-47.305	5.000	236.465	200
B31 / 230 Vac	AVS O11 48 V / 5 A	47.287-47.309	5.000-5.001	236.483	179





Each hold contains 60 steady readings at approximately one-second intervals. The first-to-last recorded steady span is about 59.0 s within the programmed 60 s hold, followed by LOAD_OFF. The table reports ASD input power; the nominal 48 V x 5 A request is 240 W, while delivered power at this measurement point includes path losses.

Temperature fields are internal ASD-PD31 telemetry affected by its cooling fan. They are retained in the original evidence but excluded from source temperature assessment. These short holds do not demonstrate thermal equilibrium or long-term endurance.

Light-load returns to 5 V

Transition	100 Vac	230 Vac	Evidence
48 -> 5 V / 0.1 A	5.141-5.143 V 0.100 A	5.144-5.145 V 0.100 A	A32 / B32
36 -> 5 V / 0.1 A	5.141-5.145 V 0.100 A	5.143-5.146 V 0.100 A	A33 / B33
28 -> 5 V / 0.1 A	5.141-5.144 V 0.100 A	5.144-5.145 V 0.100 A	A34 / B34
20 -> 5 V / 0.1 A	5.142-5.145 V 0.100 A	5.145-5.146 V 0.100 A	A35 / B35
9 -> 5 V / 0.1 A	5.142-5.144 V 0.100 A	5.144-5.145 V 0.100 A	A36 / B36
15 -> 5 V / 0.1 A	5.142 V 0.100 A	5.144-5.145 V 0.100 A	A37 / B37

Each independent case applies the initial Fixed PDO at 0.1 A and then requests Fixed 5 V at the same load. Three ADC readings per endpoint use a configured 2 s delay. All six starting voltages returned to approximately 5.14 V at approximately 0.1 A for both inputs, including 15 V to 5 V.

PD evidence and interpretation

For all 12 light-load return cases, the final captured Fixed 5 V Request was followed by Accept and PS_RDY. For the 15 V to 5 V examples [A37, B37], the final Request RDO is 0x1044B12C at both inputs. Packet row references and raw values are in analysis/transition_packet_events.csv. This records the observed exchange without assigning a timing verdict.

CY4500 packet CSVs accompany every case and the initial discovery run. The captures preserve Source Capabilities, Request/EPR Request, Accept and PS_RDY messages. They are provided as packet evidence; no automated USB-IF timing or waveform conformance score is assigned. Endpoint ADC sampling cannot exclude brief undershoot, overshoot or transient interruptions between samples.

Input comparison and scope

No case changed PASS/FAIL outcome between the two inputs. Mean ASD voltage in the Fixed 48 V / 5 A hold changed by +0.004 V (230 Vac minus 100 Vac). The tests used the same source assembly sequentially; the comparison does not isolate warm-up or conditioning effects. Ambient temperature and independent AC voltage metrology were not logged.

The recorded results support successful initial functional screening of this sample under the listed setup. Additional units, longer endurance holds and dedicated transient/thermal measurements would be needed to extend that conclusion.

Evidence index and data definitions

Axx identifies 100 Vac; Bxx identifies 230 Vac. Every pair below is PASS. Numbers are steady ADC rows per input. Full file paths relative to this package and packet counts are in evidence_index.csv.

Evidence pair	Test	Rows
A01 / B01	Fixed O1 5 V / 1 A	3
A02 / B02	Fixed O2 9 V / 1 A	3
A03 / B03	Fixed O3 15 V / 1 A	3
A04 / B04	Fixed O4 20 V / 1 A	3
A05 / B05	Fixed O8 28 V / 1 A	3
A06 / B06	Fixed O9 36 V / 1 A	3
A07 / B07	Fixed O10 48 V / 1 A	3
A08 / B08	PPS O5 5-21 V / 1 A	51
A09 / B09	PPS O6 5-21 V / 1 A	51
A10 / B10	AVS O11 15-48 V / 1 A	102
A11 / B11	Fixed O1 5 V current round trip	87
A12 / B12	Fixed O2 9 V current round trip	87
A13 / B13	Fixed O3 15 V current round trip	87
A14 / B14	Fixed O4 20 V current round trip	147
A15 / B15	Fixed O8 28 V current round trip	147
A16 / B16	Fixed O9 36 V current round trip	147
A17 / B17	Fixed O10 48 V current round trip	147
A18 / B18	PPS O5 5 V current round trip	87
A19 / B19	PPS O5 16 V current round trip	87
A20 / B20	PPS O5 21 V current round trip	87
A21 / B21	PPS O6 5 V current round trip	147
A22 / B22	PPS O6 16 V current round trip	147
A23 / B23	PPS O6 21 V current round trip	147
A24 / B24	AVS O11 15 V current round trip	147
A25 / B25	AVS O11 16 V current round trip	147
A26 / B26	AVS O11 48 V current round trip	147
A27 / B27	AVS O11 36-48-36 V / 5 A	75
A28 / B28	Fixed O10 48 V hold 60 s	60
A29 / B29	PPS O5 21 V hold 60 s	60
A30 / B30	PPS O6 21 V hold 60 s	60
A31 / B31	AVS O11 48 V hold 60 s	60
A32 / B32	Fixed O10 48 -> 5 V / 0.1 A	6
A33 / B33	Fixed O9 36 -> 5 V / 0.1 A	6
A34 / B34	Fixed O8 28 -> 5 V / 0.1 A	6
A35 / B35	Fixed O4 20 -> 5 V / 0.1 A	6
A36 / B36	Fixed O2 9 -> 5 V / 0.1 A	6
A37 / B37	Fixed O3 15 -> 5 V / 0.1 A	6

Main ASD files contain 5,198 rows: 5,136 steady and 62 helper rows. The 74 preflights add 148 readings. Discovery files and PD voltage packets are separate and are not counted as steady ASD results. analysis_phase is an added analysis field; original mode values are retained. No literal steady mode is required: precheck/ramp modes are helpers; the steady mode allow-list is documented in README.md.