

PV connectors: Manufacturer specifications

Connector manufacturer and type	Manufacturer specifications							Combinability with original type confirmed by testing organization	Connector dimensions (length × diameter)	Receiver dimensions (length × diameter)	References (companies using this manufacturer's connectors)	Net price per 100 units (connectors and receivers)	Website	
	Market entry	Test specifications	Protection types connected / unconnected	Allowable temperature range	Rated current	Maximum system voltage	Plug face is similar to							
Non-locking connectors														
Multi-Contact MC3	1996	TÜV, UL	IP 67 / IPX2	-40 to +90 °C (IEC), -40 to +75 °C (UL)	20 A	1,000 V (IEC), 600 V (UL)	-	-	41.6 (max. 51.6) × 13.5 mm	40 (max. 50) × 13.5 mm	Bosch Solar, BP Solar, Evergreen Solar, First Solar, Fronius, Helios, IBC Solar, Kaneka, Kyocera, Mitsubishi, Photowatt, Sanyo, Scheuten, Sharp, Siliken, SMA, SolarWorld, Sputnik, Sunfilm, SunPower, Suntech Power, Tenesol, Trina Solar, Würth Solar, Yingli	\$619	www.multi-contact.com	
Multi-Contact MC3 (c)	1996	TÜV, UL	IP 67 / IPX2	-40 to +90 °C (IEC), -40 to +75 °C (UL)	20 A	1,000 V (IEC), 600 V (UL)	-	-	41.6 (max. 51.6) × 13.5 mm	40 (max. 50) × 13.5 mm	Bosch Solar, BP Solar, Evergreen Solar, First Solar, Fronius, Helios, IBC Solar, Kaneka, Kyocera, Mitsubishi, Photowatt, Sanyo, Scheuten, Sharp, Siliken, SMA, SolarWorld, Sputnik, Sunfilm, SunPower, Suntech Power, Tenesol, Trina Solar, Würth Solar, Yingli	\$619	www.multi-contact.com	
Yamaichi Y-Sol3A0V	February 2009	TÜV, UL	IP 68 / IP 20	-40 to +85 °C	30 A	1,000 V (TÜV), 600 V (UL)	MC-3	-	48 × 13.5 mm	48 × 13.5 mm	-	(only with cables)	www.yamaichi.com	
Lockable connectors														
Amphenol-Tuchel Helios H4	October 2009	TÜV, UL, CSA	IP 68 / IP 2X	-40 to +90 °C	40 A	1,000 V	MC-4	yes	62 × 21 mm	61 × 21 mm	Sovello, Suntech, Yingli	~\$302	www.amphenol-industrial.com	
Amphenol-Tuchel Helios H4 (c)	October 2009	TÜV, UL, CSA	IP 68 / IP 2X	-40 to +90 °C	40 A	1,000 V	MC-4	yes	62 × 21 mm	61 × 21 mm	Sovello, Suntech, Yingli	~\$302	www.amphenol-industrial.com	
Bizlink Sunbolts PV Connector	October 2007	TÜV, UL	IP 67 / IP 20	-40 to +90 °C	30 A	1,000 V (TÜV), 600 V (UL)	MC-4	yes (TÜV)	64.4 × 18.8 mm	55.7 × 18.8 mm	Enphase, Flextronics, Samsung	~\$504	www.sunbolts.com	
Huber+Suhner Radox Solar Twist Lock (c)	2005	TÜV, UL, CSA	IP 67 / IP 68	-40 to +85 °C	38 A	1,000 V	-	-	66 × 13 mm	67 × 13 mm	Centrosolar, Conergy, Suntech, REC	~\$576 (\$5.76 each)	www.hubersuhner.com	
Leatec Fine Ceramics CN40-A0	2008	TÜV, UL	IP 67 / -	-40 to +85 °C	30 A	1,000 V (IEC), 600 V (UL)	MC-4	yes (TÜV)	58 × 18 mm	58 × 18 mm	-	-	www.leatec.com.tw	
Lumberg Connect LC4-AM 00	-	TÜV, UL	IP 68 / IP 20	-40 to +85 °C	30 A	1,000 V (IEC), 600 V (UL)	MC-4	yes	75.5 × 19 mm	72 × 19 mm	-	-	www.lumberg.com	
Lumberg Connect LC4-CP 30 (c)	-	TÜV, UL	IP 68 / IP 20	-40 to +85 °C	30 A	1,000 V (IEC), 600 V (UL)	MC-4	yes	62 × 19 mm	60 × 19 mm	-	-	www.lumberg.com	
Molex 13024402	January 2011	TÜV, UL	IP 67 / -	-40 to +85 °C	20 A	1,000 V (IEC), 600 V (UL)	MC-4	no	58.5 × 18.5 mm	55.7 × 18.5 mm	-	\$324 (\$3.24 each)	www.molex.com	
Molex 13024402 (c)	January 2011	TÜV, UL	IP 67 / -	-40 to +85 °C	20 A	1,000 V (IEC), 600 V (UL)	MC-4	no	58.5 × 18.5 mm	55.7 × 18.5 mm	-	\$324 (\$3.24 each)	www.molex.com	
Multi-Contact MC4	2002	TÜV, UL	IP 67 / IPX2	-40 to +90 °C (IEC), -40 to +75 °C (UL)	30 A	1,000 V (IEC), 600 V (UL)	-	(only with MC-3/ MC-4 adapter cable)	61 × 18.8 mm	58 × 18.8 mm	Bosch Solar, BP Solar, Evergreen Solar, First Solar, Fronius, Helios, IBC Solar, Kaneka, Kyocera, Mitsubishi, Photowatt, Sanyo, Scheuten, Sharp, Siliken, SMA, SolarWorld, Sputnik, Sunfilm, SunPower, Suntech Power, Tenesol, Trina Solar, Würth Solar, Yingli	\$318	www.multi-contact.com	
Multi-Contact MC4 (c)	2002	TÜV, UL	IP 67 / IPX2	-40 to +90 °C (IEC), -40 to +75 °C (UL)	30 A	1,000 V (IEC), 600 V (UL)	-	(only with MC-3/ MC-4 adapter cable)	61 × 18.8 mm	58 × 18.8 mm	Bosch Solar, BP Solar, Evergreen Solar, First Solar, Fronius, Helios, IBC Solar, Kaneka, Kyocera, Mitsubishi, Photowatt, Sanyo, Scheuten, Sharp, Siliken, SMA, SolarWorld, Sputnik, Sunfilm, SunPower, Suntech Power, Tenesol, Trina Solar, Würth Solar, Yingli	\$318	www.multi-contact.com	
Ningbo Chuangyuan PV-CY01L	March 2008	TÜV, UL	IP 67 / -	-40 to +85 °C	30 A	1,000 V	MC-4	yes	57.2 × 19.3 mm	57.2 × 19.3 mm	-	-	www.nbcygf.com	
Ningbo Economic (Top Hengda) PV-ST01	January 2005	TÜV, UL	IP 67 / IP 20	-40 to +85 °C	30 A	1,000 V	MC-4	yes (TÜV)	58 × 19 mm	58 × 19 mm	-	\$144	www.hd-top.com	
Ningbo GZX PC Technology PV-GZX0601-1	October 2005	TÜV, UL	IP 67 / IP 20	-40 to +85 °C	30 A	1,000 V	MC-4	yes (TÜV)	60 × 20 mm	60 × 20 mm	Schott Solar, SMA	~\$125 (\$1.25 each)	www.gzxpv.com	
QC Solar QC4	May 2008	TÜV, UL	IP 67	-40 to +85 °C	25 A	1,000 V	MC-4	yes (TÜV)	54 × 19.3 mm	52 × 19.3 mm	-	~\$160	www.qc-solar.com.cn	
TE Connectivity 1394461	2002	TÜV, UL	IP 67 / IP 20	-40 to +115 °C	30 A	1,000 V	-	-	55 × 18 mm	47 × 18 mm	Schott Solar, Solarwatt, Solyndra	\$429	www.te.com	
Wieland PST401C (c)	August 2007	TÜV, ETL (according to UL and CSA)	IP 65 / IP 67 (with locking piece; IP 68 on request)	-40 to +85 °C	32 A	1,000 V	MC-4	yes (TÜV)	59 × 22.4 mm	56 × 22.4 mm	Phrysmian	\$409 (\$4.09 each)	www.wieland-electric.com	
Yamaichi Y-Sol4A0V	May 2009	TÜV, UL	IP 68 / IP 20	-40 to +85 °C	30 A	1,000 V (TÜV), 600 V (UL)	MC-4	-	67 × 19 × 12 mm (L × W × H)	62 × 19 × 12 mm (L × W × H)	-	(sold with cables only)	www.yamaichi.com	
Yukita YS-255	September 2009	TÜV, UL	IP 67 / IP 20	-40 to +100 °C	30 A	1,000 V	MC-4	yes (TÜV)	60 × 22 mm	55 × 22 mm	-	-	www.yukita.co.jp	

(c) configurable connectors, * all manufacturer specifications for these products are the same as those given in the previous row

PV connectors: PHOTON Lab test results

Connector manufacturer and type	PHOTON Lab test results											Water resistance [GΩ]	Score for water resistance	Score for dry heat tests	Score for damp heat tests	Score for temperature cycling tests	Score for weather resistance	Cumulative score	Comments
	Score for contact resistance and thermography	Insertion force [N]	Release force [N]	Minimum withdrawal force [N]	Maximum withdrawal force [N]	Ratio of minimum withdrawal force to release force [%]	Score: Ratio of withdrawal force to release force	Score for force measurements	Score for test probe										
Non-locking connectors																			
Multi-Contact MC3	2.0	102.25	171.17	215.69	232.78	126.01	3.7	4.9	1.0			40.64	3.6	2.0	2.2	2.0	2.2	3.1	-
Multi-Contact MC3 (c)	2.2	64.62	109.07	172.84	199.09	158.47	3.3	4.7	1.0			23.44	3.8	1.6	2.0	1.7	2.1	2.9	-
Yamaichi Y-Sol3A0V	2.2	78.14	104.14	343.61	366.07	329.94	1.3	3.0	1.0			196.75	1.9	1.8	1.9	1.9	2.2	2.3	-
Lockable connectors																			
Amphenol-Tuchel Helios H4	2.0	82.85	318.47	863.05	927.82	271.00	2.0	1.9	1.0			152.21	2.4	1.4	2.0	1.2	1.4	1.7	-
Amphenol-Tuchel Helios H4 (c)	2.0	102.23	271.62	752.31	754.55	276.97	1.9	2.2	1.0			100.55	3.0	2.2	2.1	1.9	1.2	1.9	-
Bizlink Sunbolts PV Connector	2.1	76.26	302.96	626.89	693.28	206.92	2.8	2.6	1.0			289.10	1.0	1.8	1.9	2.0	1.7	2.0	-
Huber+Suhner Radox Solar Twist Lock (c)	2.5	80.27	>800	364.47	753.94	< 44.73	5.0	3.5	1.0			5.81	5.0	1.8	1.8	1.3	1.9	2.6	-
Leatec Fine Ceramics CN40-A0	2.9	101.38	379.73	587.70	630.35	154.77	3.4	2.9	△ 6.0			149.37	2.5	1.6	1.5	1.7	1.9	6.0	Failed test probe
Lumberg Connect LC4-AM 00	2.9	46.65	687.67	779.52	788.58	113.36	3.9	2.2	1.0			203.65	1.9	2.0	1.9	2.2	2.0	2.1	-
Lumberg Connect LC4-CP 30 (c)	2.8	24.42	244.88	371.64	417.54	151.77	3.4	3.2	1.0			175.37	2.2	1.9	2.0	2.0	1.7	2.4	-
Molex 13024402	2.7	56.07	375.40	147.78	164.52	39.37	△ 6.0	5.2	1.0			197.88	1.9	1.6	1.8	1.8	1.6	6.0	Minimum withdrawal force is <250 N and less than release force
Molex 13024402 (c)	2.8	80.52	454.96	187.85	189.95	41.29	△ 6.0	5.2	1.0			133.07	2.6	2.2	2.0	1.8	1.9	6.0	Minimum withdrawal force is <250 N and less than release force
Multi-Contact MC4	2.0	68.02	621.79	652.79	659.37	104.99	4.0	2.6	1.0			49.05	3.5	2.0	2.1	1.9	2.1	2.3	-
Multi-Contact MC4 (c)	2.0	62.58	560.90	651.38	684.80	116.13	3.9	2.6	1.0			18.62	3.9	2.0	2.0	1.9	1.8	2.2	-
Ningbo Chuangyuan PV-CY01L	2.6	30.34	616.61	687.58	751.39	111.51	3.9	2.4	1.0			114.37	2.8	2.2	2.0	2.0	2.1	2.3	-
Ningbo Economic (Top Hengda) PV-ST01	2.0	69.67	797.21	478.75	496.61	60.05	5.0	3.2	1.0			170.23	2.2	2.4	2.1	2.0	2.0	2.4	-
Ningbo GZX PC Technology PV-GZX0601-1	2.3	69.23	665.52	601.40	646.48	90.37	5.0	3.0	1.0			136.73	2.6	2.2	2.0	1.8	2.0	2.3	-
QC Solar QC4	2.4	49.81	548.18	596.90	688.11	108.89	3.9	2.7	1.0			189.05	2.0	2.1	2.4	2.0	2.5	2.3	-
TE Connectivity 1394461	3.3	13.57	321.01	502.10	523.05	156.41	3.4	2.8	1.0			242.63	1.4	2.1	2.2	1.6	2.1	2.3	-
Wieland PST40i1C (c)	2.4	24.24	323.92	681.15	756.62	210.28	2.7	2.2	1.0			51.28	3.5	1.7	2.1	1.9	1.7	2.1	-
Yamaichi Y-Sol4A0V	2.3	79.72	278.77	484.72	549.52	173.88	3.2	3.1	1.0			170.84	2.2	1.9	2.1	1.8	1.8	2.3	-
Yukita YS-255	2.4	52.04	278.04	635.22	745.00	228.47	2.5	2.4	1.0			277.75	1.1	2.4	1.8	1.5	1.9	2.0	-

(c) configurable connectors, * all manufacturer specifications for these products are the same as those given in the previous row