Surge Protective Device

Paperless Datasheet

Going green and protecting environment is manufacturers' responsibility. Each WatchfulEyE product has a link of downloading data sheet on its enclosure:
http://datasheet.watchfuleyesolutions.com/US120330.html

Model & Ordering Code (3P Mode)

Model	Ordering Code	MCOV/Uc	Up	Ures	UPC/EAN Code
WTH-40/C/3P-PV200	US120397	200Vdcpv	1.7kV	1.2kV	(0) 811914032076
WTH-40/C/3P-PV400	US120398	400Vdcpv	2.2kV	1.5kV	(0) 811914032083
WTH-40/C/3P-PV600	US120334	600Vdcpv	2.5kV	1.9kV	(0) 811914032090
WTH-40/C/3P-PV800	US120335	800Vdcpv	3.2kV	2.5kV	(0) 811914032106
WTH-40/C/3P-PV1000	US120330	1000Vpvdc	3.4kV	2.8kV	(0) 811914032113
WTH-40/C/3P-PV1200	US120331	1200Vpvdc	3.6kV	3.0kV	(0) 811914032120
WTH-40/C/3P-PV1600	US120395	1600Vpvdc	4.6kV	3.6kV	(0) 811914032137
WTH-40/C/3P-PV2000	US120396	2000Vpvdc	5.7kV	4.6kV	(0) 811914032144

Certificates of Products

LISTED E345944 CE RoHS IEC61643-11

Surge Protective Device

Model & Ordering Code (1P/2P Mode)

Model	Ordering Code	MCOV/Uc	Up	Ures	UPC/EAN Code
WTH-40/C/1P-PV100	US120339	100Vdcpv	1.3kV	0.8kV	(0) 811914032151
WTH-40/C/2P-PV100	US120333				(0) 811914032168
WTH-40/C/1P-PV200	US120338	200Vdcpv	1.5kV	1.0kV	(0) 811914032175
WTH-40/C/2P-PV200	US120337				(0) 811914032182
WTH-40/C/1P-PV300	US120403	300Vdcpv	1.7kV	1.2kV	(0) 811914032199
WTH-40/C/2P-PV300	US120393				(0) 811914032205
WTH-40/C/1P-PV400	US120404	400Vdcpv	1.9kV	1.4kV	(0) 811914032212
WTH-40/C/2P-PV400	US120394				(0) 811914032229
WTH-40/C/1P-PV500	US120386	500Vdcpv	2.2kV	1.6 kV	(0) 811914032236
WTH-40/C/2P-PV500	US120385				(0) 811914032243
WTH-40/C/1P-PV600	US120336	600Vdcpv	2.4kV	1.8kV	(0) 811914032250
WTH-40/C/2P-PV600	US120332				(0) 811914032267
WTH-40/C/1P-PV800	US120402	800Vdcpv	2.8kV	2.2kV	(0) 811914032274
WTH-40/C/2P-PV800	US120392				(0) 811914032281
WTH-40/C/1P-PV1000	US120401	1000Vpvdc	3.4kV	2.8kV	(0) 811914032298
WTH-40/C/2P-PV1000	US120391				(0) 811914032304

Watchful EyE

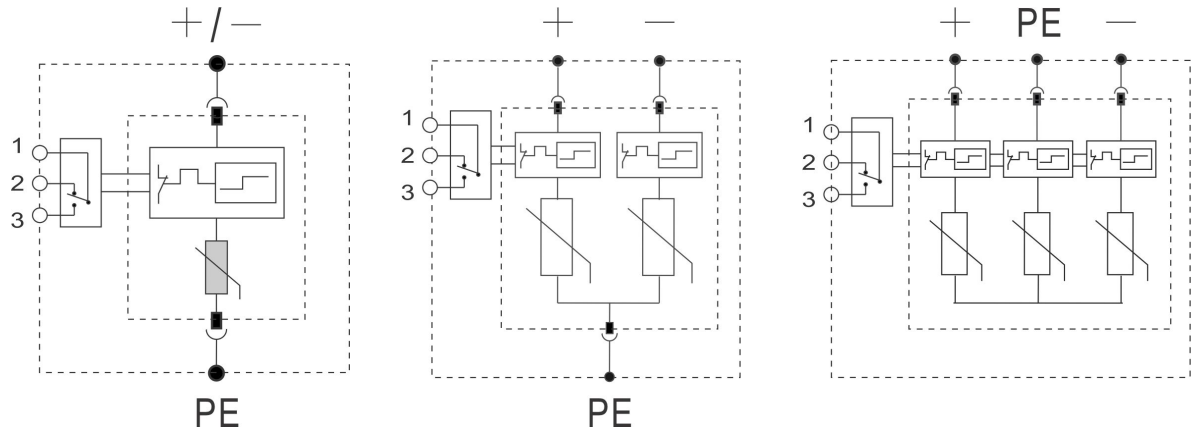
Surge Protective Device

Description

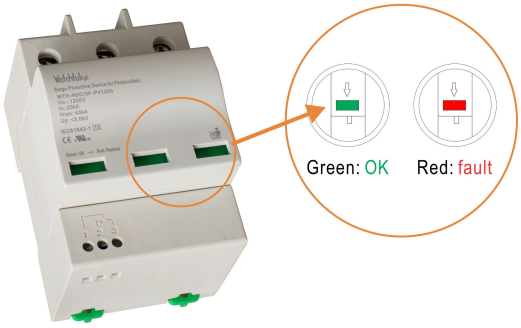
In accordance with: IEC 61643-11 - Class II and UL1449 Type 4 Location
Suitable for off-grid PV system or grid-connected system
Location of use: DC System, DCpv System, Photovoltaic Combiner Box, Photovoltaic Power Supply Box
Plug-in module and separate base design enables convenient maintenance.
Internal thermal disconnect devices help ensure safe or at end-of-life

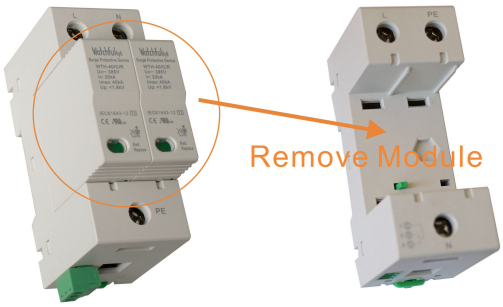
WTH-40/C Photovoltaic Series Technical Data	
Requirement Class to IEC61643-11	Class II
IEEE Category Rating	B & A
Nominal Discharge Current (In)	20kA
Max. Discharge Current (Imax)	40kA
Protection Modes	DC+/PE, DC-/PE, DC+/DC-
Protective Element	MOV
Follow Current (If)	NO
Response Time (tA)	<5ns
Leakage Current (at 75%U1mA)	<20μA
Thermal Protection	YES
Protection Rating (IP Code)	IP 20
Short Circuit Current Ratings (SCCR)	25kA rms
Max. Back-up Fuse (if mains >80A)	80A gL (circuit-breaker: <40A)
Surge Life at 3kA (8/20μs)	>5000 events
Temperature Range	- 40°F to 176°F (-40°C to 80°C)
Relative Humidity	0% to 95% noncondensing
Maximum Operating Altitude	10,000 feet (3000m)
Terminal Cross Section	35mm² (solid) / 25mm² (stranded)
Stripping Length Contacts	0.6inches (15mm)
Terminal Screw Torque	Max. 3.5Nm
DIN Rail EN60715	35mm top-hat rail
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Modular design

Surge Protection Connection Diagram



Fault Indication (same indication in 1P/2P/3P models)





Remote Contacts (Dry Contacts)

1: COM (Common)
2: NC (Normally Close)
3: NO (Normally Open)

Contact Ratings	125VAC/3A, 250VAC/1.5A
Terminal Cross Section	Max. 1.5mm²
Stripping Length Contacts	0.25 inches (6-7mm)
Remote Terminal Torque	0.25Nm

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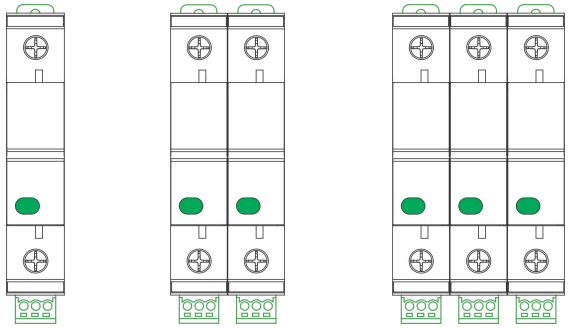
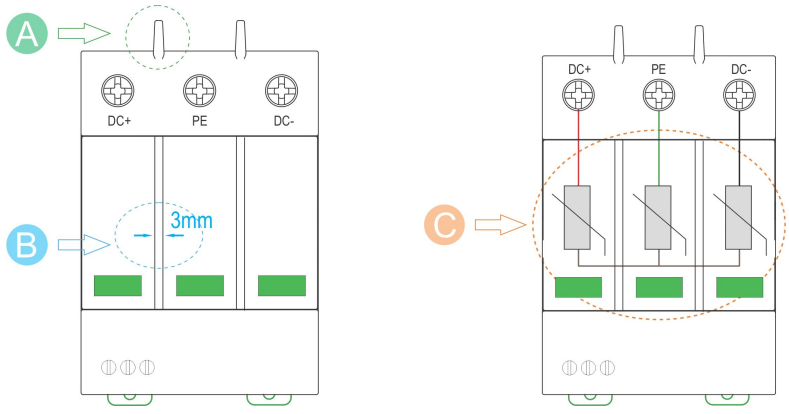
1P mode

Single modules can be combined with a bus bar in multiple combination methods.



Three features of 3P mode strengthening protection

A: The isolated barrier between two modules
B: 3mm-wide gap between two modules
1. Increase creepage distance
2. Increase the capacity of insulation isolation and make the connection more secure
3. More important for the application with MCOV (Uc) higher than 800Vdc



C: Two MOVs are connected in series between each line to make the conduction voltage of common mode and differential mode surge protection achieve the best balance, and the Up value between all lines is kept on a horizontal level.

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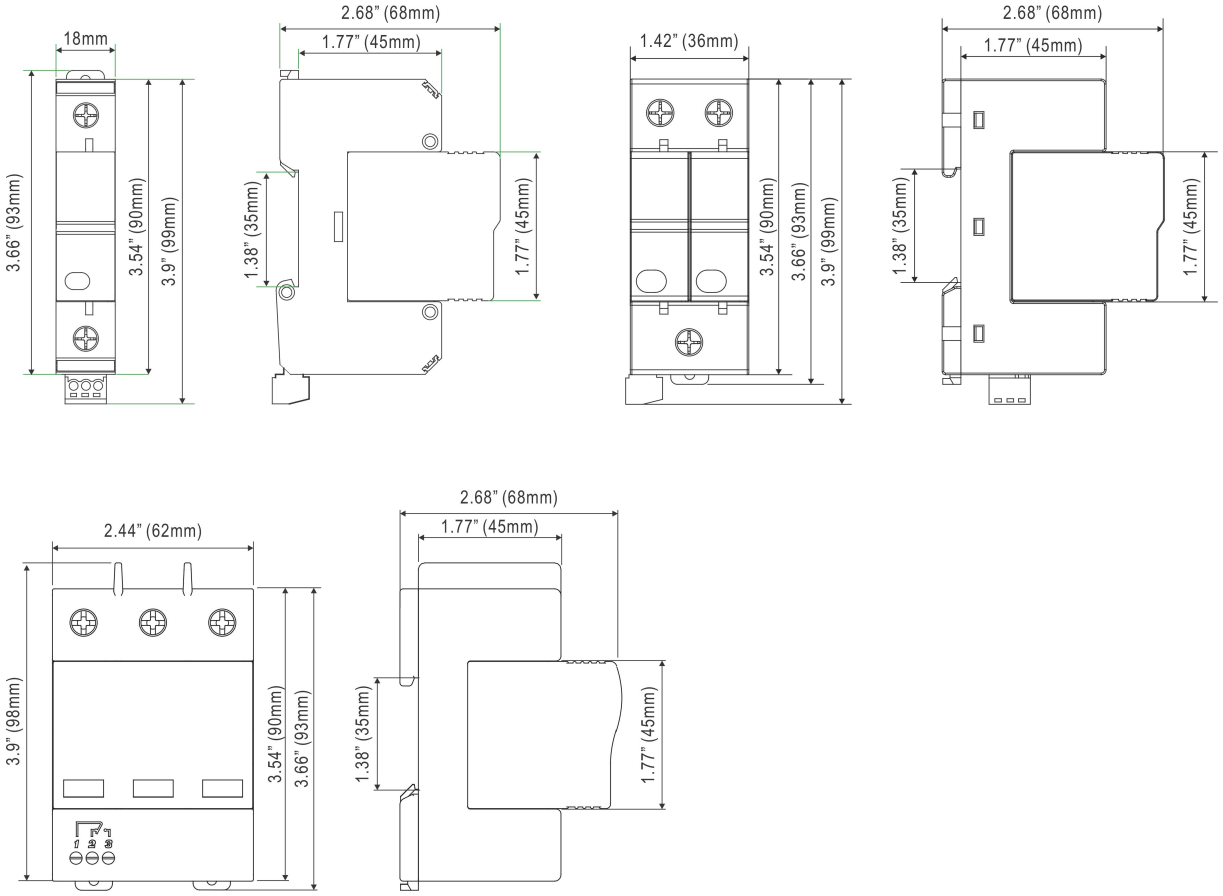
Dimensions


18mm
3.66" (93mm)
3.54" (90mm)
3.9" (99mm)
2.68" (68mm)
1.77" (45mm)
1.38" (35mm)
1.77" (45mm)
1.42" (36mm)
3.54" (90mm)
3.66" (93mm)
3.9" (99mm)
2.68" (68mm)
1.77" (45mm)
1.38" (35mm)
1.77" (45mm)
2.44" (62mm)
3.9" (98mm)
3.54" (90mm)
3.66" (93mm)
2.68" (68mm)
1.77" (45mm)
1.38" (35mm)
1.77" (45mm)

Common Terms and Definitions

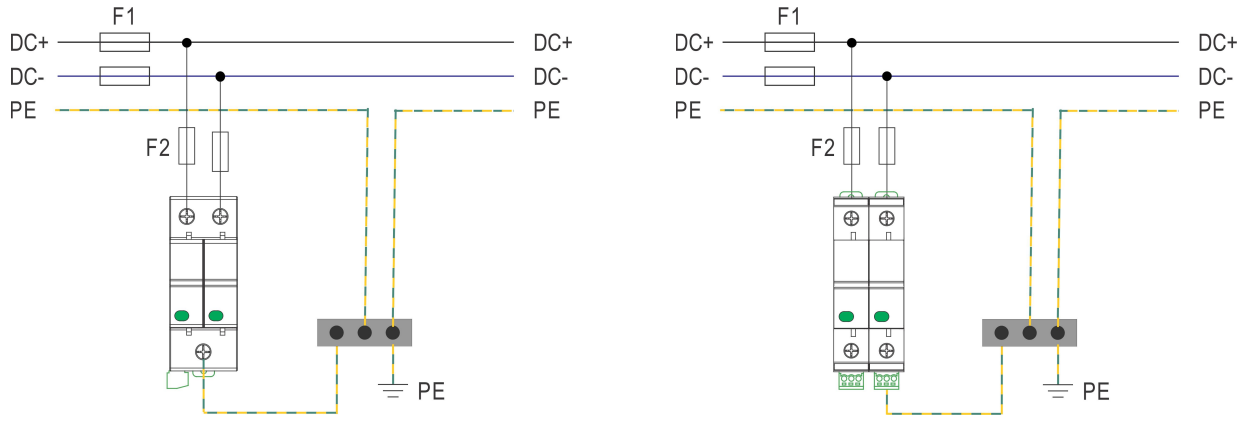
1. Normal operating voltage rating (Un)
2. Maximum Continuous Operating Voltage (Uc/MCOV):
Maximum r.m.s. voltage, which may be continuously applied to the surge protective device's mode of protection.
3. Nominal Discharge Current for Class II Test (In):
crest value of the current through the surge protective device having a current waveshape of 8/20μs.
4. Maximum Discharge Current (Imax):
Crest value of a current through the surge protective device having an 8/20μs waveshape and magnitude according to the manufacturers specification. Imax is equal to or greater than In.
5. Voltage Protection Level (Up):
Maximum voltage to be expected at the surge protective device terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape.
6. Residual Voltage (Ures):
Crest value of voltage that appears between the terminals of an surge protective device due to the passage of discharge current.
7. IEEE 62.41
CATEGORY C: outdoor overhead lines, service entrance (most severe)
CATEGORY B: major feeder, short branch circuits, service panel (indoor)
CATEGORY A: long branch circuits, receptacles (indoor) (least severe)

How to choose a suitable Uc(MCOV) value

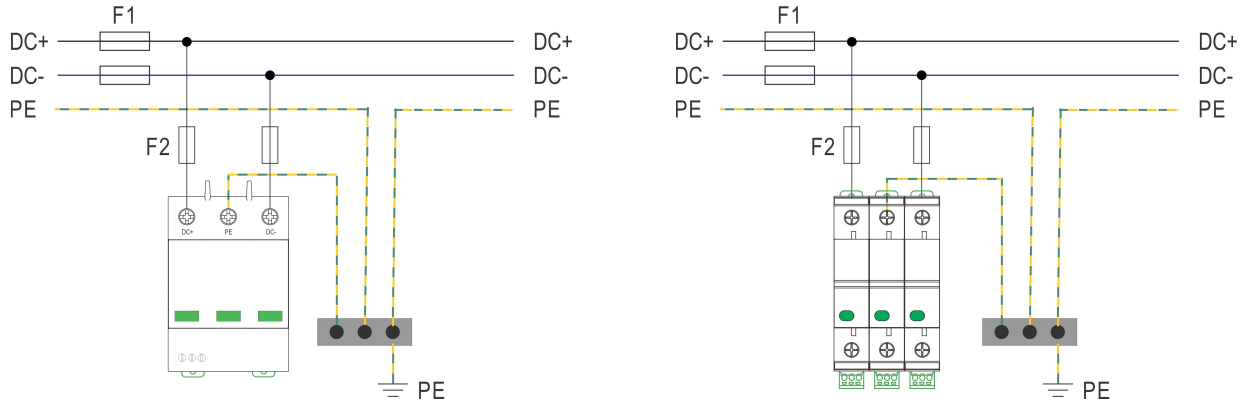
Note: Uc >1.15Un
The relationship between two parameters Uc and Up of a surge protective device is proportional.
If Uc is small, the value of Up is also small; surge protective devices with smaller Up can provide better surge protection.
Whether to choose smaller Uc depends on the voltage stability of the grid.
If you choose surge protective devices with smaller Uc for the grid with instable voltage, the surge protective devices will frequently work while the grid voltage fluctuates, resulting in shortening surge protective device's product life.
If you choose larger Uc, and the value of Up is accordingly large, the surge protective efficiency will not be so fine.
If you are unsure of the voltage stability of the grid,
it is suggested to calculate MCOV(Uc) using the following formula: $\sqrt{2}$ Un < Uc < $\sqrt{3}$ Un

DC System (Un)	MCOV(Uc), DC+/DC-		DC System (Un)	MCOV(Uc), DC+/DC-
70Vdc	100Vdc		560Vdc	800Vdc
140Vdc	200Vdc		700Vdc	1000Vdc
210Vdc	300Vdc		840Vdc	1200Vdc
280Vdc	400Vdc		1120Vdc	1600Vdc
350Vdc	500Vdc		1400Vdc	2000Vdc
420Vdc	600Vdc			

2P Mode Connection Diagram



3P Mode Difference mode & Common mode Connection Diagram



Common mode: DC+ to PE, DC- to PE surge protection
Difference mode: DC+ to DC- surge protection

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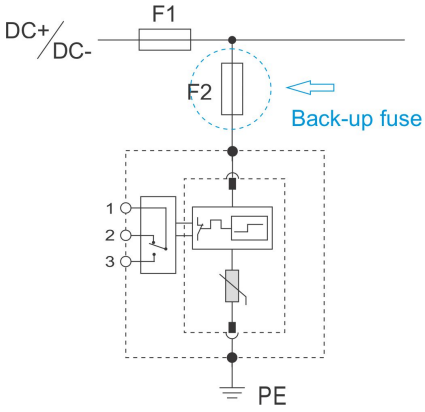
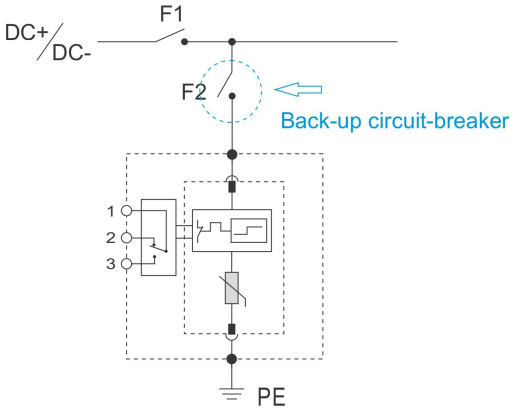
Selection of back-up fuse



F1 > 80A gL ⇨ F2 = 80A gL
F1 ≤ 80A gL ⇨ ~~F2~~

Selection of back-up circuit-breaker



F1 > 40A ⇨ F2 = 40A
F1 ≤ 40A ⇨ ~~F2~~

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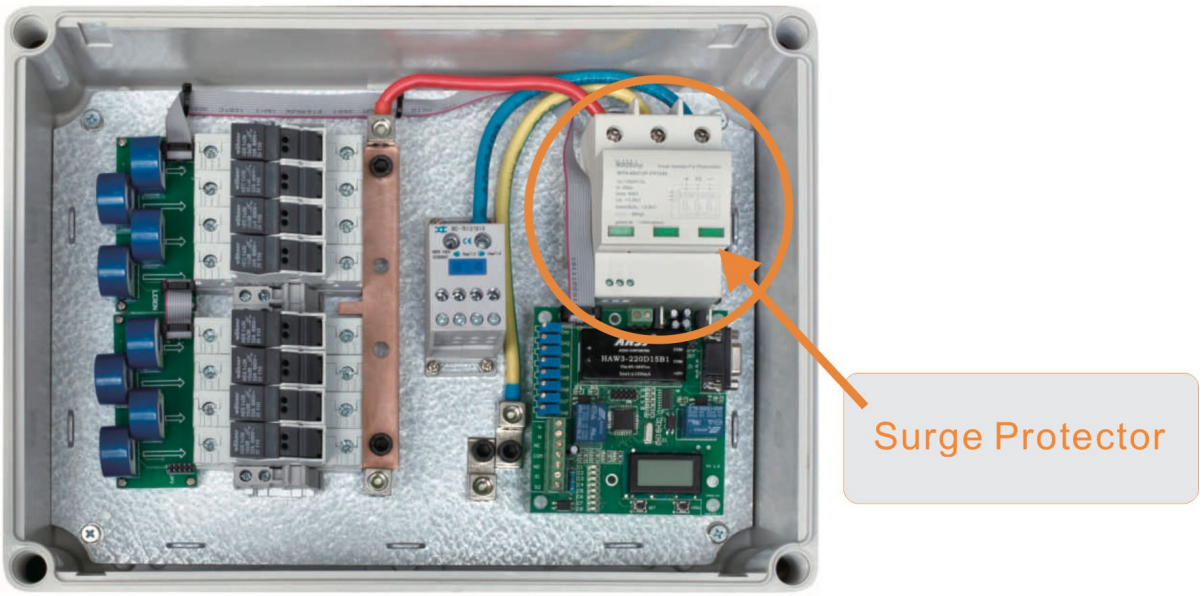
Application



FAQ & Help

1. What should I do if I can't find the paper manual in the product packaging?
Watchful Eye products is committed to going green with paperless data sheets. On the side of each product enclosure is an engraved link with URL for downloading paperless data sheet and QR code of the website. If you need the paper data sheet, you can open the link and print the data sheet by yourself.

2. The advantages of fault indication windows?
If surge protection fails, the fault indication windows will turn red, thus it can be seen intuitively, and the surge protective device can be replaced in time to avoid damage to the equipment caused by a second surge.

3. What instruments can be used to test whether its surge protection function is normal or not?
Test with a Watchful Eye surge protector tester

4. Can you list more applications?
DC System, DCpv System, Photovoltaic Combiner Box, Photovoltaic Power Supply Box

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Watchful Eye provides a 5-year quality warranty globally.

I have a question