



Mount on all terrains, in no time.

The IronRidge Ground Mount System combines our XR1000 rails with locally-sourced steel pipes or mechanical tubing, to create a cost-effective structure capable of handling any site or terrain challenge.

Installation is simple with only a few structural components and no drilling, welding, or heavy machinery required. In addition, the system works with a variety of foundation options, including concrete piers and driven piles.



Rugged Construction

Engineered steel and aluminum components ensure durability.



PE Certified

Pre-stamped engineering letters available in most states.



UL 2703 Listed System

Meets newest effective UL 2703 standard.



Design Software

Online tool generates engineering values and bill of materials.



Flexible Architecture

Multiple foundation and array configuration options.



25-Year Warranty

Products guaranteed to be free of impairing defects.



360° Product Tour
Visit ironridge.com

Substructure

Top Caps



Connect vertical and cross pipes.

Bonded Rail Connectors



Attach and bond Rail Assembly to cross pipes.

Diagonal Braces



Optional Brace provides additional support.

Cross Pipe & Piers



Steel pipes or mechanical tubing for substructure.

Rail Assembly

XR1000 Rails



Curved rails increase spanning capabilities.

UFOs



Universal Fastening Objects bond modules to rails.

Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

Accessories



Wire Clips and End Caps provide a finished look.

Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

Go to ironridge.com/design



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to ironridge.com/training

ALTERNATIVE FOUNDATION METHODS FOR GROUND MOUNT SYSTEMS



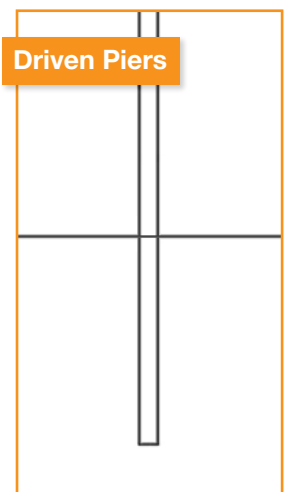
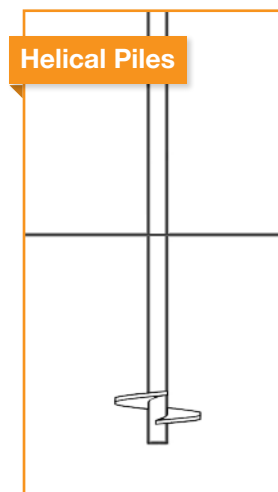
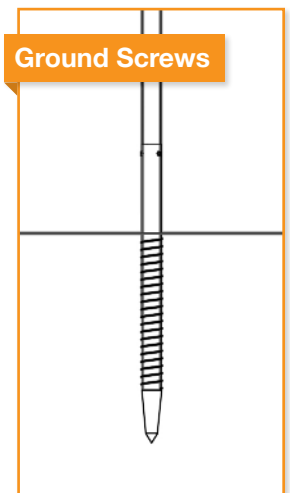
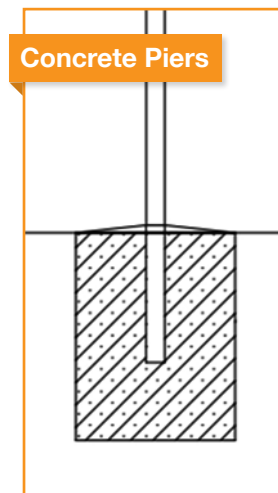
There are various foundation methods for ground-based solar installations outside of poured concrete. This document will discuss each option in detail, and go over the unique considerations associated with each foundation type.

GROUND MOUNT SYSTEM

In the IronRidge Ground Mount System, poured concrete piers or ground screws are used as the standard foundation types. The concrete piers provide excellent resistance to vertical and lateral loads, and can be constructed with readily available materials. Ground (soil/earth) screws are gaining popularity because they're versatile, quick to install, and have a low impact on land drainage.

Using [Ground-based Design Assistant](#) for concrete piers or ground screws gives you standardized design options that will meet a wide range of requirements—and are backed by stamped engineering letters. That approach lowers engineering and permitting costs, enables faster timelines, and reduces risk. You can learn more about the installation process in the [Ground Mount Installation Manual](#).

However, the Ground Mount System can also be installed using alternative foundation methods such as helical piles, driven piers, or even above-ground ballast blocks. Each of these foundation methods comes with its own set of challenges, considerations, and benefits.



HELICAL PILES



These products provide very good resistance to uplift, but provide minimal resistance to lateral loads compared to the standard IronRidge concrete foundations.

Lower lateral load resistance results in:

- Shorter E-W pier spans
- More piers (foundations)
- Additional bracing

All of these factors will increase system costs. From an installation standpoint, these anchors may be faster to install, but increased material, equipment and engineering costs may outweigh any labor savings.

To design a Ground Mount system with these anchors, a Professional Engineer (PE) will need to know the bearing capacity of the soil. For smaller systems, manufacturers of these anchors will come on-site to conduct pull tests to evaluate pullout strength and lateral resistance failure with their anchors. For larger systems, a soils report is typically required in addition to the pull tests. After the capacity of the anchor is determined, the PE can compare it to the reaction forces acting on each footing (provided by [Ground-based Design Assistant](#)) to determine the allowable pier spans. The PE can then provide a letter for the foundation design.

PILE-DRIVEN OR VIBRATORY-DRIVEN PIERS



This foundation method requires analysis to understand the bearing capacity and corrosivity of the soil (performed by a Geotechnical Engineer). From an installation standpoint, specialized equipment and operators are required to install these types of foundations which increases the overall system costs.

Additionally, this option does not utilize a helical blade or screw, which means that it will have a lower resistance to uplift forces. This necessitates deeper foundations. As with a helical pile, a PE will be required to determine the pier depth and spacing, and provide a letter for the foundation design.

BALLASTED SYSTEMS



This is a common foundation method especially for brownfield sites, such as landfills, where there is a cap layer that cannot be penetrated. Ballast foundations can be either cast-in-place or pre-cast depending on project requirements and shipping costs.

To design a system with this foundation type, a PE must determine how large the concrete blocks need to be based on the reaction forces of the system (provided by [Ground-based Design Assistant](#)). The PE can then provide a letter for the foundation design.

Q.PEAK DUO BLK-G10+ 350-370

ENDURING HIGH
PERFORMANCE



Quality
Controlled PV

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BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (~1500 V, 96h)

² See data sheet on rear for further information.

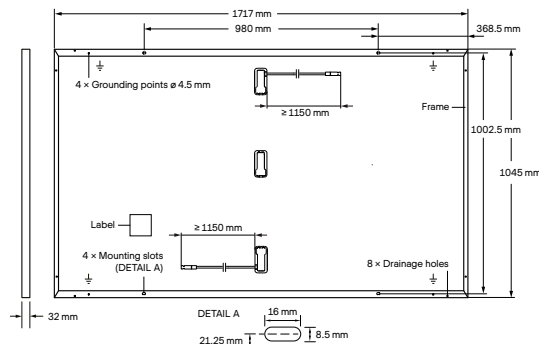
THE IDEAL SOLUTION FOR:



Rooftop arrays on
residential buildings

MECHANICAL SPECIFICATION

Format	1717 mm × 1045 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 1150 mm, (-) ≥ 1150 mm
Connector	Stäubli MC4; IP68

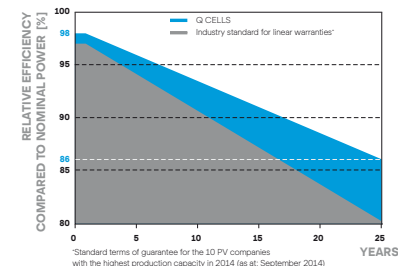


ELECTRICAL CHARACTERISTICS

POWER CLASS				350	355	360	365	370
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / – 0 W)								
Minimum	Power at MPP ¹	P _{MPP}	[W]	350	355	360	365	370
	Short Circuit Current ¹	I _{SC}	[A]	10.97	11.00	11.04	11.07	11.10
	Open Circuit Voltage ¹	V _{OC}	[V]	41.11	41.14	41.18	41.21	41.24
	Current at MPP	I _{MPP}	[A]	10.37	10.43	10.49	10.56	10.62
	Voltage at MPP	V _{MPP}	[V]	33.76	34.03	34.31	34.58	34.84
	Efficiency ¹	η	[%]	≥19.5	≥19.8	≥20.1	≥20.3	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²								
Minimum	Power at MPP	P _{MPP}	[W]	262.6	266.3	270.1	273.8	277.6
	Short Circuit Current	I _{SC}	[A]	8.84	8.87	8.89	8.92	8.95
	Open Circuit Voltage	V _{OC}	[V]	38.77	38.80	38.83	38.86	38.90
	Current at MPP	I _{MPP}	[A]	8.14	8.20	8.26	8.31	8.37
	Voltage at MPP	V _{MPP}	[V]	32.24	32.48	32.71	32.94	33.17

¹Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2°C, AM 1.5 according to IEC 60904-3 • 2800 W/m², NMOT, spectrum AM 1.5

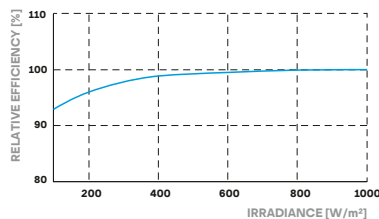
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°C]	43 ± 3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V _{SYS}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I _R	[A]	20	Fire Rating based on ANSI / UL 61730	C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty	-40°C - +85°C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland;
IEC 61215:2016; IEC 61730:2016.
This data sheet complies
with DIN EN 50380.
QCPV Certification ongoing.



Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH

Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range ²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit ³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

2. Nominal voltage range can be extended beyond nominal if required by the utility.

3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

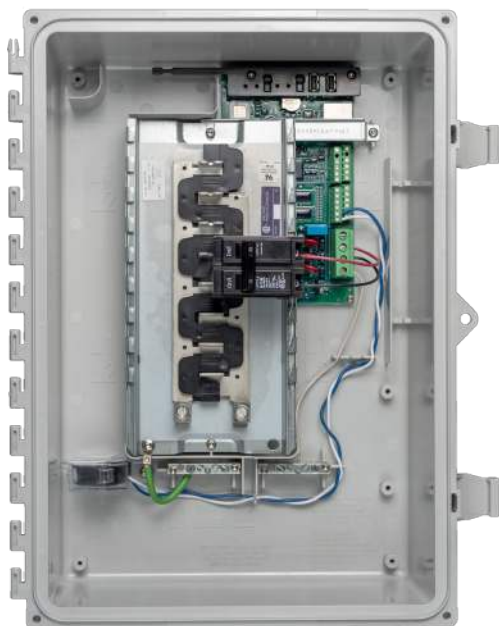
To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed



LISTED

To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER

IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
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ACCESSORIES and REPLACEMENT PARTS (not included, order separately)

Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
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Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
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Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
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EPLC-01	Power line carrier (communication bridge pair), quantity 2
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XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
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XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
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ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy

MECHANICAL DATA

Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors 60 A breaker branch input: 4 to 1/0 AWG copper conductors Main lug combined output: 10 to 2/0 AWG copper conductors Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)

COMPLIANCE

Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit enphase.com

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2018-09-13

