Temperature Monitor Specifications

The A6630 Temperature Monitor is designed for extremely high reliability for the plant's most critical rotating machinery. This 1-slot mult-channel monitor is used together with other CSI 6500 monitors to build a complete API 670 machinery protection monitor. Applications include steam, gas, compressors, and hydro turbomachinery.

The main function of the Temperature Monitor is to input RTD and thermocouple temperature sensors and confidently protect machinery by comparing temperature levels against alarm setpoints as well as driving alarms and relays. Temperature monitoring along with vibration and position measurements provides better fault confirmation, which leads to increased availability and safety.

Machinery protection applications include radial and thrust bearing metal temperature. Important process temperature values include generator, rotor, and stator winding temperature, oil supply temperature, steam temperature, and ambient temperature.

The CSI 6500 is an integral part of the PlantWeb digital plant architecture and AMS Suite. PlantWeb provides the operator with integrated machinery health combined with the Ovation™ and DeltaV™ process control systems. AMS Suite provides maintenance personnel with advanced predictive and performance diagnostic tools to confidently and accurately determine machine malfunctions early.

- Component of the CSI 6500 machine monitoring system

- Applicable for thermocouple and RTD (resistance temperature detector) temperature sensors

- No additional sensor transmitter required

- Access to individual card via front RS232 port for configuration and visualization of monitored information

- Readout of all measured data via the serial interfaces

- Extended self-checking facilities for electronic circuits and sensors

- Hot-swappable, monitor may be changed during operation

- Measurements according to API 670 requirements

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Technical Data	

Sensor Input	The following sensor types are supported:
	Thermocouples:
	   Type E −270...1000°C
	   Type J −210...1200°C
	   Type K −270...1372°C
	   Type T −270...400°C
	   Signal voltage range: ±500mV
	
	RTDs:
	   PT100 (α=0,00385)−200...850°C
	   PT100 (α=0,00392)−200...660°C
	   Ni100 (α=0,00549)−60…180°C
	   Ni120 (α=0,00672)−80...260°C
	   Cu10 (α=0,00427)−200...260°C
	   Range of measurable resistors: 0...1000kΩ
	These inputs are galvanically isolated from the rest of the monitor circuits.

Sensor supply	Each channel is equipped with an integrated sensor power supply.
	Thermocouples:
	   Bias voltage for isolated thermocouples
	
	RTDs:
	   Constant current supply: 250µA ...1mA
	   Voltage: 4V

Power supply	Redundant supply via two supply inputs (decoupled diodes). At least one supply input is required for the supply of the module. Supply voltage: 24 (18...31.2) VDC according to IEC 654−2; class DC4 Power consumption: max. 8 W
Control inputs	Two logic binary inputs are available for all channels for two of the following features: ■ Reset max measured temperature ■ Reset latching relays ■ Limit Blocking Control inputs designed as 24V logic (active Low inputs) Low: 0...3V; High: 13...48V Input resistance: ≥30 kΩ
Current outputs	Nominal range: 0/4...20 mA or 20...4/0 mA open and short circuit proof Permissible load: ≤500 Ω Resolution: 16 bit
Optocoupler Outputs	Six collector / emitter outputs U_{ce} = 48 VDC I_{ce} = 100 mA
Mechanical construction	Circuit board: European standard size according to DIN 41494 100 x 160 mm / 3.94 x 6.30 in Connector: DIN 41612, type F 48 M Module width: 6 HP 30 mm / ≈ 1.18 in Module height: 3 RU 128,4 mm / ≈ 5.06 in Length: 160 mm / ≈ 6.30 in Net weight: approx. 320 g / 11.29 oz Gross weight: approx. 450 g / 15.87 oz

Measuring Modes

The measuring modes can be set by means of the configuration software.

Each channel can be configured individually via the configuration software.

The configuration can be changed at any time during operation. When changed, the measuring operation of the module will be stopped for approximately 15 seconds.

Function and Design

Two modes of operation are user selectable:

- Subtype "RTD Mode" is used for temperature module inputs of type Resistance Temperature Device.

- Subtype "TC" is used for temperature module inputs of type Thermocouple (TC).

For each temperature module with thermocouple inputs, an RTD must be used for cold junction compensation (CJC).

Programmable Measuring Parameters

- Measuring range
- Measurement type
- Sensor types
- Alarm function and limits
- Current outputs can be freely assigned to the input channels
- Digital outputs can be freely assigned to the input channels

- Digital outputs are configurable for use as normally open or normally closed
- Channel identification: freely selectable by means of a point ID and a description

Limit Supervision

Six digital outputs with separately adjustable limit values are available.

The alarm output functions can be blocked by means of the channel clear/circuit fault function or by an external binary input.

After downloading the configuration parameters, the alarm function will be locked for the duration of the settling time of approximately 15 seconds.

Adjustable range of the limit values:
  0...100 % of the measuring range

Resolution and reproducibility:
  1 % of the measuring range

Delay time:
  0...25.5 seconds, selectable

Switching characteristic:
  with increasing signal levels

Switching hysteresis:
  only effective during decreasing signal values

Module and Sensor Supervision

The internal module supervision includes the following functions:

- Sensor signal within a preset OK range
- Wiring between sensor and module (open and short circuit detection)
- System supply voltages within preset limits
- Configuration and parameter settings
- Internal temperature of module
- System watchdog

While changing from a sensor malfunction into the OK-status and after switching on the module, all functions are locked for a settling time of 15 seconds.

The "Channel clear" is visualized on the front of the module by means of a green LED. This LED switches off during a "channel fault". During a delay time or during settling time, this LED flashes.
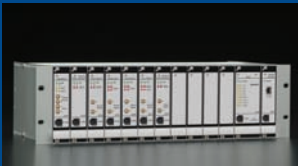
Detailed information about reasons for a "channel fault" indication can be seen through the module configuration software.

Operating Elements at the Module Front

- 2 green LEDs indicate channel clear and power OK
- 6 yellow LEDs indicate the logical conditions of the binary outputs
- 1 mini-DIN diode type socket, RS-232 connector for configuration cable

- Front panel handle allows custom identification labeling and is used to insert and remove module

System Design

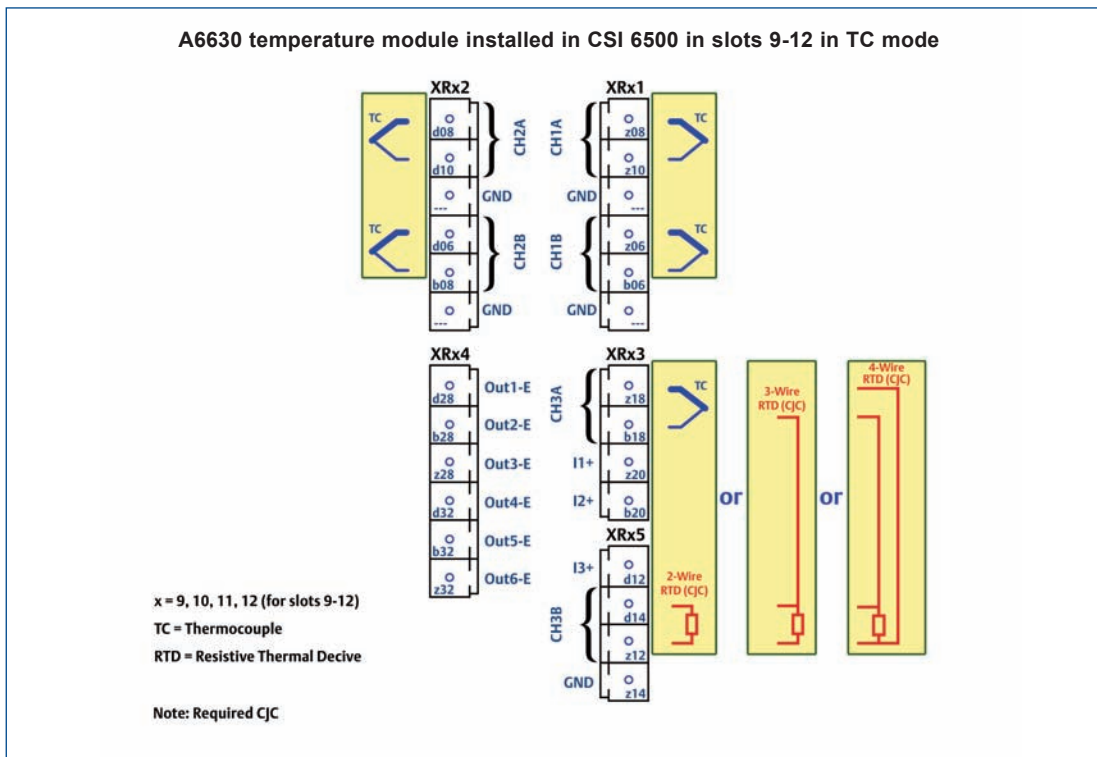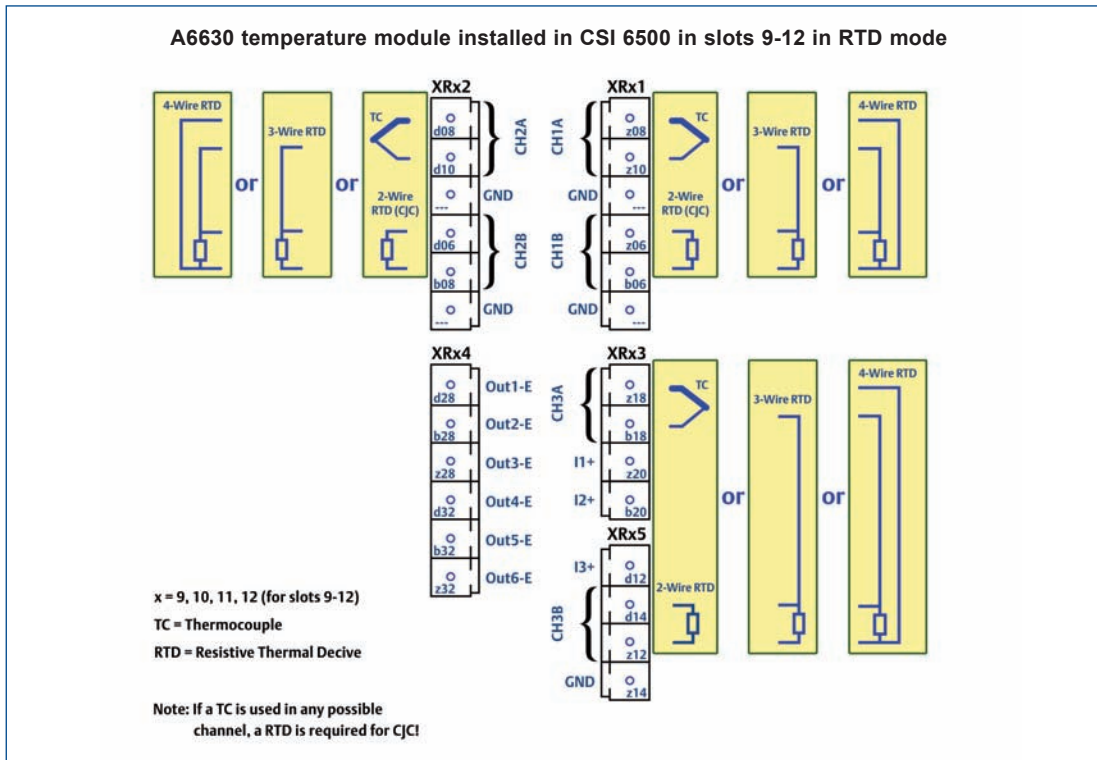The following table provides an overview of the number of input channels and current outputs that are possible with the various chassis options.

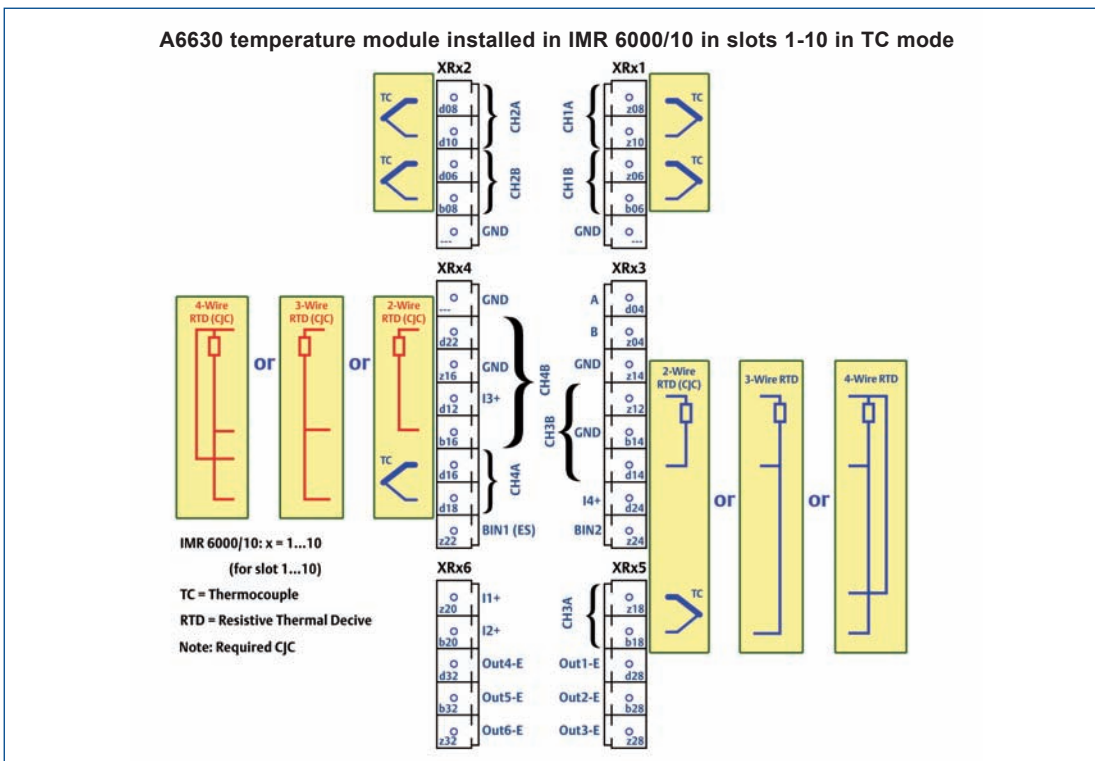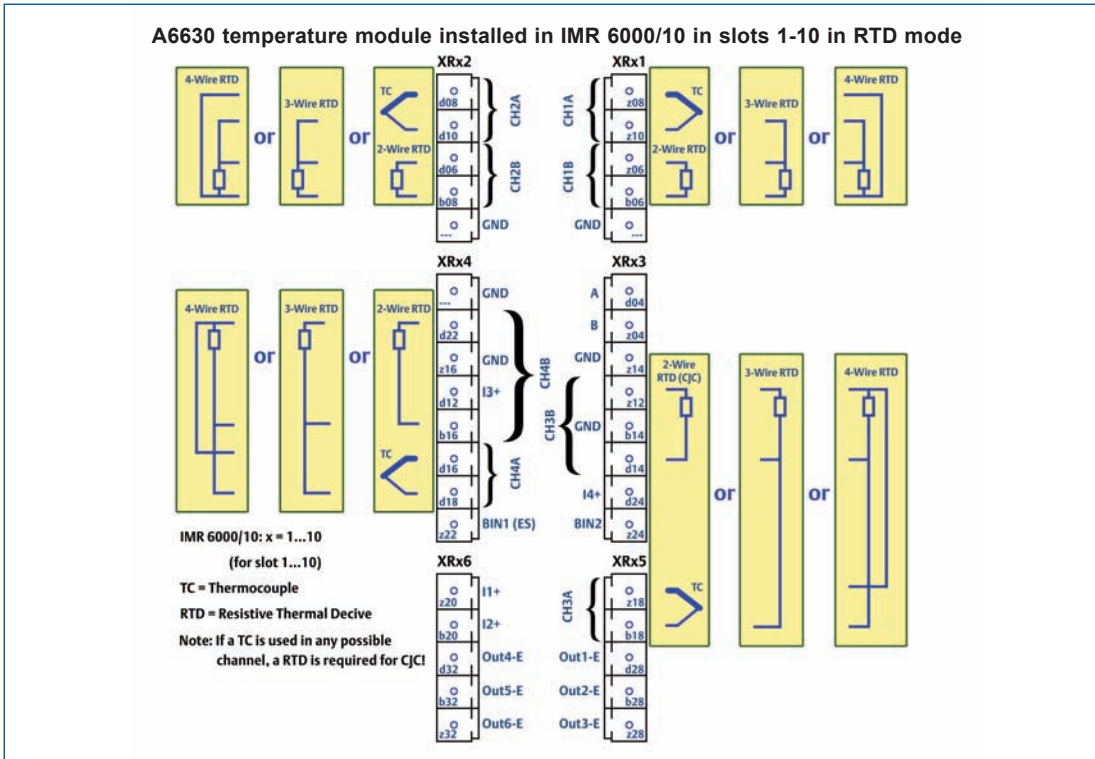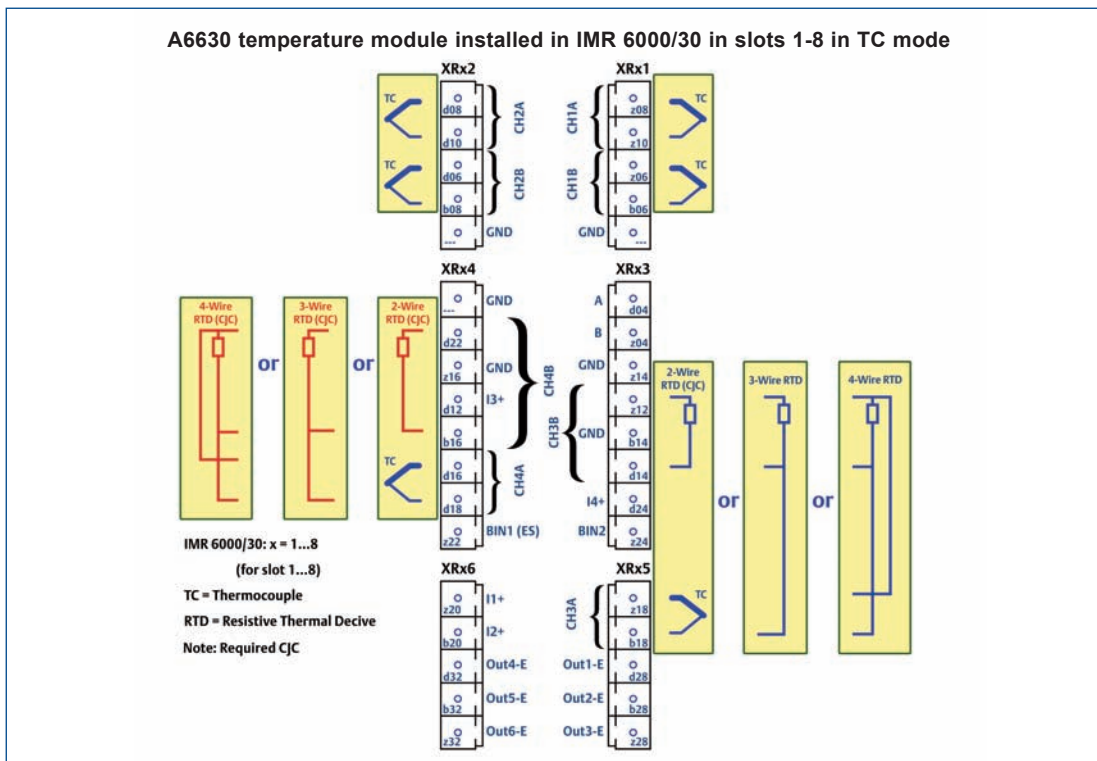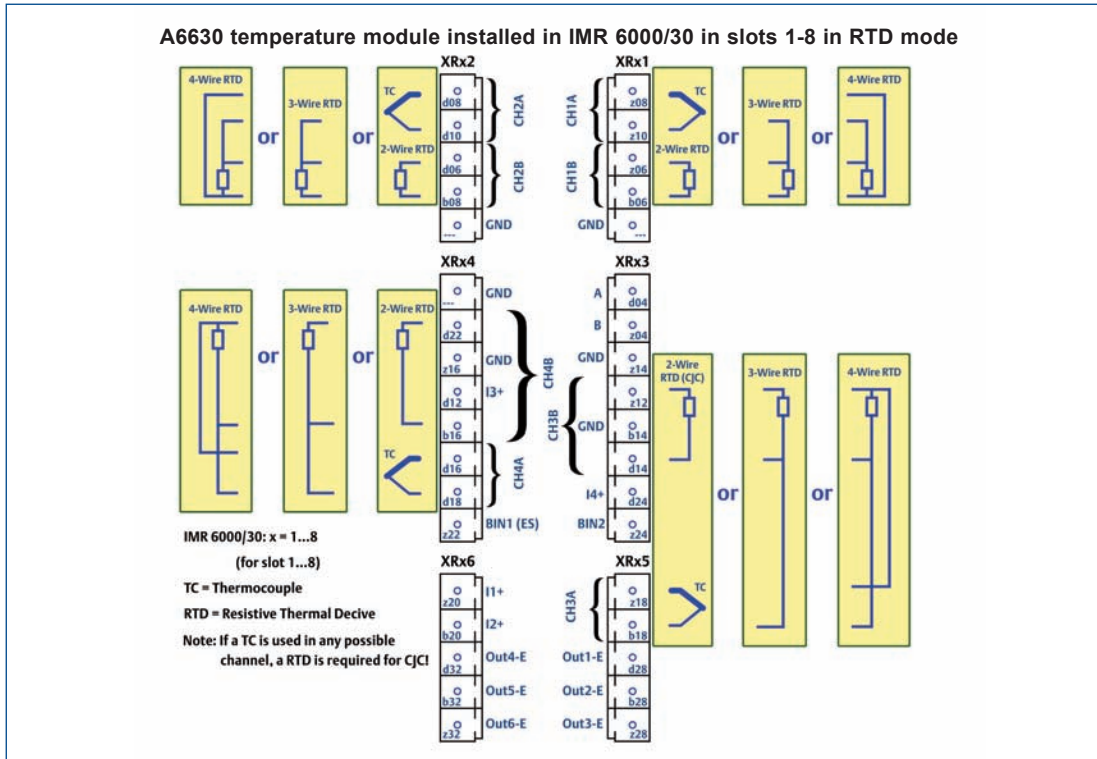|	RTD[1] Input Channels Per Module	Thermocouple[2] Input Channels Per Module	4-20mA out Per Module
Slots 9 - 12	3	5	3
	RTD[1] Input Channels Per Module	Thermocouple[2] Input Channels Per Module	4-20mA out Per Module
All slots	4	6	4

[1]RTDs are the API 670 standard
[2]Thermocouples are used in API 670 when specified
More combinations are possible, for example, mixing RTD's and TC on same module

The following are wiring diagrams for all possible sensor termination options:

A6630 temperature module installed in CSI 6500 in slots 9-12 in RTD mode

A6630 temperature module installed in CSI 6500 in slots 9-12 in TC mode

A6630 temperature module installed in IMR 6000/10 in slots 1-10 in RTD mode

A6630 temperature module installed in IMR 6000/10 in slots 1-10 in TC mode

A6630 temperature module installed in IMR 6000/30 in slots 1-8 in RTD mode

A6630 temperature module installed in IMR 6000/30 in slots 1-8 in TC mode

CSI 6500 Machinery Health™ Monitor

Environmental Conditions

- Protection class:
  module:
    IP00 according to DIN 40050
  front plate:
    IP21 according to DIN 40050

- Climate conditions:
  according to DIN 40040,
  class KTF operating
  temperature range:
  0...+65°C / +32...+149°F

- Temperature range for storage
  and transport:
  -30...+85°C / -22...185°F

- Permissible relative humidity:
  5....95%, noncondensing

- Permissible vibration:
  according to EN-IEC
  60068-2-6

- Permissible shock:
  according to EN−IEC
  60068−2−27

- EMC:
  according to
  EN−IEC 61326−1

Configuration PC Requirements

The temperature monitor can be configured using the supplied interface cable connected to the temperature monitor front panel serial interface. The computer used to configure the temperature monitor should meet the following minimal requirements:

- Processor:
  Pentium III or higher

- Required space on fixed disk:
  minimum 300MB available hard disk space

- Operating system:
  Windows XP or up to current Microsoft operating system

- Drive: CD-ROM

- Interfaces:
  a RS232 9-pin D serial connection such as COM1

Order Numbers

A6630	Temperature Monitor	9100-00001
Accessories:	Configuration software for CSI 6500 monitors	9510-00027

Warning note

Installation and commissioning of the monitor may only be made by trained staff. The manufacturer is not liable for damages which were caused by improper use or by operation errors of unauthorized persons.

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