FB1100/FB1200 Flow Computer CPU Module Field Replacement Guide

For Part Numbers (Kits):

- 399134018-KIT: CPU (DC power only)
- 399393-01-0: CPU (with lithium battery board)
- 399381-01-1: CPU (with lead acid battery board)
- 399381-02-0: CPU (with lead acid battery board - Enersys)

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Device Safety Considerations

- ## Reading these Instructions

  Before operating the device, read these instructions carefully and understand their safety implications. In some situations, improperly using this device may result in damage or injury. Keep this manual in a convenient location for future reference. Note that these instructions may not cover all details or variations in equipment or cover every possible situation regarding installation, operation, or maintenance. Should problems arise that are not covered sufficiently in the text, immediately contact Customer Support for further information.

- ## Protecting Operating Processes

  A failure of this device – for whatever reason -- may leave an operating process without appropriate protection and could result in possible damage to property or injury to persons. To protect against this, you should review the need for additional backup equipment or provide alternate means of protection (such as alarm devices, output limiting, fail-safe valves, relief valves, emergency shutoffs, emergency switches, etc.). Contact Remote Automation Solutions for additional information.

- ## Returning Equipment

  If you need to return any equipment to Remote Automation Solutions, it is your responsibility to ensure that the equipment has been cleaned to safe levels, as defined and/or determined by applicable federal, state and/or local law regulations or codes. You also agree to indemnify Remote Automation Solutions and hold Remote Automation Solutions harmless from any liability or damage which Remote Automation Solutions may incur or suffer due to your failure to ensure device cleanliness.

- ## Grounding Equipment

  Ground metal enclosures and exposed metal parts of electrical instruments in accordance with OSHA rules and regulations as specified in *Design Safety Standards for Electrical Systems*, 29 CFR, Part 1910, Subpart S, dated: April 16, 1981 (OSHA rulings are in agreement with the National Electrical Code). You must also ground mechanical or pneumatic instruments that include electrically operated devices such as lights, switches, relays, alarms, or chart drives.
  Important: Complying with the codes and regulations of authorities having jurisdiction is essential to ensuring personnel safety. The guidelines and recommendations in this manual are intended to meet or exceed applicable codes and regulations. If differences occur between this manual and the codes and regulations of authorities having jurisdiction, those codes and regulations must take precedence.

- ## Protecting from Electrostatic Discharge (ESD)

  This device contains sensitive electronic components which be damaged by exposure to an ESD voltage. Depending on the magnitude and duration of the ESD, it can result in erratic operation or complete failure of the equipment. Ensure that you correctly care for and handle ESD-sensitive components.

System Training

A well-trained workforce is critical to the success of your operation. Knowing how to correctly install, configure, program, calibrate, and trouble-shoot your Emerson equipment provides your engineers and technicians with the skills and confidence to optimize your investment. Remote Automation Solutions offers a variety of ways for your personnel to acquire essential system expertise. Our full-time professional instructors can conduct classroom training at several of our corporate offices, at your site, or even at your regional Emerson office. You can also receive the same quality training via our live, interactive Emerson Virtual Classroom and save on travel costs. For our complete schedule and further information, contact the Remote Automation Solutions Training Department at 800-338-8158 or email us at *education@emerson.com*.

Ethernet Connectivity

This automation device is intended to be used in an Ethernet network which **does not** have public access. The inclusion of this device in a publicly accessible Ethernet-based network is **not recommended**.

Replacing the CPU Module

You can replace the CPU module in the field provided that the replacement is the identical CPU type. Depending upon the CPU type, the CPU module may have one or more additional boards ("daughter boards") sitting on the main CPU board. The procedure for replacing the module is the same, with the exception that for the FB1200, if you purchased the optional 6-channel expansion I/O module, you must disconnect it from the old CPU so you can re-connect it to the new CPU.

Restriction
Hazardous area approvals request that any part replaced in the field be the exact same part ("like-for-like"). Upgrading or substituting different parts violates hazardous area certification.

Refer to the table below for the correct field replacement part number.

Item	Field Replacement Kit Part Number
CPU board with DC power only	395620-03-1
CPU board with lithium battery board (FB1100 only)	399393-01-0
CPU board with solar (Div. 2 only) /lead acid battery charge board	399381-01-0
CPU board with solar (Div. 2 only)/lead acid battery charge board for Enersys battery	399381-02

Important
When replacing one of the CPU and charger boards used with a lead acid battery, ensure your flow computer has the correct lead acid battery type. To see what type you have, check the part number shown on the label on the bottom of the battery pack enclosure. See the following compatibility chart.

Important
Use **only** accessories (batteries) supplied with the flow computer or sold by Emerson as spare parts for this flow computer. **Substituting** a part you obtain elsewhere (such as a battery) voids your certification.

Charger Board and Lead Acid Battery Compatibility

	CPU Type	
Lead Acid Battery Type	CPU and Charger Board 399381-01-0	CPU and Charger Board 399381-02-0 (for Enersys battery)
399186-01-8	SUPPORTED	NOT SUPPORTED
399457-00-0 (Enersys)	SUPPORTED	SUPPORTED

Ambient Temperature Range

May be used up to a *maximum* ambient temperature of 80°C and a *minimum* ambient temperature of –40°C; refer to the data plate attached to the device for ambient temperature.

Required Tools

- #1 Phillips-head screwdriver
- #2 Phillips-head screwdriver
- 3/32-inch flat head screwdriver (for 3.81 mm pitch terminal block connections and disconnecting the internal connector to the sensor)
- Hexagonal torque wrenches with 3mm, #1, and #2 Phillips-head bits. Ranges must include 1 to 2 in-lbs (0.1 to 0.2 N-m), 4 to 6 in-lbs (0.5 to 0.7 N-m), and 10 to 12 in-lbs (1.1 to 1.4 N-m).

Electrical Ratings

- **Input Voltage**: 5.7-30Vdc, 10 Watts Max
- **I/O Ratings** (FB1200 Flow Computer):
  - 4 Digital Outputs: 0.5A, 24Vdc
  - 2 Analog Outputs: 4-20 mA

⚠ WARNING

EXPLOSION HAZARD –Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

⚠ WARNING

EXPLOSION HAZARD -Substitution of any components may impair suitability for Class I, Division 1 or Class I, Division 2.

⚠ DANGER

EXPLOSION HAZARD: Ensure the area in which you perform this operation is non-hazardous. Performing this operation in a hazardous area could result in an explosion.

⚠ DANGER

EXPLOSION HAZARD: Never remove end cap(s) in a hazardous location. Removing cover(s) in a hazardous location could result in an explosion.

Removing/Replacing the CPU Module

UL Listed CPU Module Field Installed Accessory Kit for use in Class I, Division 1, Groups C, and D; and Class I, Division 2, Groups A, B, C, and D.

- Flow Computer CPU Board with DC power only Field Installed Accessory Kit Part No. 399134018-KIT for use with UL Listed Model Series FB1100 and FB1200.
- Flow Computer CPU Board with lithium battery board Field Installed Accessory Kit Part No. 399393-01-1 for use with UL Listed Model Series FB1100.
- Flow Computer CPU board with solar/lead acid battery charge board Field Installed Accessory Kit Part No. 399381-01-0 for use with UL Listed Model Series FB1100 and FB1200.

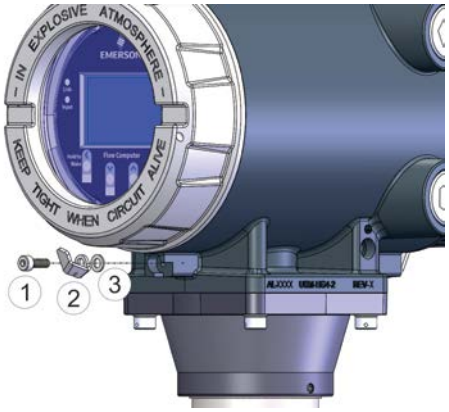
- Flow Computer CPU board with solar/Enersys lead acid battery charge board Field Installed Accessory Kit Part No. 399381-02-0 for use with UL Listed Model Series FB1100 and FB1200.

⚠ CAUTION

If your flow computer uses lead acid battery pack 399186-01-8 and you need to replace the CPU and battery charge board, you **must** select kit 399381-01-0 because the 399186-01-8 battery is not supported by the Enersys charge board.

1. Remove the front and rear end caps. Remove the retaining clamps on the end caps (if present) using a 3 mm hexagonal wrench.

Components of Retaining Clamp Assembly



1 Screw
2 Retaining Clamp
3 Washer

2. Grasp the end cap.

Front End Cap

Rear End Cap

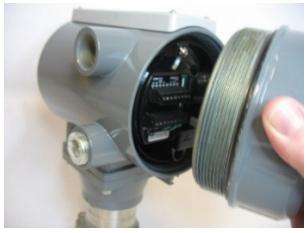
3. Unscrew the end cap by turning it counter-clockwise until it comes off. Set the end cap aside in a safe location.

Note

If you need more leverage, place a long screwdriver or other appropriate tool across the two notches in the end cap to act as a pry bar.

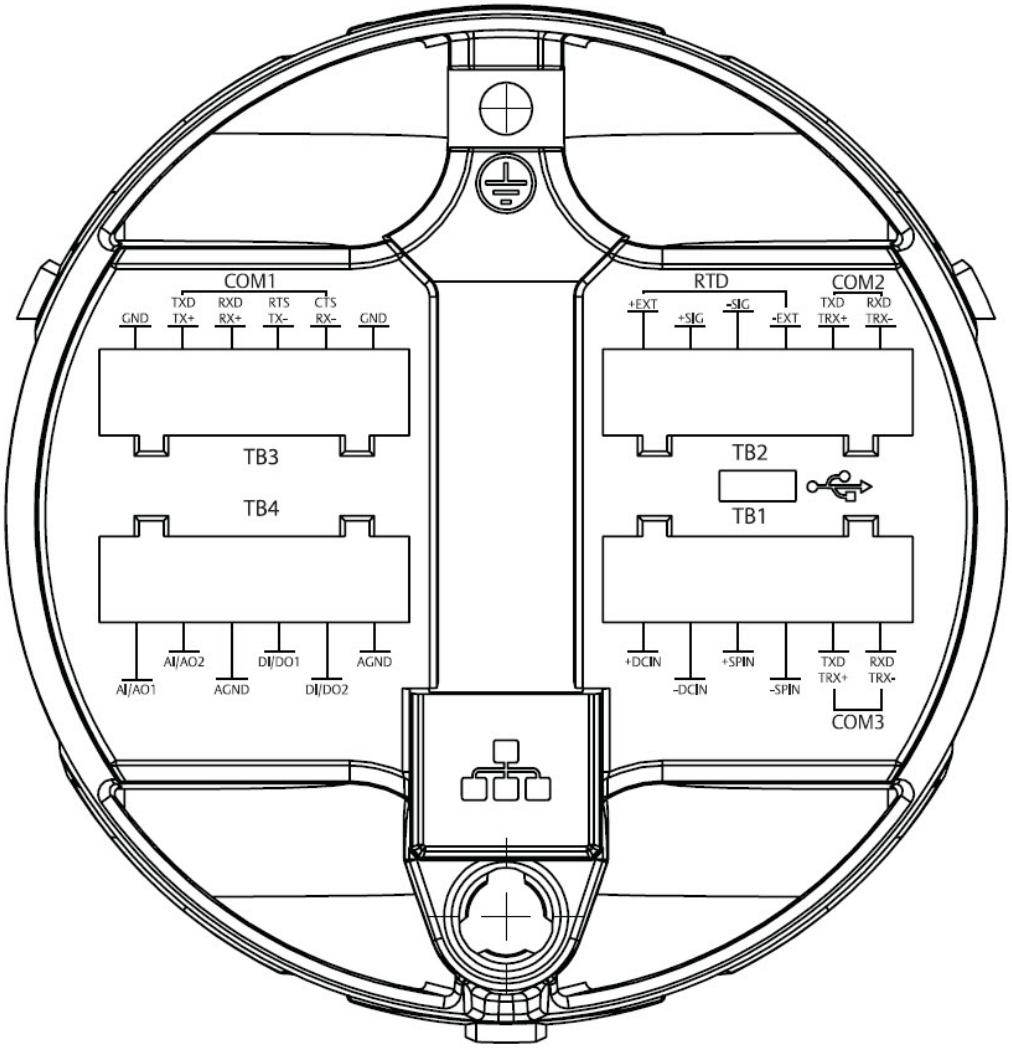
Front End Cap (unscrewed)

Rear End Cap (removed)

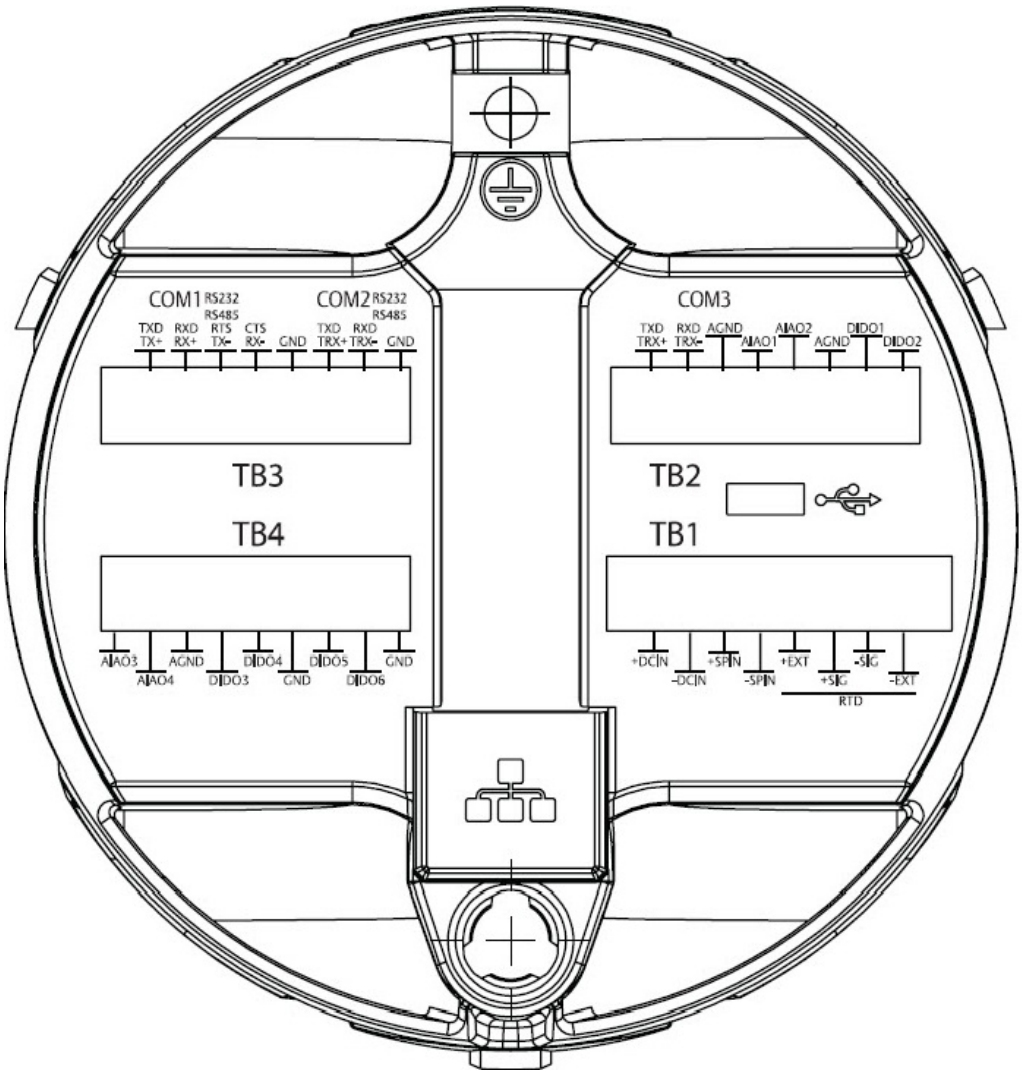


4. Unplug terminal block TB1 to disconnect main power. TB1 has either six connectors or eight connectors. See the graphics below for detail:

TB1 (Six connectors)



TB1 (Eight connectors)



5. With a #2 Phillips-head screwdriver, loosen the two captive fastening screws in the recessed areas of the battery pack enclosure.

Note

Not all units include an internal battery but the battery enclosure is always present.

Captive Screws

6. With a #1 Phillips-head screwdriver, loosen the two bottom captive fastening screws on the HMI module. Leave the two top screws on the HMI module connected to the battery pack enclosure.

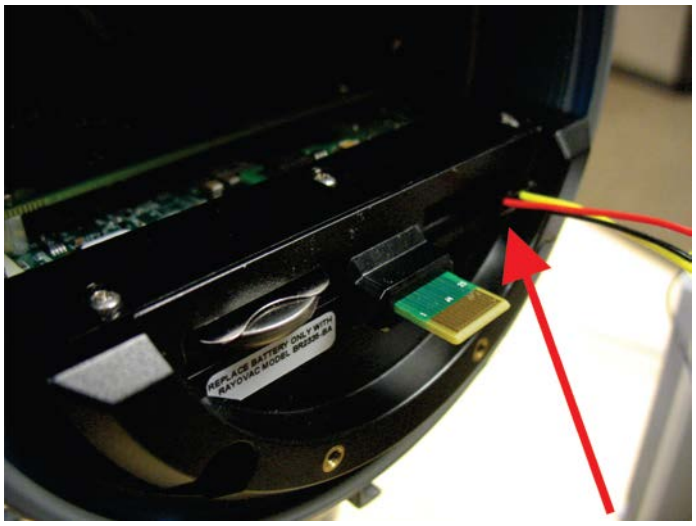
Captive Screws (loosened)

7. Grasp the HMI module and gently pull it and the battery pack enclosure out of the housing.

HMI Module (removed)

8. If the battery pack holds an internal battery, disconnect it.

Internal Battery (disconnected)

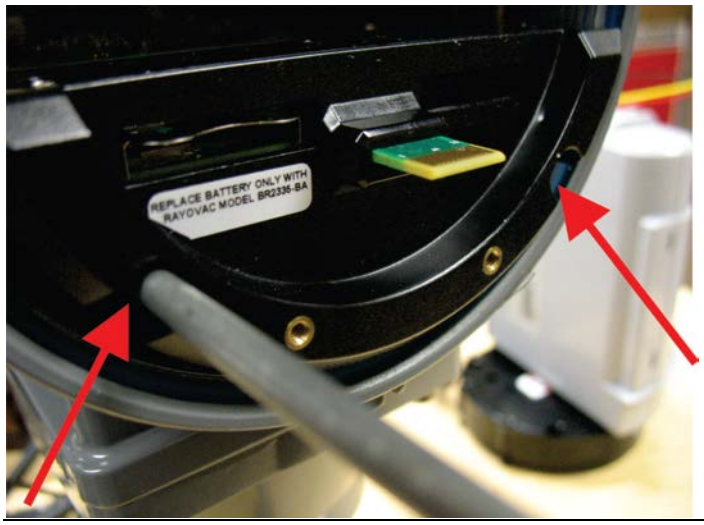


9. Set the battery pack enclosure and HMI module assembly aside.
10. Remove the SRAM backup battery; set it aside in a safe place.

SRAM Battery (removed)

11. With a #2 Phillips-head screwdriver, loosen the two captive fastening screws in the plastic bezel that hold the CPU module in place.

Bezel Fastening Screws

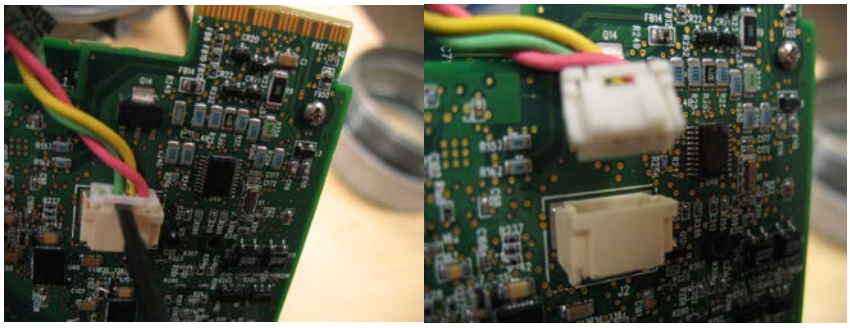


12. Grasp the plastic bezel and gently pull the CPU module out of the housing.

CPU Module (removed)

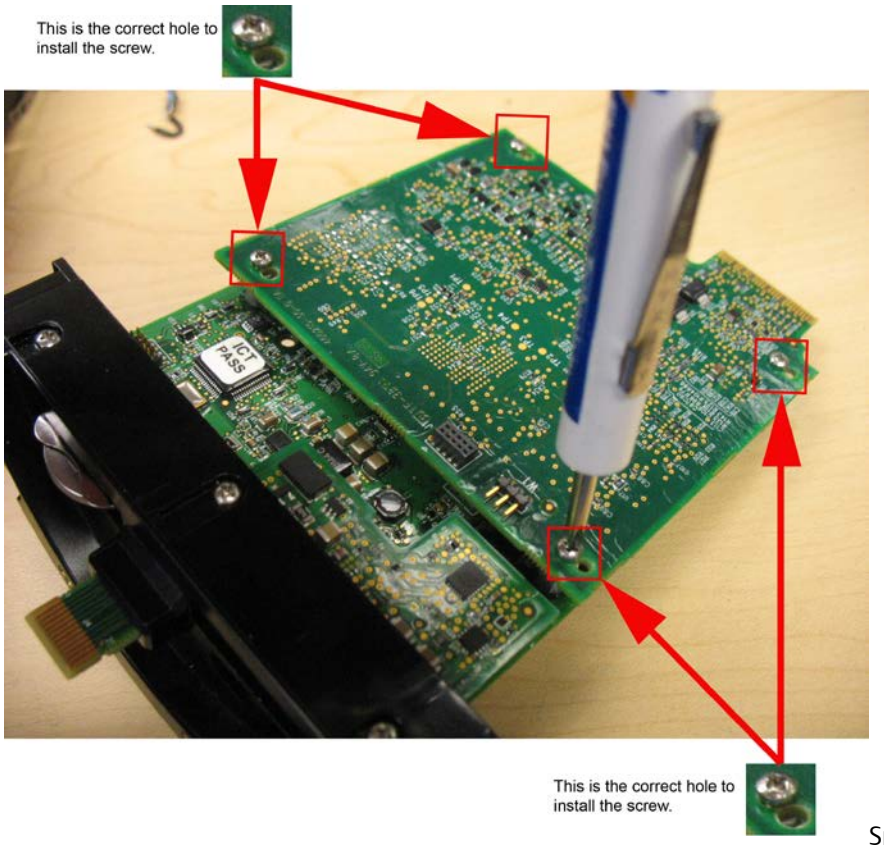
13. Use a 3/32-inch flathead screwdriver to separate the internal wire connector plug from the plug on the bottom of the CPU module.

Internal Wire Connector Plug on CPU Module



14. If your flow computer includes the 6-channel expansion I/O board (available **only** on FB1200 units), use a #1 Phillips-head screwdriver to remove the four screws that attach the I/O expansion board to the CPU module and separate the board from the CPU module. Set the old CPU module aside and now use those four screws to attach the 6-channel expansion I/O board to your **new (replacement) CPU module**. Torque screws to 1 to 2 in-lbs (0.1 to 0.2 N-m).

Correct IO Expansion Board Screw Locations



Snap the internal wire connector plug (from Step 13) onto the mating plug on the bottom of the new (replacement) CPU module and gently slide the new CPU module into the housing, being careful not to pinch wires. Press firmly into place.

16. Tighten the two captive fastening screws that hold the CPU module in the housing. Torque screws to 4 to 6 in-lbs (0.5 to 0.7 N-m).
17. Replace the SRAM backup battery you removed in Step 10. (The "+" must be facing upwards.)
18. Slide the HMI module/battery pack enclosure assembly (from Step 7) back into the housing. Tighten the captive fastening screws on the top of the battery pack enclosure and then tighten the bottom screws on the HMI module with a torque value of 4 to 6 in-lbs (0.5 to 0.7 N-m).
19. Reconnect battery power (if present). (See the connector shown in Step 8).
20. Restore main power at connector TB1.
21. Carefully align the end cap threads with the threads of the enclosure and screw each end cap clockwise (eight full turns) until it is tightly sealed to the enclosure. End caps must have at least 8 full threads engaged upon reassembly.

Note
If you need more leverage, place a long screwdriver or other appropriate tool across the two notches in the end cap to act as a pry bar.

22. If applicable, tighten the retaining clamp onto each end cap using a 3mm hexagonal wrench. When tightening, torque to 10 to 12 in-lbs (1.1 to 1.4 N-m).

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