
Document No. MS00356

Date 26/02/2026

Revision 1.0

TECHNICAL SERVICE BULLETIN

Subject

CH₄ Bypass Switch – Fail-Safe Design Improvement for Torque and JUG-A-0 Loaders, initially described in Technical Service Bulletin MS00355 from November 2025.
(Not applicable to C9, Basic MMS, Electric System)

Purpose / Scope

This bulletin defines the corrective action for potential failure mode in the current CH₄ Bypass Switch for Torque and JUG-A-0, and introduces a design improvement to ensure fail-safe system behavior.

This bulletin shall be read in conjunction with Product Change Notification PCN-1000 and PCN-1001.

Go to:

For PCN's

<https://www.nautitech.com.au/resources/product-change-notifications/>

For MS00355

<https://www.nautitech.com.au/resources/bulletins/technical-bulletins/>

Background

The current CH₄ Bypass Switch relies on electrical continuity through internal wiring (red/white conductors) and terminal connections to determine operating mode.

Under certain conditions, including:

- Mechanical vibration
- Improper terminal retention
- Conductor or ferrule degradation

loss of continuity may occur at the switch terminals during operation.

Resulting Condition

- The system may interpret this condition as **CH₄ Bypass Mode**, which will be visually displayed on the LCD screen accompanied with flashing amber LED.
- The machine may continue operating without automatic CH₄ shutdown protection
- Automatic shutdown on high CH₄ is not available in this state

NOTE: This condition does not represent a valid operator-selected bypass. Any occurrence of this condition must be treated as a system fault and investigated.

Design Requirement

For safety-critical systems, any loss of signal integrity in CH₄ Bypass switch must result in a **fault condition**, not a valid operating state.

Fail-Safe Engineering Solution

To address this, a **hardware and software design upgrade** has been developed.

Solution Components

Hardware:

- **CH₄ Bypass Switch ME5070-2-10-030 Rev.4**
 - Incorporates complementary pair outputs to ensure mutually exclusive, positively defined states

Software:

- **IS 7.2V Battery ME5070-2-99-151, updated to Revision 4**
 - Software Enables fault detection and fail-safe response

Operating Logic

Condition	Resistance	System Response
Normal Operation	1 kΩ	Normal mode
Bypass Mode	39 kΩ	CH ₄ Bypass active
Fault Condition	Open / Short Circuit	Fault detected and shutdown (fail-safe)

Fail-Safe Behavior

The updated design ensures:

- Bypass mode is only activated by a valid 39 kΩ signal
- Normal operation is only activated by a valid 1 kΩ signal
- Open or short circuits result in fault condition and system shutdown

This prevents:

- Wiring faults from simulating bypass mode
- Mechanical or environmental failures (e.g. water ingress) from producing unsafe states
- Operation under loss of signal integrity

Related Product Change Notifications (PCN)

The design changes described in this bulletin are formally controlled under the following Product Change Notifications:

- **PCN-1000 – CH₄ Bypass Switch ME5070-2-10-030 Rev.4 (Feb 2026)**
- **PCN-1001 – IS 7.2V Battery ME5070-2-99-151 Rev.4 (Feb 2026)**

These documents define:

- Product changes and revision updates
- System compatibility requirements
- Identification and traceability of updated components
- Customer actions and upgrade requirements

⚠️ Accordance with the above PCNs is mandatory when implementing this solution.

Implementation Requirements

1. Software / Battery Update

- Upgrade battery to **LS 7.2V Battery ME5070-2-99-151 Rev.4** (software updated version)
Rev.4 batteries are identifiable via product labelling

2. Hardware Update

- Replace CH₄ Bypass Switch with:
CH₄ Bypass Switch ME5070-2-10-030 Rev.4 (Complementary Pair Switch)

3. System Compatibility Requirement (CRITICAL)

- Battery Rev.4 **is only compatible with** Switch Rev.4
- Switch Rev.4 **is not compatible with** Battery Rev.3

⚠ Mismatched components will result in system fault indication and incorrect operation.

4. Implementation Control

- Systems must not be operated with mixed revision components
- All upgrades must be performed in accordance with:
 - PCN-1000
 - PCN-1001

Contact Information

For further information or clarification, please contact Nautitech Mining Systems:

Phone: (02) 9099 0832

E-mail: Artur.G@nautitech.com.au