



M88A2 重型全履帶式戰車救濟車操作手冊譯本(第四章 第一節-預防性維護檢查與潤滑保養說明) TM9-2350-292-10,NOVEMBER 2005, HEADQUARTERS,DEPARTMENT OF THE ARMY.

譯者/周致熠

提要

- 一、本篇譯文-美陸軍司令部2005年11月版M88A2 重型全履帶戰車救濟車操作手冊，本書籍區分一冊五個章節，為美陸軍保修單位配賦M88A2部隊所用之單位技術書刊，然其內容包含裝備諸元性能、操作機件名稱及功用、正常及非正常之操作程序、單位保養項目及規範、簡易故障排除要領等，實可供我未來佈署該型裝備之單位運用。
- 二、本篇譯文針對第四章第一節(預防性維護檢查與保養之底盤使用前、中檢查)等項目加以說明，闡明該裝備保養之時機、律定保養執行人員職責、檢查程序、及標準；另亦就危安防處及裝備停用之評估標準予以明確說明。

關鍵詞：預防性維護檢查與保養、桁架、主絞盤、起重機絞盤、輔助絞盤、鏟

壹、前言

鑑於裝甲部隊為地面防衛作戰決定性兵種，我軍近期已積極展開戰車的汰舊換新將攸關防衛作戰任務之成敗，近期為配合採購M1A2戰車同時也購入適用於該型戰車之同級等重型全履帶式救濟車M88A2，使得我裝甲部隊在保修能量可大幅度的提升，在新式救濟車獲得的同時應先對於該項裝備之特殊設計、系統特性、操作、保養等項目有初步之了解，俾利未來接裝訓練時可加速接裝人員對裝備了解及提升對裝備之熟悉度。

本篇譯文-美陸軍司令部2005年11月版M88A2重型全履帶戰車救濟車操作手冊，本書籍區分一冊五個章節，美陸軍配賦M88A2戰車救濟車之保修部隊所用之單位技術書刊，亦為未來我陸軍配屬M88A2戰車救濟車之保修部隊重要運用之書籍之一；囿於全書篇幅過大及筆者任職單位屬性，且預防保養的落實攸關裝備的良窳與否，故就第一冊第四章第一節「預防性維護檢查與保養」項目實施譯文，俾供讀者參斟運用。

貳、譯文

一、表 1，預防性維護檢查，行駛前

TABLE1,PREVENTIVE MAINTENANCE CHECKS AND SERVICES , BEFORE

(一)前置工作/INITIAL SETUP

1.工具與特殊工具/Tools and Special Tools

- (1)活動扳手(項目 41，表 2，WP 0133 00)
Adjustable wrench (item 41,Table 2, WP 0133 00)
- (2)漏斗(項目 15，表 2，WP 0133 00)
Funnel (item 41,Table 2, WP 0133 00)
- (3)偏位漏斗(項目 46，表 2，WP 0133 00)
Offset Funnel (item 46,Table 2, WP 0133 00)
- (4)機油油壺(項目 47，表 2，WP 0133 00)
Utility jup,measure and fill (item 47,Table 2, WP 0133 00)

2.零件及材料/Materials/Parts

- (1)內燃機潤滑油(項目 25，WP 0135 00)
Lubrication oil,internal combustion(item 25, WP 0135 00)
- (2)擦拭布(項目 45，WP 0135 00)
Wiping rags(item 25, WP 0135 00)

3.所需人員/Personnel Required

3 員
Three

4.參考文件/References

- (1)WP 0017 00
- (2)WP 0012 00
- (3)WP 0133 00
- (4)WP 0036 00
- (5)WP 0135 00
- (6)WP 0031 00
- (7)WP 0122 00
- (8)TM9-1005-213-10
- (9)TM11-5820-890-10
- (10)TM9-5820-263-10
- (11)TM9-5820-340-12



(二)行駛前檢查項目

PREVENTIVE MAINTENANCE CHECKS AND SERVICES , BEFORE

1.位置-外觀/LOCATION-EXTERIOR

(1)項次1-車輛本體/ Item No.1- Vehicle

A.負責乘員/Crewmember

駕駛/DRIVER

B.檢查流程/Procedure :

環繞車輛四周，檢查是否有液體滲漏或物件遺失或設備損壞。
Walk around vehicle. Check for fluid leakage, missing items or damage to equipment.

C.以下狀況停用/Not Fully Mission Capable if:

任何燃料洩漏，發現任何機油及液壓油有三級滲漏，車輛損壞或
缺少任何物品而導致車輛操作危險。
Any fuel leaks. Any Class III oil or hydraulic fluid leak found. Vehicle has damage or is
missing items that would make operation hazardous.

(2)項次2-艙底部排水管及檢修板/ Item No.2-Subfloor Drains and Access Plates (圖1)

A.負責乘員/Crewmember :

駕駛/DRIVER

B.檢查流程/Procedure :

(A)注意/CAUTION。

如果排水管及檢修板遺失時請勿跨越。
Do not ford if any or hull access plate is missing.

(B)檢查車體五個排水口、五個檢修板及(包括兩個制動器調整檢 修蓋)是否存在及固定。

Check that both hull drains and five access plates (including brake adjustment
access covers) are present and secure.

C.以下狀況停用/Not Fully Mission Capable if:

車體排水口未關閉或檢修板(包括兩個制動器調整檢修蓋)無法操
作。

Hull drains not closed or access plates (including brake adjustment access covers) are
not present for operation.

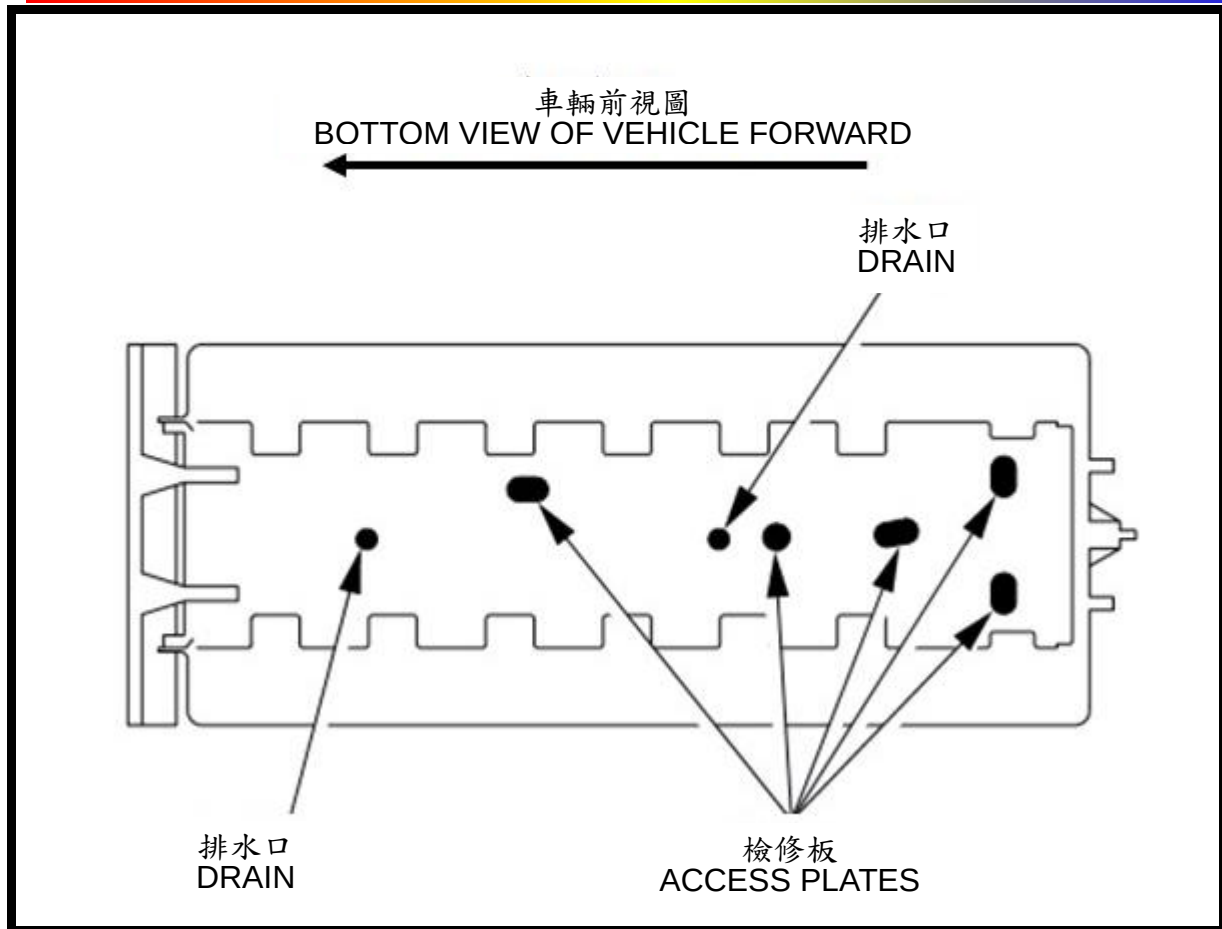


圖 1 艙底部排水管及檢修板

(3)項次3滅火器車外拉柄/ Item No.3- External Fire Extinguisher Handle (圖2)

A.負責乘員/Crewmember

駕駛/ DRIVER

B檢查流程/Procedure

目視檢查拉柄上鉛封是否緊定。

Visually inspect for lead seals and locking wires.

C.以下狀況停用/Not Fully Mission Capable if:

(A)鉛封斷裂或遺失

Missing or broken seals/wires.

(B)拉柄遺失或損壞

Missing or damaged handles.

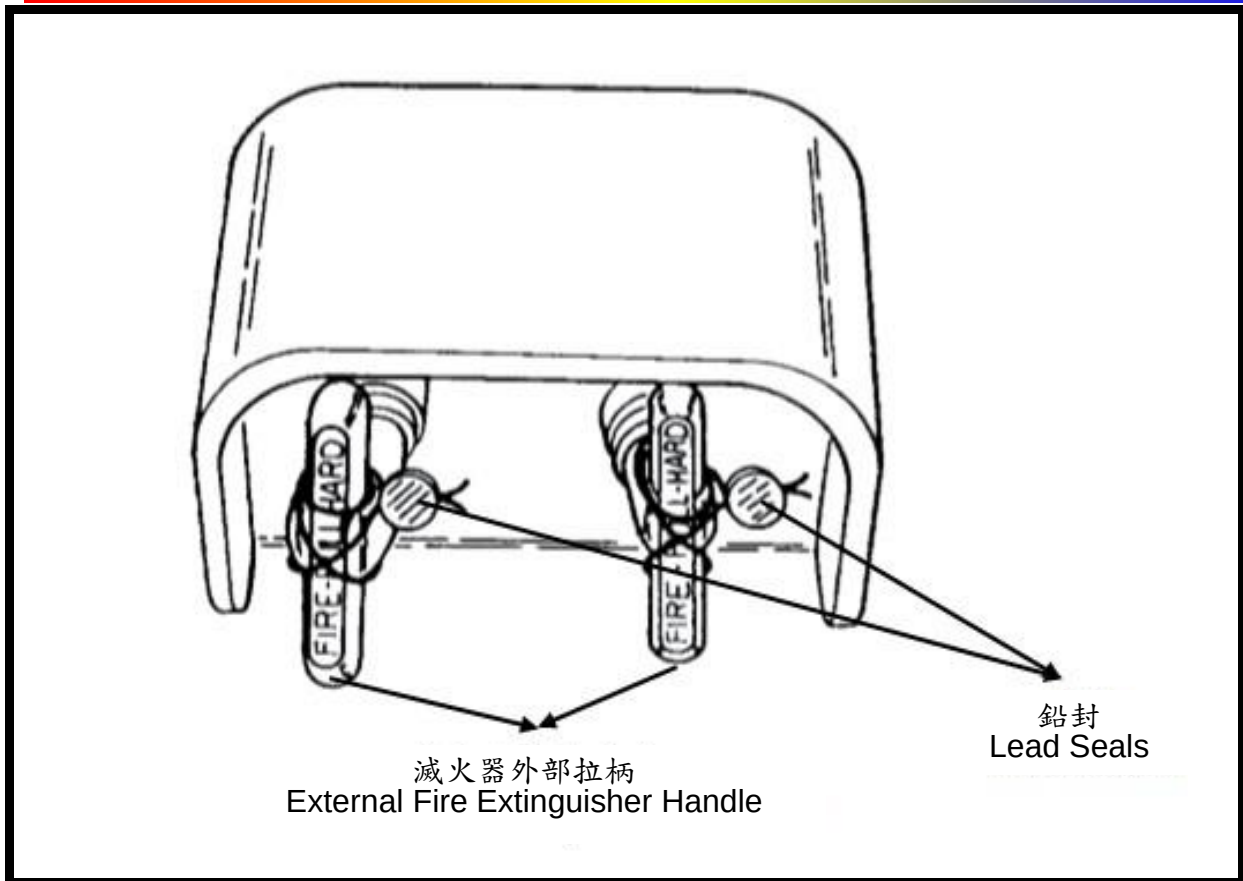


圖2滅火器車外拉柄

(4)項次4-拖車勾/ **Item No.4- Tow Pintle**(圖3)

A. 負責乘員/**Crewmember**

駕駛/ **DRIVER**

B. 檢查流程/**Procedure**

檢查拖車勾是否損壞或缺件

Inspect tow pintle for damage, or missing parts.

C. 以下狀況停用/**Not Fully Mission Capable if**

本體有裂痕、損壞或缺件。

Cracks, damage, or parts missing.

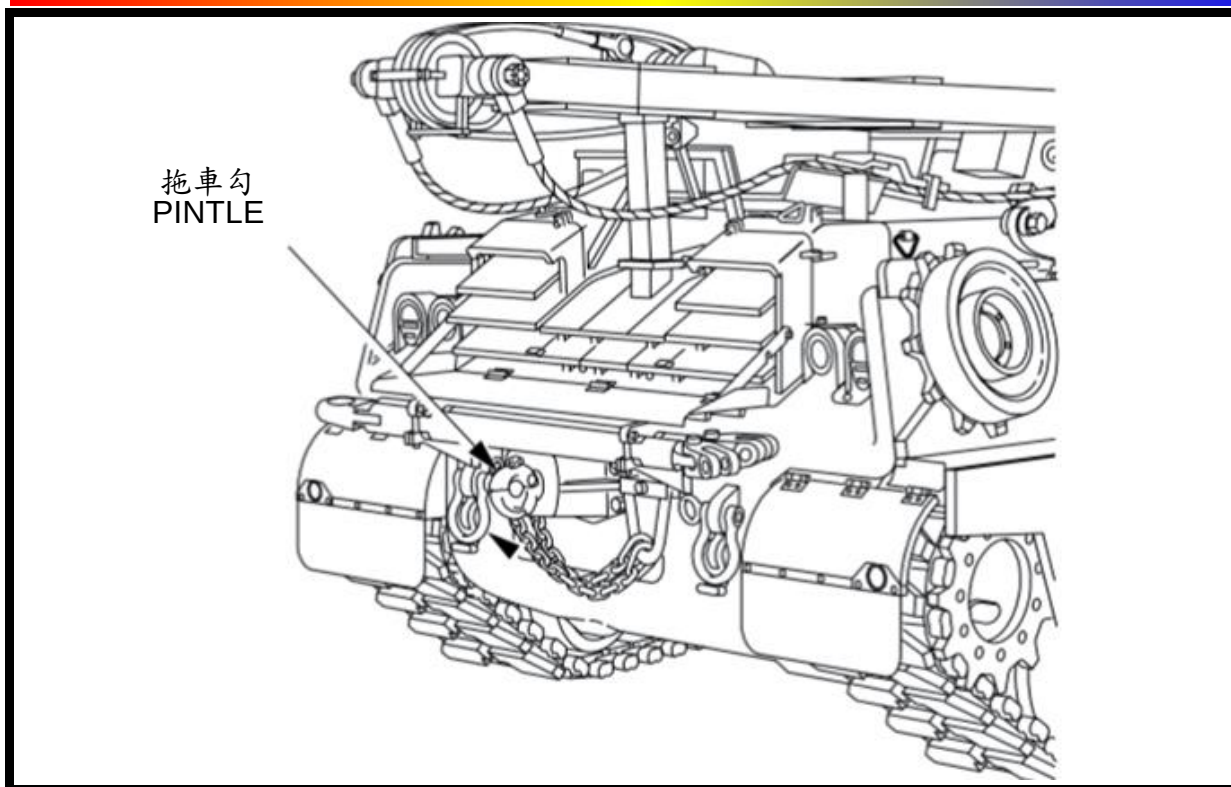


圖3拖車勾

2.位置-引擎室/LOCATION-ENGINE COMPARTMENT

(1)項次5-引擎機油量測檢查(早期型雙檢修門式)/ Item No.5- Engine Oil Level Check(圖4.5.6)

A.負責乘員/Crewmember

駕駛/ DRIVER

B.檢查流程/Procedure

(A)注意/CAUTION

車輛須放置於平坦路面且引擎停止運轉2小時後才可實施引擎機油量測檢查。

該階段檢查機油平面時，不可使用機油表尺「怠速合格範圍」那側，如誤用該標準可能會導致裝備損壞。

Perform engine oil check with vehicle on a level surface and engine stopped for at least two hours. Do not use ENG. IDLING RANGE side of oil gauge rod to measure engine oil level. Use of ENG. IDLING RANGE side of oil gauge rod could result in equipment damage.

(B)註記/NOTE

引擎上甲板可能有單檢修門及雙檢修門兩種型式。如屬於雙檢修門車型，則在量測機油容量或加註引擎機油時可選擇打開其中一個專屬檢修門。

Engine deck cover may be equipped with a single or double door. If vehicle is equipped with double door open the small door only when checking or filling engine oil.



(C)警告/WARNING

發動機表面高溫會點燃機油，為避免發動機起火，請使用偏心漏斗(WP 0133 00 表2 項目46)或添加油壺 (WP 0133 00 表2 項目47)來添加機油，並用擦拭布將加油管周邊噴濺之機油加以清潔參照(WP0135 00 項目45) ，加注機油完畢後，確實將機油加注蓋旋緊，並將加注檢修門關閉及鎖定。

Engine oil can be ignited by hot engine surfaces. To avoid engine fire, use offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00) to add engine oil, clean oil from around oil filler tube area with wiping rags (item 45, WP 0135 00) after filling. Make sure engine oil filler tube cap is tight and engine oil fill access door is closed and latched.

- a. 將車輛停妥於平坦路面2小時以上。
Park vehicle on a level surface for at least two hour
- b. 打開引擎上甲板門，程序請參照(WP0031 00或0031 01)。
Open engine deck door (WP 0031 00 or WP 0031 01).

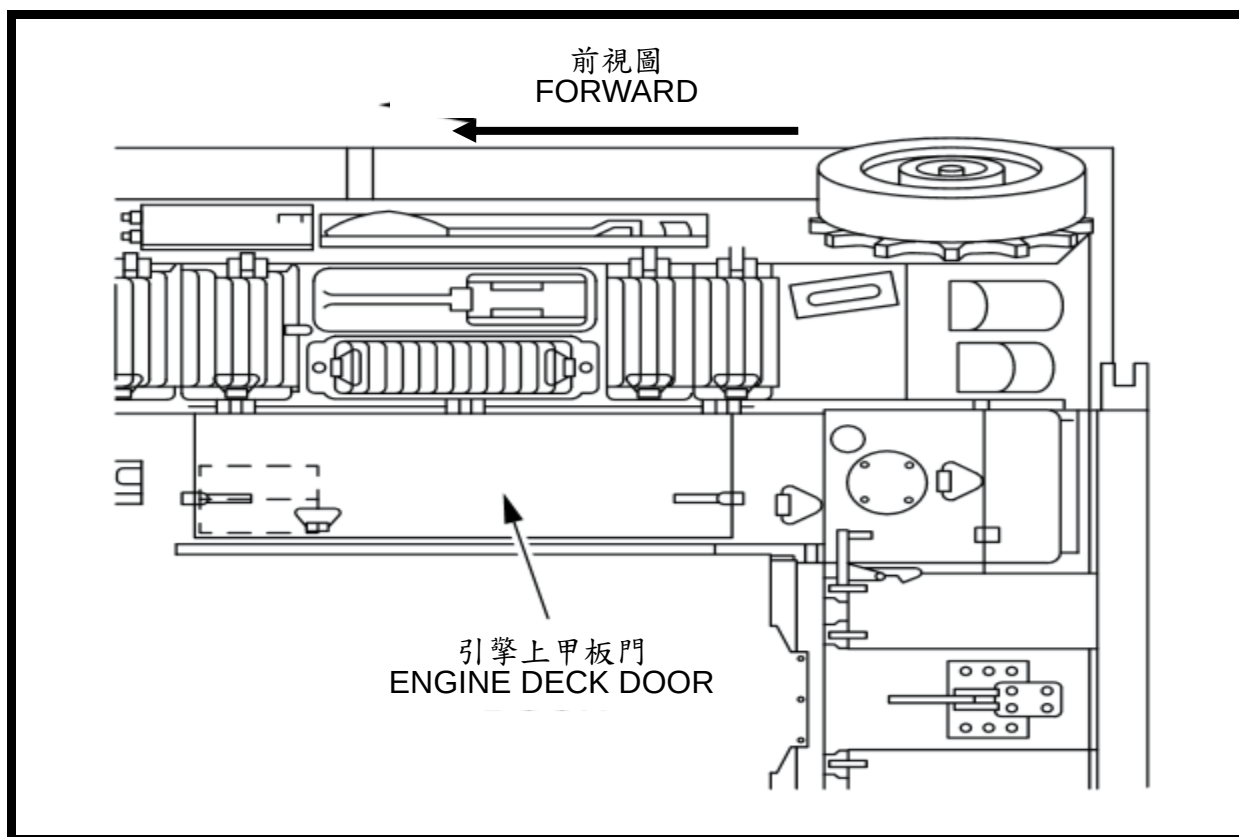


圖4引擎上甲板門

- c. 打開引擎機油量測或加注專屬之檢修門。
Open ENGINE OIL LEVEL check and fill access door
- d. 打開引擎機油量測外蓋。
Open ENGINE OIL LEVEL door
- e. 將機油表尺由導管抽出並擦拭乾淨，將其重新插回導管中，再次抽出表尺，檢查表尺上機油平面是否沾附在STATIC

ENG(靜態引擎)的位置上。翻至表尺的另一面油平面需在 FULL(滿線)與1加侖標記線之間為標準。

Remove oil gauge rod and wipe clean. Insert oil gauge rod in gauge tube. Remove oil gauge rod. Verify oil level on STATIC ENG. side of oil gauge rod is between FULL and 1-gallon range.

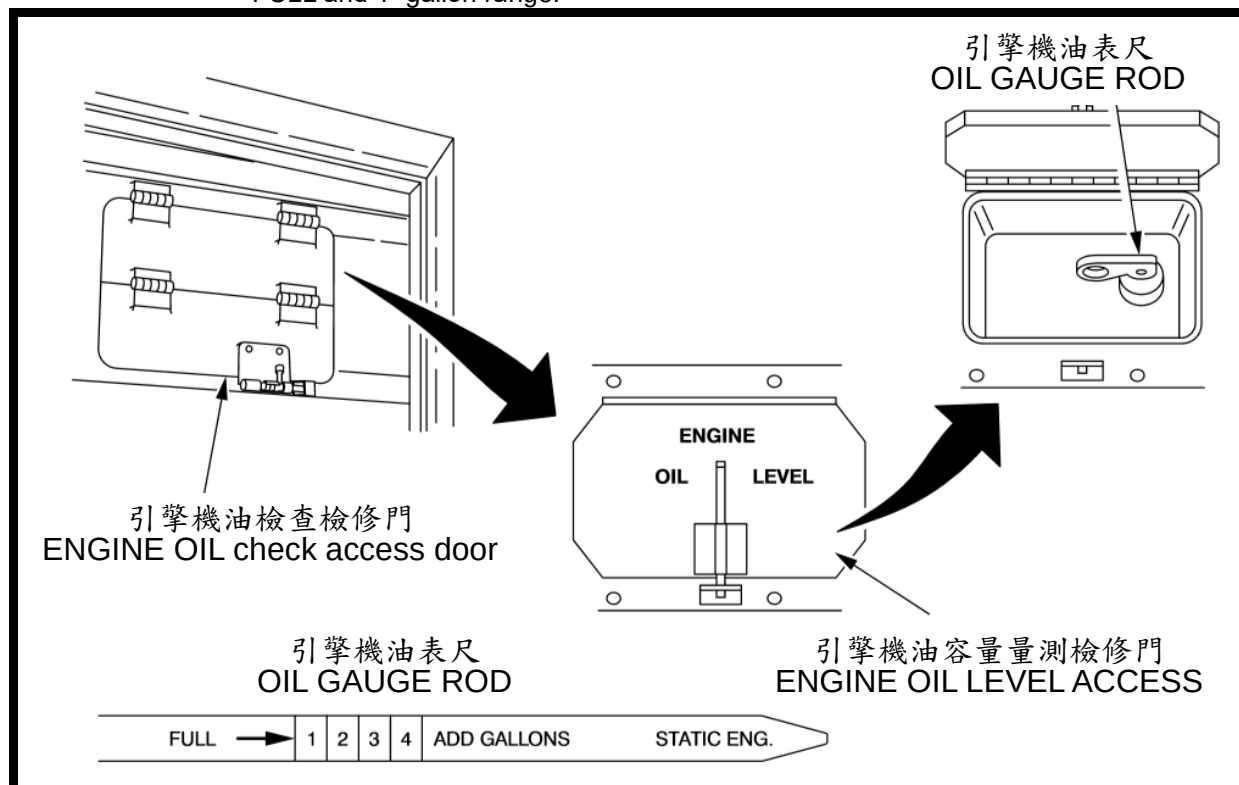


圖5檢修門、外蓋、機油表尺

- f.如果機油低於滿線，則按油尺上指示的加侖數將及適當等級之機油(表6 WP 0105 00)，添加至滿線上方，加注時請打開機油加注口蓋，請使用偏心漏斗(WP 0133 00 表2 項目46)或制式油桶(WP 0133 00 表2 項目47)使用機油加注管實施加注。

If oil level is below FULL, add the amount in gallons indicated on the oil gauge rod. To add proper grade oil (Table 6, WP 0105 00) open engine oil fill access door, add oil through engine oil filler tube using offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00).

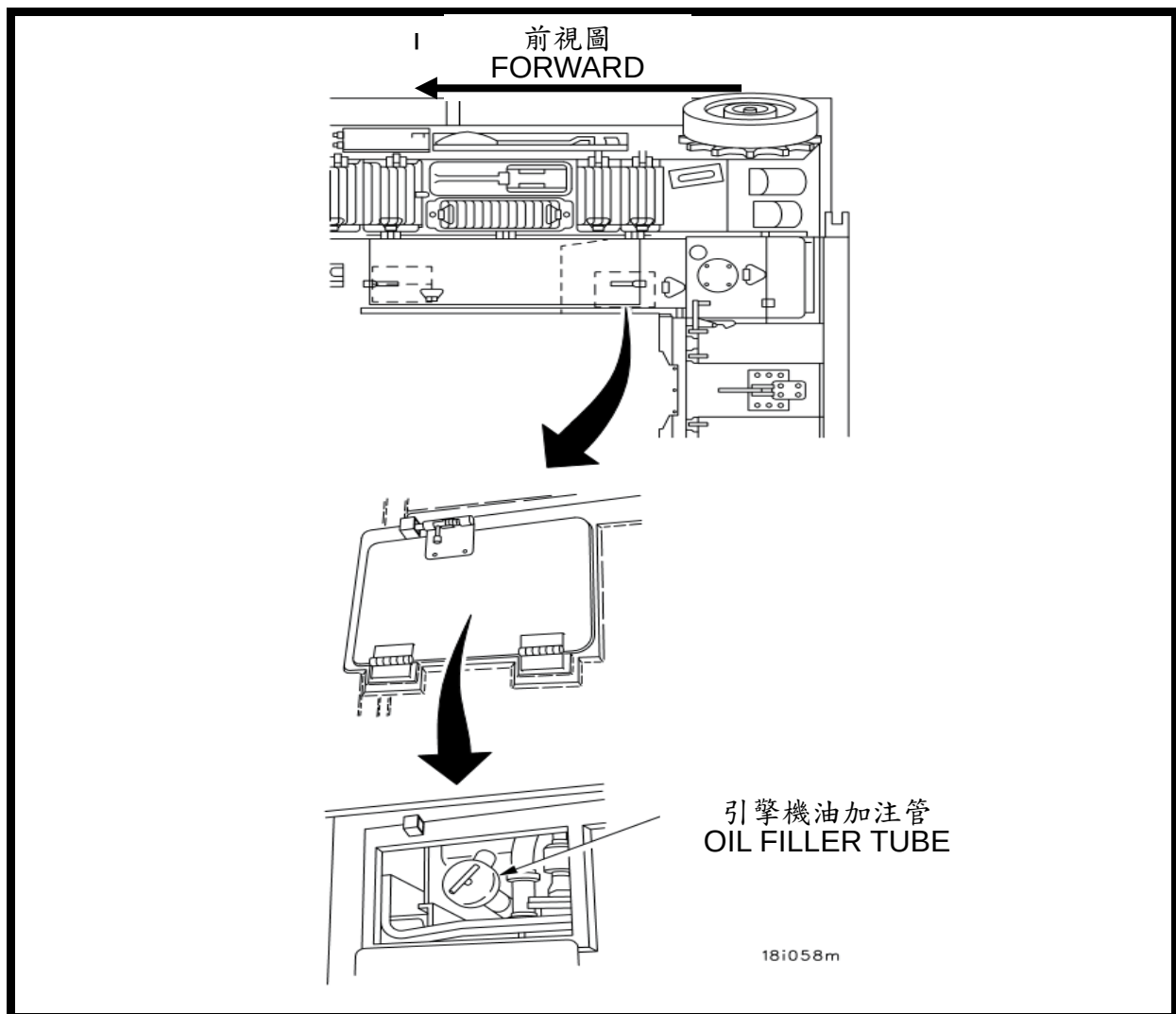


圖6引擎機油加注

(2)項次6-引擎機油量測檢查(新型單檢修門式)/ Item No.6- Engine Oil Level Check(NEW)(圖7)(圖8) (圖9)

A.負責乘員/Crewmember

駕駛/DRIVE

B.檢查流程/Procedure

(A)注意/CAUTION

車輛須停放於平坦路面且引擎停止運轉2小時後才可實施引擎機油量測檢查。

該階段檢查機油平面時，不可使用機油表尺「引擎怠速範圍」專用面，如誤用該標準可能會導致裝備損壞。

Perform engine oil check with vehicle on a level surface and engine stopped for at least two hours. Do not use ENG. IDLING RANGE side of oil gauge rod to measure engine oil level. Use of ENG. IDLING RANGE side of oil gauge rod could result in equipment damage.

- a. 將車輛停妥與平坦路面2小時以上。
Park vehicle on a level surface for at least two hour

(B) 註記/NOTE

引擎上甲板可能有單檢修門及雙檢修門兩種型式。如屬於雙檢修門車型，則在量測機油容量或加註引擎機油時可選擇打開其中一個專屬檢修門。

Engine deck cover may be equipped with a single or double door. If vehicle is equipped with double door open the small door only when checking or filling engine oil.

(C) 警告/WARNING

發動機表面高溫會點燃機油，為避免發動機起火，請使用偏心漏斗(項目46，表2，WP 0133 00)或機油壺(項目47，表2，WP 0133 00)來添加機油，並用擦拭布將加油管周邊噴濺之機油加以清潔，參照(WP0135 00 項目45)加注機油完畢後，確實將機油加注蓋旋緊，並將加注檢修門關閉及鎖定。

Engine oil can be ignited by hot engine surfaces. To avoid engine fire, use offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00) to add engine oil, clean oil from around oil filler tube area with wiping rags (item 45, WP 0135 00) after filling. Make sure engine oil filler tube cap is tight and engine oil fill access door is closed and latched.

- a. 打開引擎上甲板門，程序請參照(WP0031 00或0031 01)。
Open engine deck door (WP 0031 00 or WP 0031 01)

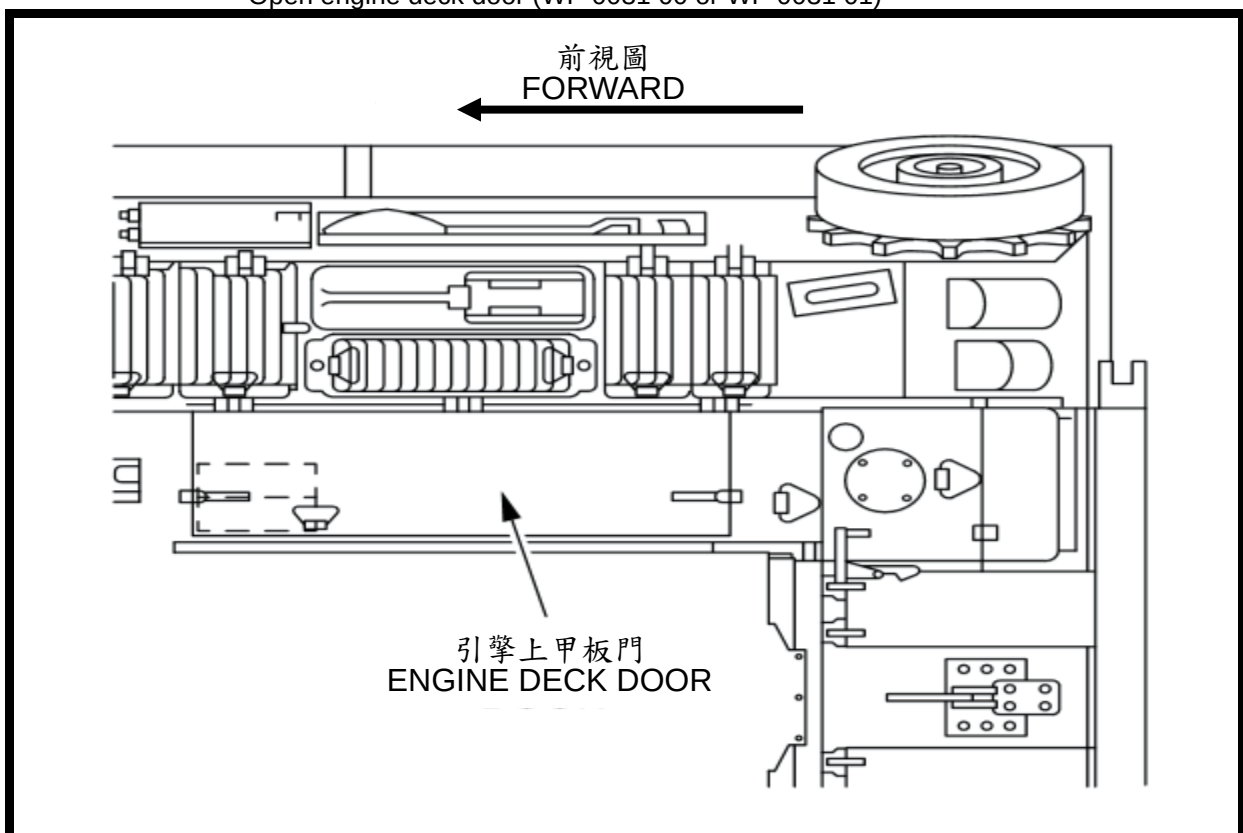


圖7引擎上甲板門



b. 打開引擎機油量測或加注專屬之檢修門。

Open ENGINE OIL LEVEL check and fill access door

c. 將機油表尺由導管抽出並擦拭乾淨，將其重新插回導管中，再次抽出表尺，檢查表尺上機油平面是否沾附在STATIC ENG(靜態引擎)專用面的位置上。油平面需在FULL(滿線)與1加侖標記線之間為標準。

Remove oil gauge rod and wipe clean. Insert oil gauge rod in gauge tube. Remove oil gauge rod. Verify oil level on STATIC ENG. side of oil gauge rod is between FULL and 1-gallon range.

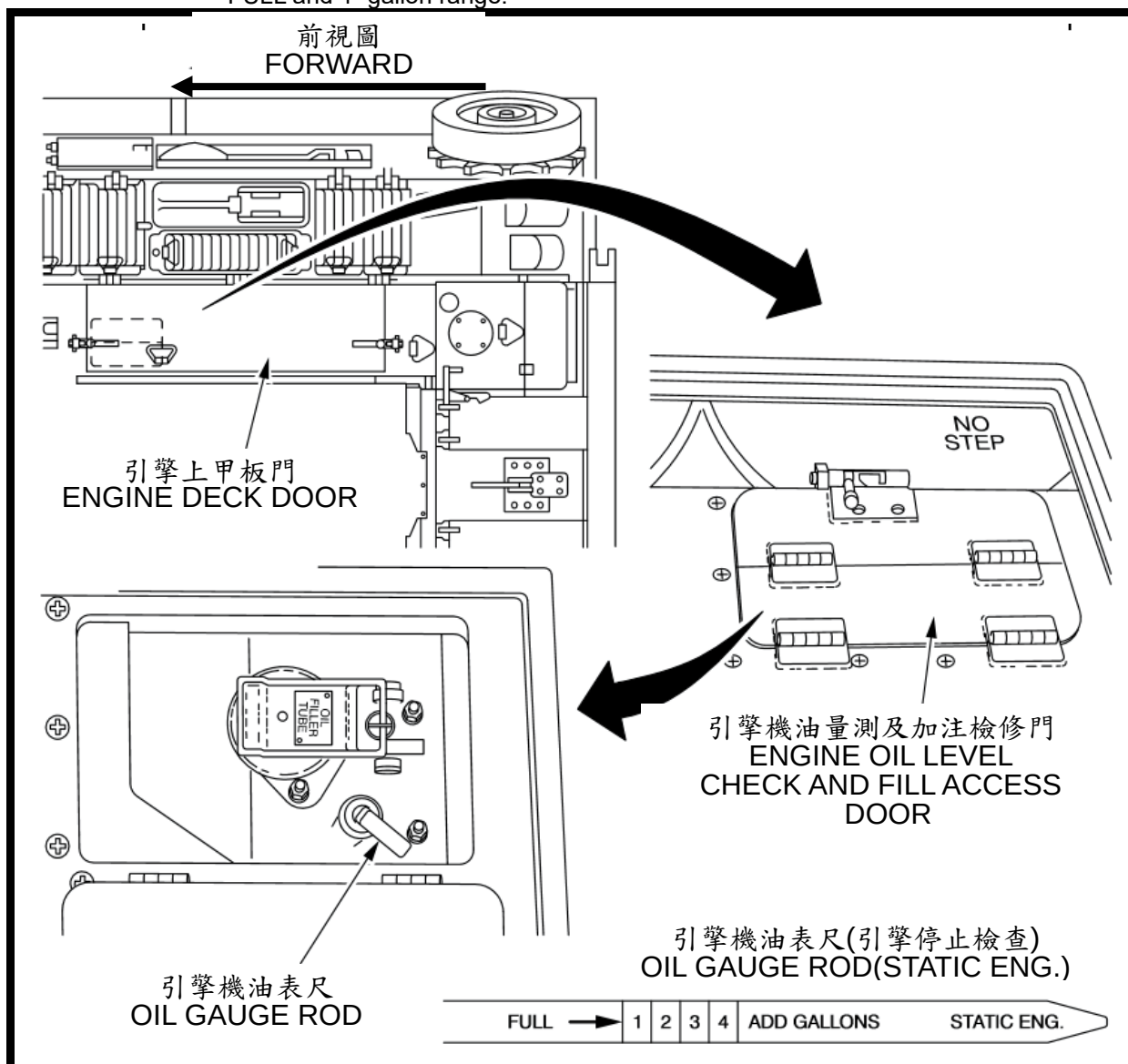


圖8 檢修門、外蓋、機油表尺

e. 如果機油低於滿線，則按油尺上指示的加侖數將適當等級之機油(表6 WP 0105 00)，添加至滿線上方。

If oil level is below FULL, add the amount in gallons indicated on the oil gauge rod (Table 6, WP 0105 00). To add proper grade oil:

f. 拉起機油加注管蓋拉柄，打開機油加注管。

Pull up on engine oil filler tube cap handle and open engine oil filler tube.

g.在加油管中插入偏心漏斗(項目46, 表2, WP 0133 00)

Insert offset funnel (item 46, Table 2, WP 0133 00) in oil filler tube.

h.如油尺計量所示, 倒入的油量為2.5加侖。(項目47, 表2, WP 0133 00)

Pour quantity of oil as indicated on gauge rod into graduated 2.5 gallon utility jug (item 47, Table 2, WP 0133 00)

i.將機油加入引擎, 關閉機油加注管蓋和所有檢修門

Pour oil into engine. Close oil filler tube cap and all access doors.

C.以下狀況停用/Not Fully Mission Capable if:

無/NON

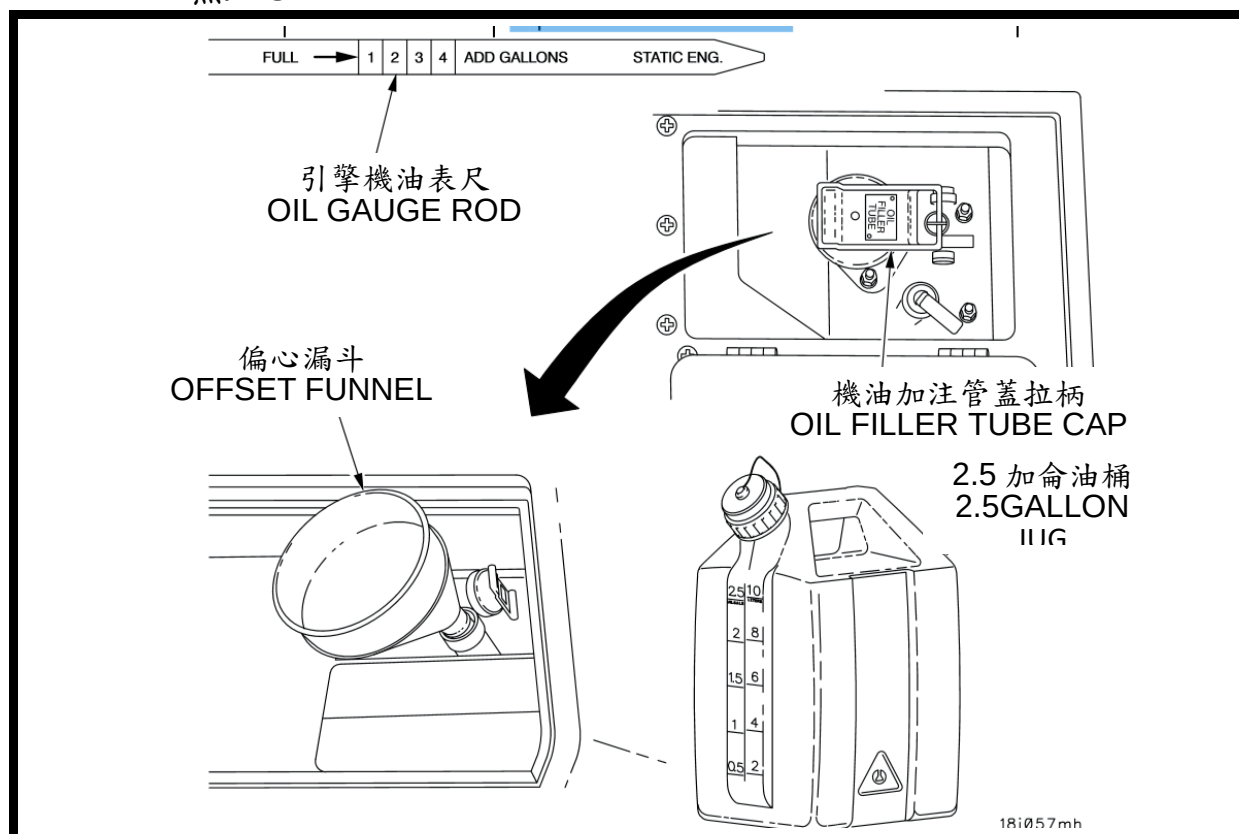


圖9 引擎機油加注

(3)項次-機槍與支架/ Item No.7- Machine gun and Mount (圖10)

A.負責乘員/Crewmember

車長/COMMANDER

B.檢查流程/Procedure

(A)註記/NOTE

關於M2 .50機槍支架維護詳細說明, 請參照

TM9-1005-213-10。

For detailed instructions on the maintenance of the M2 caliber .50 machine gun mount see TM 9-1005-213-10.

a.拆下固定銷並旋鬆固定螺絲。

Remove locking pin and loosen lock screw.



b.檢查機槍支架是否活動正常

Check that machine gun mount moves freely.

C.以下狀況停用/Not Fully Mission Capable if

(A)無法鎖定。

Cannot be locked down.

(B)無法自由活動及旋轉。

Does not move or rotate freely.

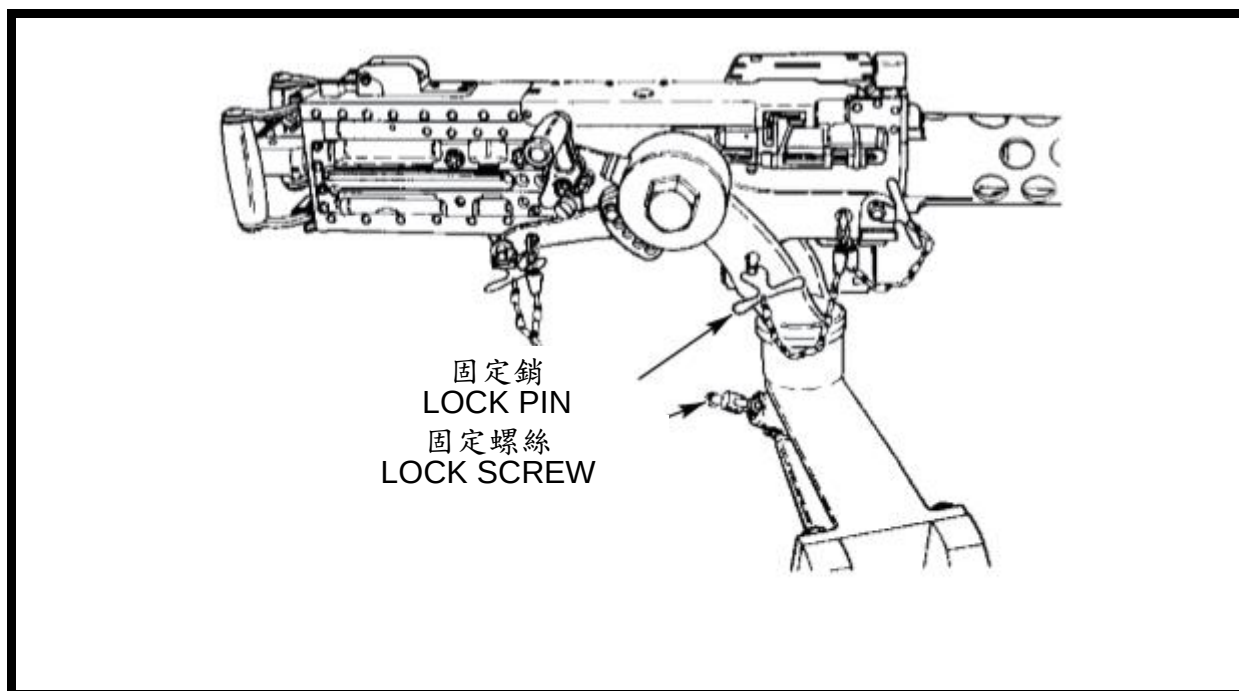


圖10 機槍與支架

3.位置-乘員艙/CREW COMPARTMENT

(1)項次8-固定式滅火系統/ Item No.8- Fixed Fire Extinguisher system (圖11)

A.負責乘員/Crewmember :

駕駛/DRIVE

B.檢查流程/Procedure :

(A)檢查銷、頂部、連接管、控制機件封條是否破裂，密封性及適用條件。檢查銷、滅火器鋼瓶上蓋及連接管是否鬆動及破裂。

在檢查鋼瓶之前需先檢視檢查標籤。

Inspect pins, heads, connecting tubes and controls for broken seals, tightness and for serviceable condition. Check pins, cylinder heads and connect tubes for looseness, cracking or evidence of damage. Check inspection tags for current inspection of cylinders.

(B)檢查內部拉柄是否損壞。檢查機件封條之鉛封是否斷裂或遺失。

Check internal pull handles for damage. Check that seals' locking wires are not broken or missing.

(C)檢查分配管路是否鬆動，安裝是否固定良好及存在裂痕。
Check distribution lines for loose fittings, tight mountings, and cracks.

C.以下狀況停用/Not Fully Mission Capable if:

- (A)密封件遺失或損害，遺失任一固定式滅火器鋼瓶或內無藥劑，
檢查標籤已過期。
Seals broken or missing. Any fixed fire extinguisher cylinder missing or discharged.
Out of date inspection tag.
- (B)內部拉柄損壞、密封件或鉛封遺失或損壞
Any damaged handles, broken or missing seals or locking wires.
- (C)分配管路固定不良、鬆動、有裂痕。
Distribution lines, loose, cracked or mounting not tight.

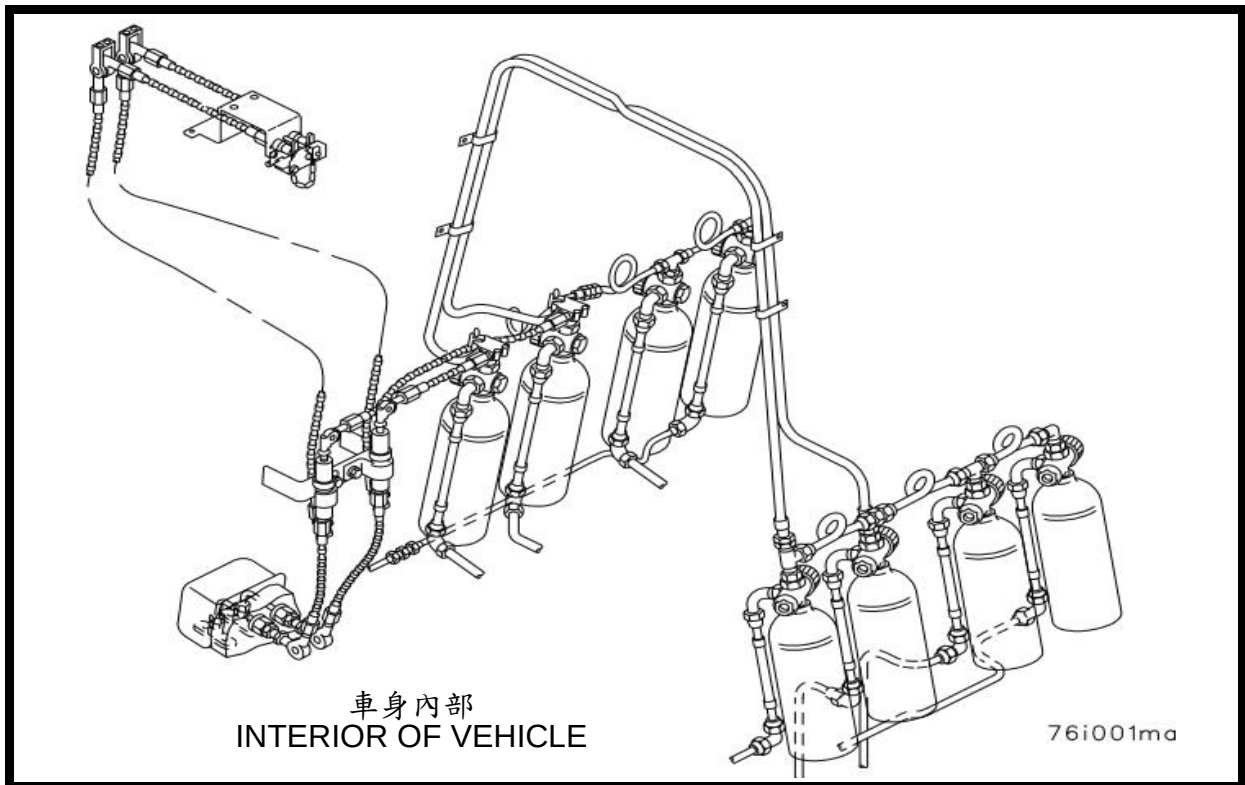


圖 11 固定式滅火器系統

(2)項次9-起重機絞盤油量/ Item No.9- Hoist Winch Oil Level (圖 12)

A.負責乘員/Crewmember :

車長/**COMMANDER**

B.檢查流程/Procedure :

將車輛停放於平坦地面上，卸下或打開檢修門參照(WP0036 00、WP0036 01)。

確認油量是否介於視距表一半到頂部之範圍。

Park vehicle on a level surface. Remove or open subfloor access door (WP 0036 00 or WP 0036 01). Verify oil level is between the middle and top of the sight gauge.



(A) 註記/ **NOTE**

油量不要超過視距表的頂部，因為此舉將無法確定正確油量。
若機油量位未達視距表一半下方，則卸下排氣/加油塞，並添加適當等級之機油，直至油量介於視距表一半到頂部之範圍，當油量正確時，安裝排氣/加油塞。

Do not fill above top of sight gauge, as correct oil level cannot be determined.
If oil is below the middle of the sight gauge, remove the vent/fill plug and add proper grade oil (Table 6, WP 0105 00) until the oil level is between the middle and top of the

C. 以下狀況停用/Not Fully Mission Capable if:

機油達三級滲漏。
Class III oil leaks

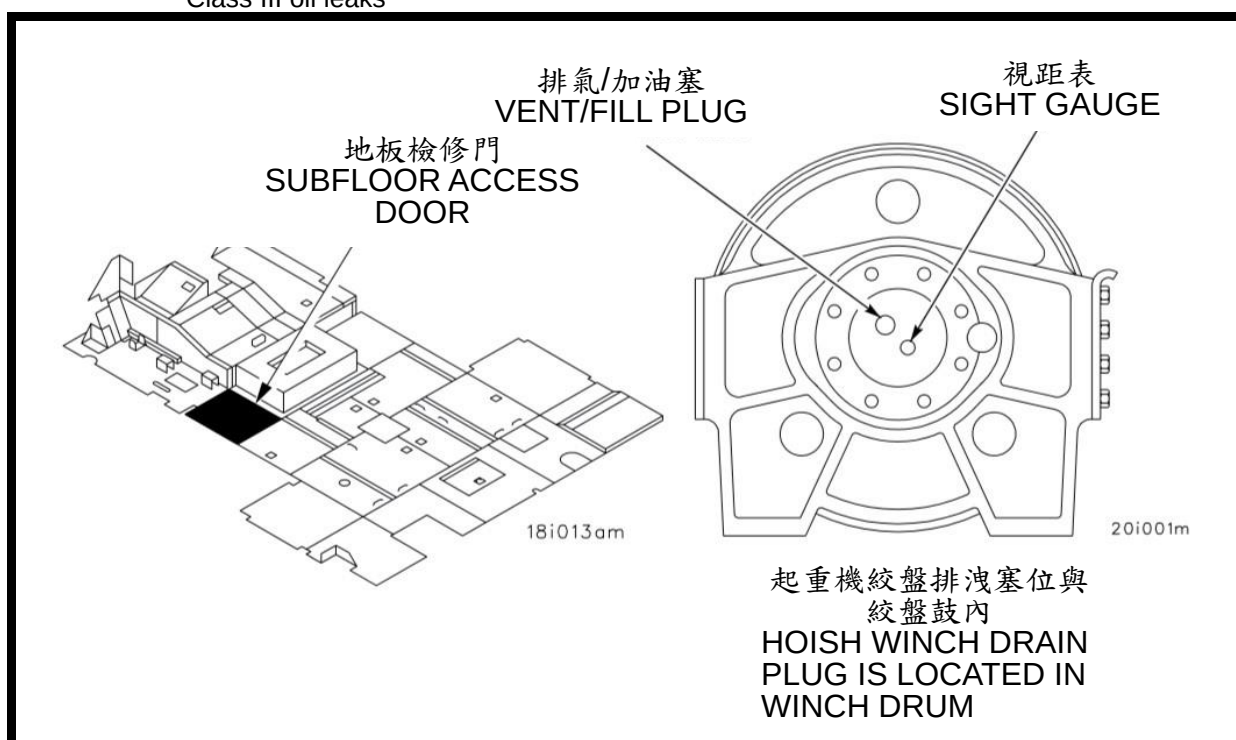


圖12 起重機絞盤油量

(3) 項次10-手提式滅火器/ **Item No.10-Portable Fire Extinguishers**
(圖13)

A. 負責乘員/**Crewmember** :

車長/**COMMANDER**

B. 檢查流程/**Procedure** :

(A) 檢查手提式滅火器的控制握把密封墊，確認密封墊或鉛封沒有損壞。

Check portable fire extinguisher's control seals. Make sure seals or locking wires are not broken.

(B) 為了安全，請檢查滅火器的安裝組件有無缺少組件。

Check fire extinguishers for security of mounting hardware and missing hardware.



(C)查核檢查標籤，以確認各鋼瓶是否於近期完成檢查。
Check inspection tags for current inspection date of cylinders.

C.以下狀況停用/Not Fully Mission Capable if:

(A)缺少任何滅火器，密封墊或鉛封遺失或損壞。
Any fire extinguisher missing. Seal or lockwire missing or broken.

(B)檢查標籤是否為最近期。
Inspection tag not current.

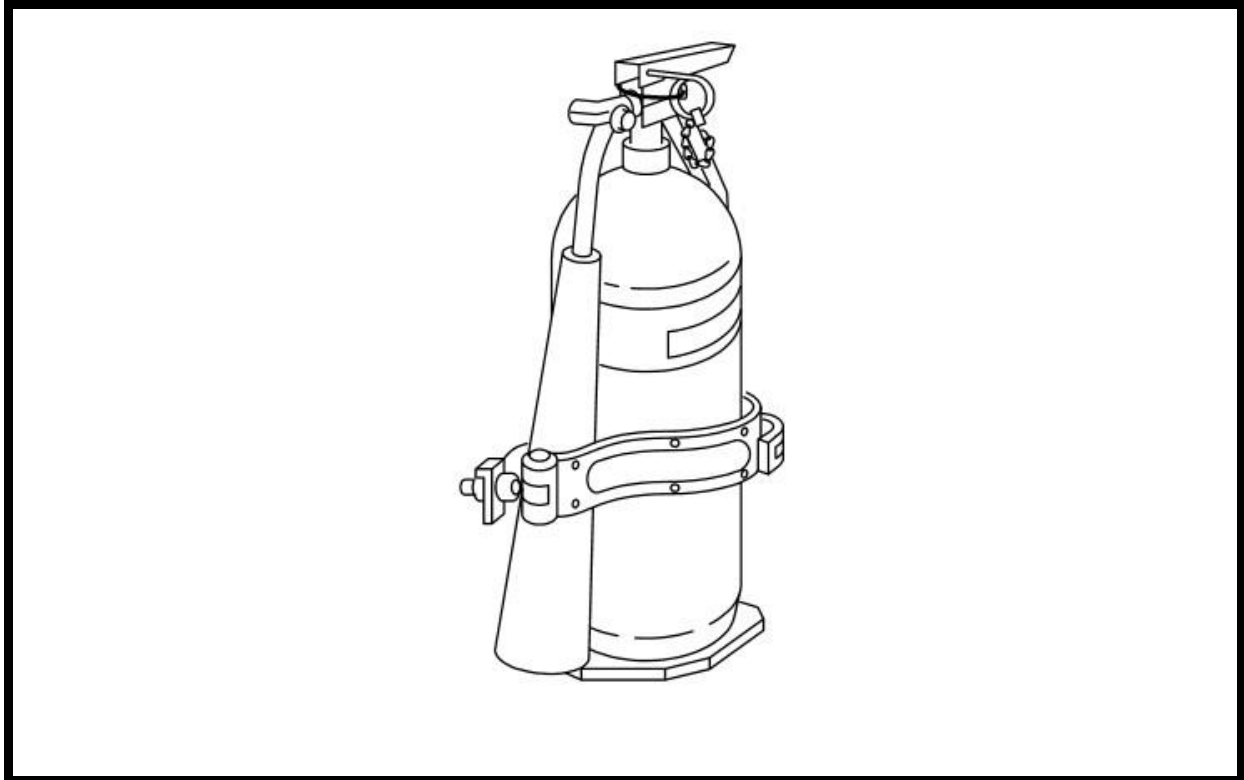


圖13 手提式滅火器

(4)項次11-無線電與通聯系統 / Item No.11-Intercommunications System and Radio Sets

A.負責乘員/Crewmember :

車長/ **COMMANDER**

B.檢查流程/Procedure :

(A)註記/NOTE

參照TM11-5820-890-10(AN/VIC-1(V)或TM11-5830-263-10

(AN/VIC-3(V)和TM11-5830-340-12檢查無線電系統

Refer to TM 11-5820-890-10 (AN/VIC-1(V) or TM 11-5830-263-10 (AN/VIC-3(V) and TM 11-5830-340-12 for radio operational checks.

a.檢查通聯系統作用正常。

Check intercommunication system operation.

b.檢查是否有異常雜音功率低落，將所見問題回報單位保修人員。

Check for unusual noises, interference or poor operation in general. Report all



problems to unit maintenance..

C.以下狀況停用/Not Fully Mission Capable if:

駕駛與指揮官間訊息無法完成通聯

Fire extinguisher missing.Pin, wire or mount is missing or broken.

(5)項次12-儀錶板 / Item No.12- Gauge panel (圖14)

A.負責乘員/Crewmember :

駕駛/DRIVE

B.檢查流程/Procedure :

(A)危險/WARNING

確認方向盤置於居中並鎖定，在發動引擎過程中，車輛可能造成人員危險。

檢查相關儀表引擎在啟動或操作後須在標準溫度內，啟動引擎請參照(WP 0012 00)。

Make sure steering wheel is centered and locked. Vehicle may move during engine starting causing injury to personnel.

Engine must be started and operated at normal temperature to check gauges. Start engine (WP 0012 00).

(B)註記/NOTE

依據氣候條件，引擎可能需要更長的預熱時間。

檢查儀錶板上所有儀表是否損壞，並檢查儀表是否作用正常。

Engine may take longer to warm-up depending on climatic conditions.

Check all gauges on gauge panel for damage and the following gauges for indicators of normal operations:

a.引擎機油壓力表(1)在每分鐘2400轉或華氏180度正常壓力範圍為每平方英吋40-70磅。

Engine oil PRESS gauge (1) normal pressure range 40-70 psi (276 kPa - 483 kPa) at 2400 rpm and 180F (82C) oil temperature.

b.變速箱機油壓力表(2)正常壓力為每平方英吋17磅。

TRANSMISSION oil PRESS gauge (2) normal pressure 17 psi (117 kPa).

c.電瓶發電機指示器(3)，單純指示電瓶電壓時指針需位於黃色位置，在發電機作用時指針需位於綠色位置。

BATT-GEN gauge (3) normal indication - green zone for generator or yellow zone for batteries.

d.轉速表及速率表應能正常作用，而指針無不正常上下波動或發出異常雜音。

Tachometer (4) should operate normally without excessive fluctuations or unusual noises.

C.以下狀況停用/Not Fully Mission Capable if:

(A)任何儀表遺失，不正常波動或無作用。

Any gauge is missing, fluctuating or inoperative.

(B)電瓶發電機指示器指針未達綠色位置。

BATT/GEN gauge not in green zone.

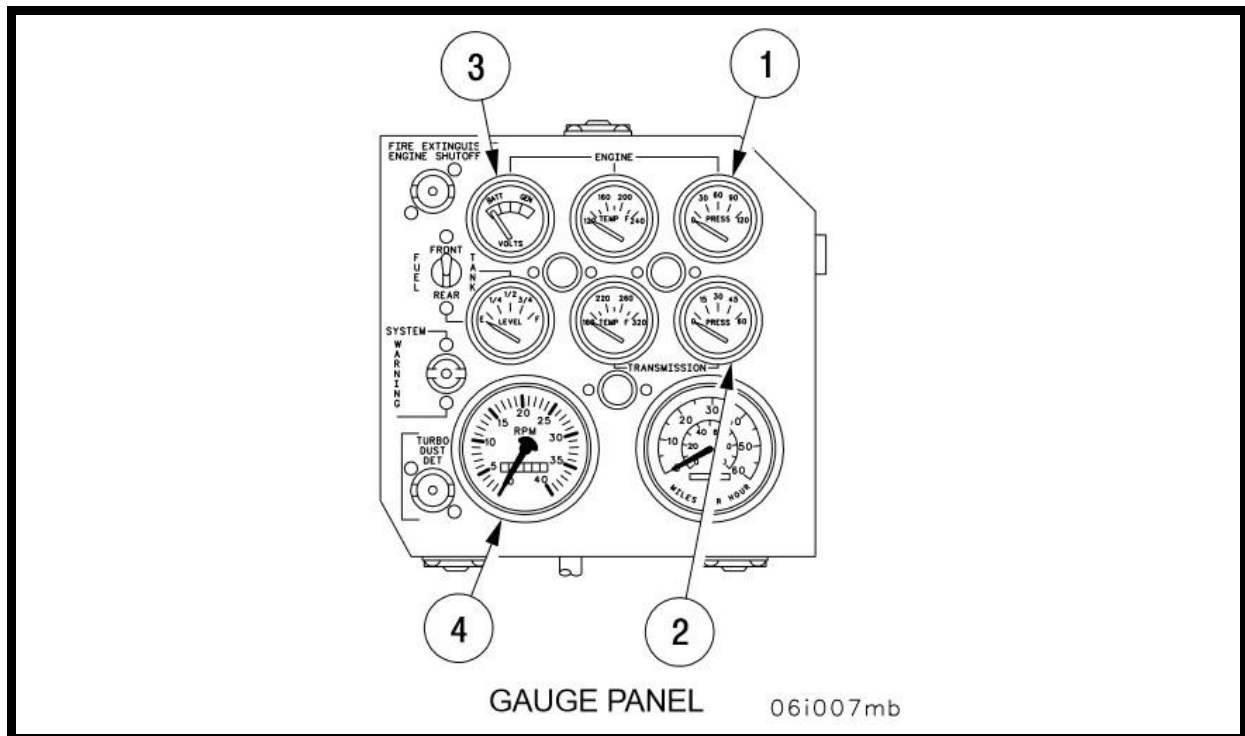


圖14 儀錶板

(6)項次13-指示燈測試/ Item No.13- Indicator Lamp Test (圖15)

A. 負責乘員/Crewmember :

駕駛/ DRIVER

B. 檢查流程/Procedure :

檢查所有警示燈作用是否正常

Check that all warning indicator lamps work.

(A)向上開啟測試燈開關、並驗證動力輸出器附件面板、液壓控制

附件面板上的指示燈均亮起。

Move LAMP TEST switch up and verify that all indicators on the PTO/Accessory panel and hydraulic control panel light. i.

(B)將「絞盤測試」切換開關移到「測試」，並驗證「系統危險」

指示燈是否亮起，並且發出警告聲響。

Move WINCH TEST toggle switch to TEST and verify that SYSTEM WARNING indicator comes on, and system warning horn sounds.

C. 以下狀況停用/Not Fully Mission Capable if:

(A)任何指示燈無法亮起。

Any warning indicator will not light.

(B)將「絞盤測試」切換開關移到「測試」，並驗證「系統危險」

指示燈是否亮起，並發出警告聲響。

SYSTEM WARNING indicator does not come on

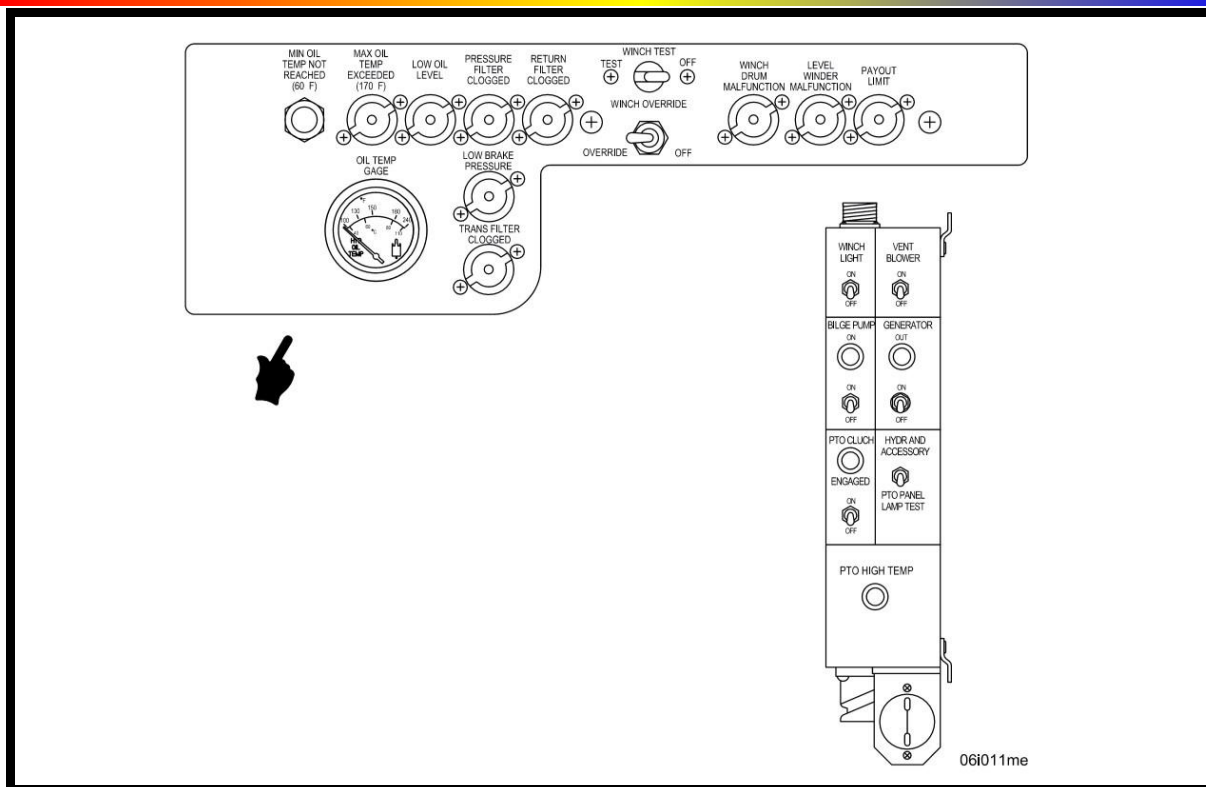


圖15 測試燈附件面板

(6)項次14-煞車/ Item No.14- Brake (圖16)

A. 負責乘員/Crewmember :

駕駛/ **DRIVER**

B. 檢查流程/Procedure :

(A) 註記/NOTE

適用於裝置煞車洩氣閥及壓力表之(新構型1)、裝置改良型煞車調節器之(新構型2)、裝置有煞車調節器及強化駐車煞車系統之(新構型3)，(新構型2.3)均安裝改良型煞車踏板/調節器且具備高煞車壓力之特性，上述之(1-3構型)均依據項目14之操作程序實施檢查煞車系統。

Perform Item number 14a only if vehicle is equipped with brake bleed valve and gauge (new configuration) or modified brake pedal/modulation valve and higher operating pressure (new configuration with brake modulation or new configuration with brake modulation and enhanced parking brake).

- a. 裝置壓力表(如附圖16所示)及煞車洩氣閥構型之車種，須於發動主引擎後25秒後檢查壓力表，煞車壓力標準須達950每平方吋/磅，或裝置改良型煞車調節器及強化駐車煞車系統之車種，煞車壓力標準須達1300每平方吋/磅。

Observe brake pressure gauge (1). Approximately 25 seconds after the main engine is started the gauge should indicate 950 psi (new configuration) or 1300 psi (new configuration with brake modulation)

- b. 若壓力表(如附圖16所示)及煞車洩氣閥構型之車種，其錶上



壓力低於950每平方吋/磅，或改良型煞車調節器及強化駐車煞車系統之車種，其錶上壓力低於1100每平方吋/磅，且煞車泵馬達不斷從管線排出空氣時，處置程序請參照(WP 0122 00)。

If gauge (1) indicates below 950 psi (new configuration) or 1100 psi (new configuration with brake modulation or new configuration with brake modulation and enhanced parking brake) and brake pump motor runs continuously bleed air from brake lines (WP 0122 00).

C.以下狀況停用/Not Fully Mission Capable if:

(A)煞車洩氣閥及壓力表(新構型1)之車種，其煞車壓力低於950每平方吋/磅，且煞車泵馬達持續運轉。

Brake pressure does not reach 950 psi (new configuration) and brake pump motor runs continuously.

(B)改良型煞車調節或煞車調節及增強駐車煞車的(新構型2.3)車輛其煞車壓力低於1100每平方吋/磅到1300每平方吋/磅，且煞車泵馬達持續運轉。

Brake pressure does not reach 1100 to 1300 psi (new configuration with brake modulation or new configuration with brake modulation and enhanced parking brake) and brake pump motor runs continuously.

(7)項次15-煞車/ Item No.15- Brake (圖16)

A.負責乘員/Crewmember：

駕駛/ **DRIVER**

B.檢查流程/Procedure：

移動車輛向前並實施煞車，觀察車輛是否停止或踏板是否固定，請參照(WP 0017 00)。

DRIVER Move vehicle forward and apply brakes to see if vehicle stops or pedal binds (WP 0017 00).

C.以下狀況停用/Not Fully Mission Capable if:

煞車失效

Brakes are inoperative

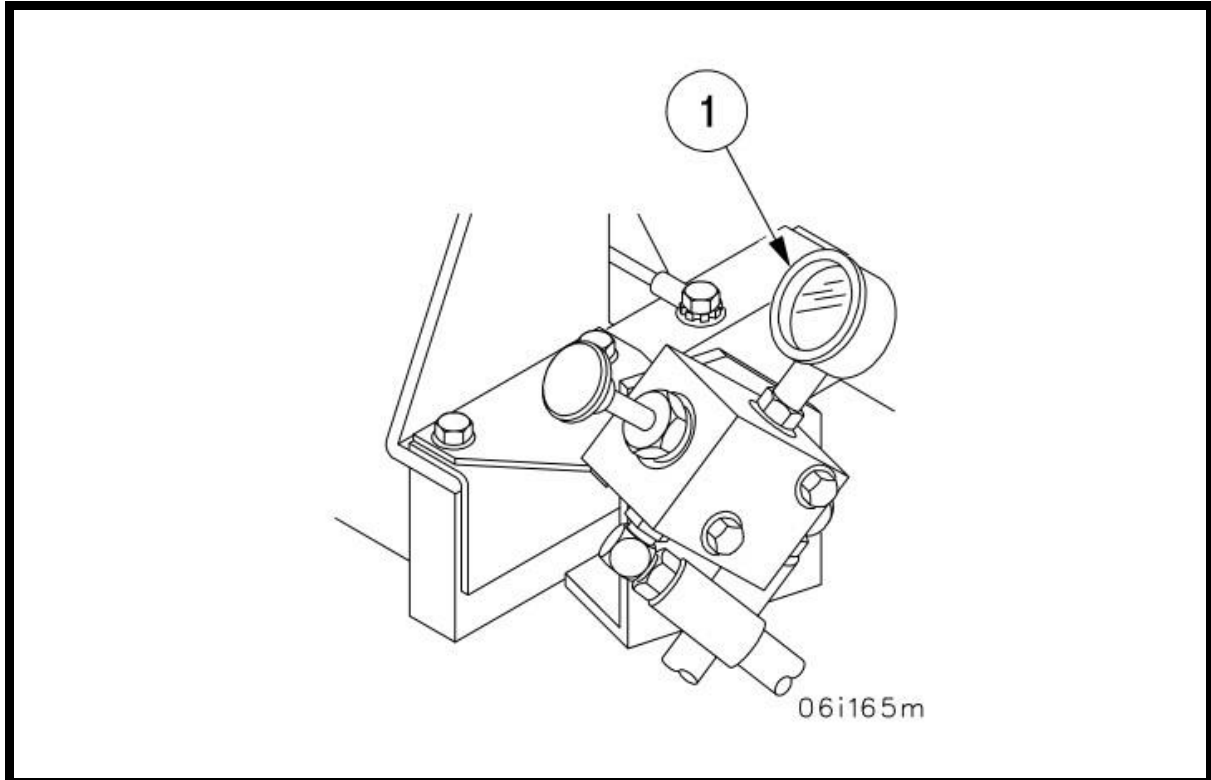


圖16 煞車壓力表

二、表 2，預防性維護檢查，行駛中

TABLE2,PREVENTIVE MAINTENANCE CHECKS AND SERVICES , DURING

(一)前置工作/INITIAL SETUP

1.工具與特殊工具/Tools and Special Tools

(1)漏斗(項目 15，表 2，WP 0133 00)

Funnel (item 41,Table 2, WP 0133 00)

(2)偏位漏斗(項目 46，表 2，WP 0133 00)

Offset Funnel (item 46,Table 2, WP 0133 00)

(3)機油壺(項目 47，表 2，WP 0133 00)

Utility jup,measure and fill (item 47,Table 2, WP 0133 00)

2.零件及材料/Materials/Parts

(1)內燃機潤滑油(項目 25，WP 0135 00)

Lubrication oil,internal combustion(item 25, WP 0135 00)

(2)擦拭布(項目 45，WP 0135 00)

Wiping rags(item 25, WP 0135 00)

3.所需人員/Personnel Required

3 員

Three

4.參考文件/References

(1)WP 0031 00



- (2)WP 0133 00
- (3)WP 0135 00
- (4)WP 0046 00
- (5)WP 0116 00
- (6)WP 0045 00
- (7)WP 0047 00
- (8)WP 0048 00
- (9)WP 0049 00
- (10)WP 0050 00

(二)行駛中\檢查項目

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES ,
DURING**

1.位置-操作機構/LOCATION-CONTROLS

**(1)項次1-方向盤、排檔機構、油門和煞車/ Item No.1- Steering, Shift,
Accelerator and Brake.**

A.負責乘員/Crewmember

駕駛/DRIVER

B.檢查流程/Procedure :

- (A)操作方向盤，並注意是否有不順暢或行程間隙過大的情形。
Operate steering controls and note any binding or excessive play
- (B)操作排檔桿，並注意是否有不順暢或行程間隙過大的情形。
Operate shift controls and note any binding or excessive play
- (C)操作油門，並注意是否有不順暢或行程間隙過大的情形。
Operate accelerator controls and note any binding or excessive play
- (D)操作煞車，並注意是否有不順暢或行程間隙過大的情形。
Operate brake controls and note any binding or excessive play

C.以下狀況停用/Not Fully Mission Capable if:

- (A)方向盤有阻力或行程間隙過大的情形。
Binding or excessive play in steer controls.
- (B)排檔桿有阻力或行程間隙過大的情形。
Binding or excessive play in shift controls.
- (C)油門有阻力或行程間隙過大的情形。
Binding or excessive play in s accelerator pedal.
- (D)煞車有阻力或行程間隙過大的情形。
Binding or excessive play in brake pedal.

(2)項次2-異常聲響/ Item No.2-Unusual Noises

A.負責乘員/Crewmember :



駕駛/DRIVER

B. 檢查流程/Procedure :

注意引擎、變速箱、懸吊系統或液壓系統出現異常聲響、氣味或其他異常問題。

Be alert for unusual noises, odors or visual indications of problems in the engine, transmission, suspension or hydraulic systems.

(3) 項次3-液壓系統、桁架、主絞盤、起重機絞盤、輔助絞盤、鏟/

Item No.3- Hydraulic System, Boom, Main Winch, Hoist Winch, Auxiliary Winch, and Spade

A. 負責乘員/Crewmember :

駕駛/DRIVER

B. 檢查流程/Procedure :

(A) 危險/WARNING

在進行任何起重、拖曳或絞盤操作前，請確認所有安全銷、螺栓完成安裝及固定良好。

Ensure all safety pins and bolts are in place and secure prior to any lifting, towing, or winching operation.

(B) 接合主液壓系統以確定控制裝置和泵的運行狀況，請參照(WP 0045 00)

Engage main hydraulic system to determine operation of controls and pumps (WP 0045 00).

(C) 操作期間應注意任何異常聲響或震動。

During operation be alert for any unusual noises or vibrations.

(D) 檢查液壓系統、主絞盤、輔助絞盤、桁架、鏟及鏟固定銷的操作狀況，請參照(WP 0048 00，WP 0047 00，WP 0049 00，WP 0046 00和WP 0050 00)。

Check operation of main, hoist and auxiliary winches; boom, spade, and spade lock (WP 0048 00, WP 0047 00, WP 0049 00, WP 0046 00 and WP 0050 00)

C. 以下狀況停用/Not Fully Mission Capable if:

液壓系統效能不佳或故障，液壓油達三級滲漏、任何絞盤、桁架、鏟、鏟固定銷無作用。

Hydraulic system inoperative; improper performance or malfunction; class III oil leaks; any winch, boom, spade or spade lock inoperative.

(4) 項次4-儀錶板/Item No.4- Gauge Panels(圖17)

A. 負責乘員/Crewmember :

駕駛/DRIVER

B. 檢查流程/Procedure :

監控下列儀表：

Monitor following gauges :



(A)引擎機油溫度表在引擎運行時溫度正常範圍介於華氏160度到284度間(攝氏71度到140度)

ENGINE oil TEMP gauge (1) normal temperature range 160F–230F (71C–140C).

(B)變速箱溫度表在車輛運行時溫度正常範圍介於華氏160度到260度間(攝氏71度到127度)

TRANSMISSION oil TEMP gauge (2) normal temperature range 160F–260F (71C–127C).

(C)引擎機油壓力表為每分鐘2400轉及引擎機油溫度華氏180度(攝氏82度)時，壓力正常範圍介於40-70每平方英吋/磅(276千帕到6207千帕)

ENGINE oil PRESS gauge (3) normal pressure range 40–70 psi (276 kPa–6201 kPa) at 2400 rpm and 180F(82C) oil temperature.

(D)變速箱壓力表，壓力正常範圍於17每平方英吋/磅(117千帕)

TRANSMISSION oil PRESS gauge (4) normal pressure 17 psi (117 kPa).

C. 以下狀況停用/Not Fully Mission Capable if:

任何儀表遺失、失效、不正常之波動。

Any gauge is missing, fluctuating or inoperative.

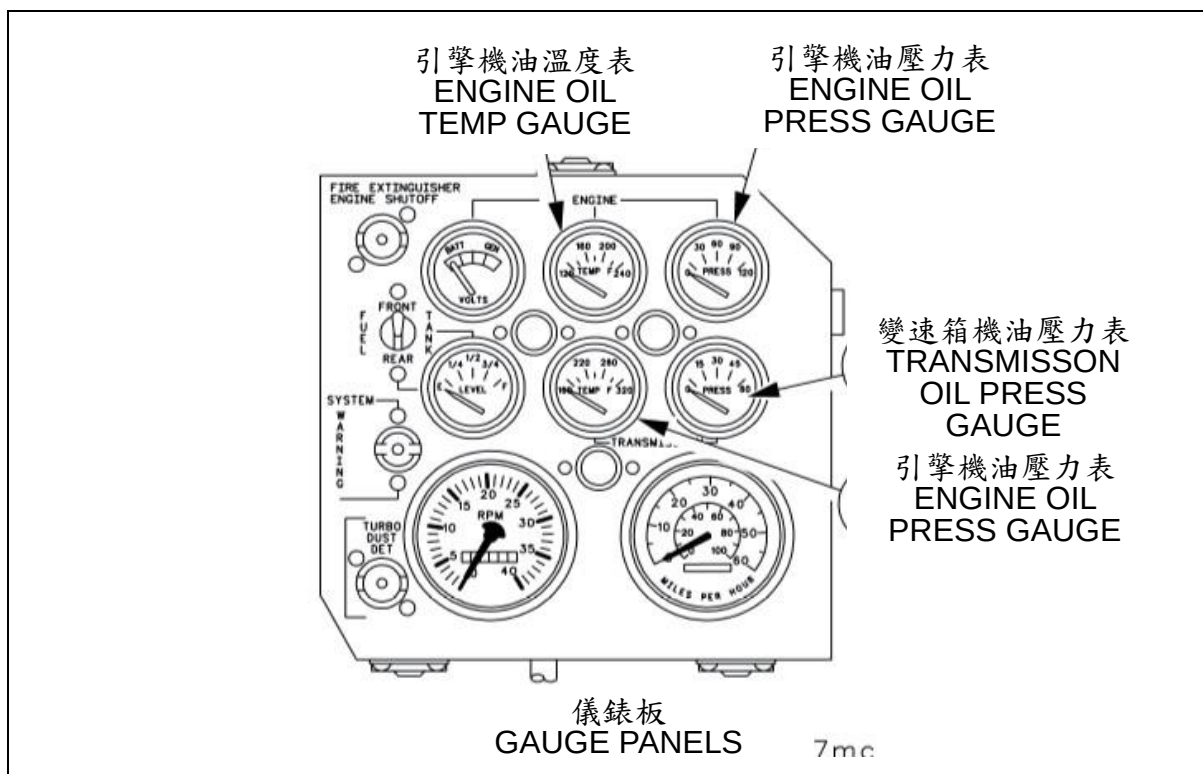


圖17 儀錶板

2. 位置-引擎室//LOCATION-ENGINE COMPARTMENT

(1)項次5-引擎機油量測檢查/Item No.5- Gauge Panels(圖18.19)

A. 負責乘員/Crewmember :

駕駛/DRIVER

B. 檢查流程/Procedure :



(A) 慎重/CAUTION

於引擎運轉連續超過2小時以上，且因任務需要而無法將引擎熄火檢查時，須採用下述機油檢查方式。

This engine oil level check method should only be used when it is impractical to wait at least two hours with the engine stopped.

(B) 註記/NOTE

- a. 引擎運轉超過8個小時以上，須立即停止引擎運轉，並以「引擎停止運轉之方式機標準」實施機油量測，請參考(表6，WP 0105 00)。

此時引擎須以怠速運轉5分鐘，且機油溫度低於華氏140度(攝氏60度)

Check oil level during extended missions at least every 8 hours with engine running. Verify oil level using engine stopped method (Table 6, WP 0105 00) as soon as possible.

Engine must be idling for at least 5 minutes and oil temperature is less than 140°F (60°C).

- b. 引擎上甲板可能有單檢修門及雙檢修門兩種型式。如屬於雙檢修門車型，則在量測機油容量或加註引擎機油時可選擇打開其中一個專屬檢修門。

Engine deck cover may be equipped with a single or double door. If vehicle is equipped with double door open the small door only when checking or filling engine oil.

(C) 危險/WARNING

發動機表面高溫會點燃機油，為避免發動機起火，請使用偏心漏斗(項目46，表2，WP 0133 00)或機油壺(項目47，表2，WP 0133 00)來添加機油，並用擦拭布將加油管周邊噴濺之機油加以清潔參照(WP0135 00 項目45)，加注機油完畢後，確實將機油加注蓋旋緊，並將加注檢修門關閉及鎖定。

Engine oil can be ignited by hot engine surfaces. To avoid engine fire, use offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00) to add engine oil, clean oil from around oil filler tube area with wiping rags (item 45, WP 0135 00) after filling. Make sure engine oil filler tube cap is tight and engine oil fill access door is closed and latched.

- a. 將車輛停止於平坦地面上。

Park vehicle on a level surface

- b. 打開引擎上甲板門，程序請參照(WP0031 00或0031 01)。

Open engine deck door (WP 0031 00 or WP 0031 01)

- c. 打開引擎機油檢查門。

Open engine oil access door.

- d. 打開引擎機油量測外蓋。

Open ENGINE OIL LEVEL door.

- e. 將機油表尺由導管抽出並擦拭乾淨，將其重新插回導管中，再次抽出表尺，檢查表尺上機油平面是否沾附在引擎怠速範圍專用檢查面的引擎怠速範圍記號位置上。

Remove oil gauge rod and wipe clean. Insert oil gauge rod in gauge tube. Remove oil gauge rod. Verify oil level on ENG. IDLING RANGE side of oil gauge rod is within ENG. IDLING RANGE marks

- f. 需添加適當等級之機油參照(表6，WP 0105 00)，請將機油加注檢修門打開，使用偏心漏斗或機油壺參照(項目46，表2，WP 0133 00) 或參照(項目47，表2，WP 0133 00)，以機油加注管添加機油。

To add proper grade oil (Table 6, WP 0105 00) open engine oil fill access door, add oil through engine oil filler tube using offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00).

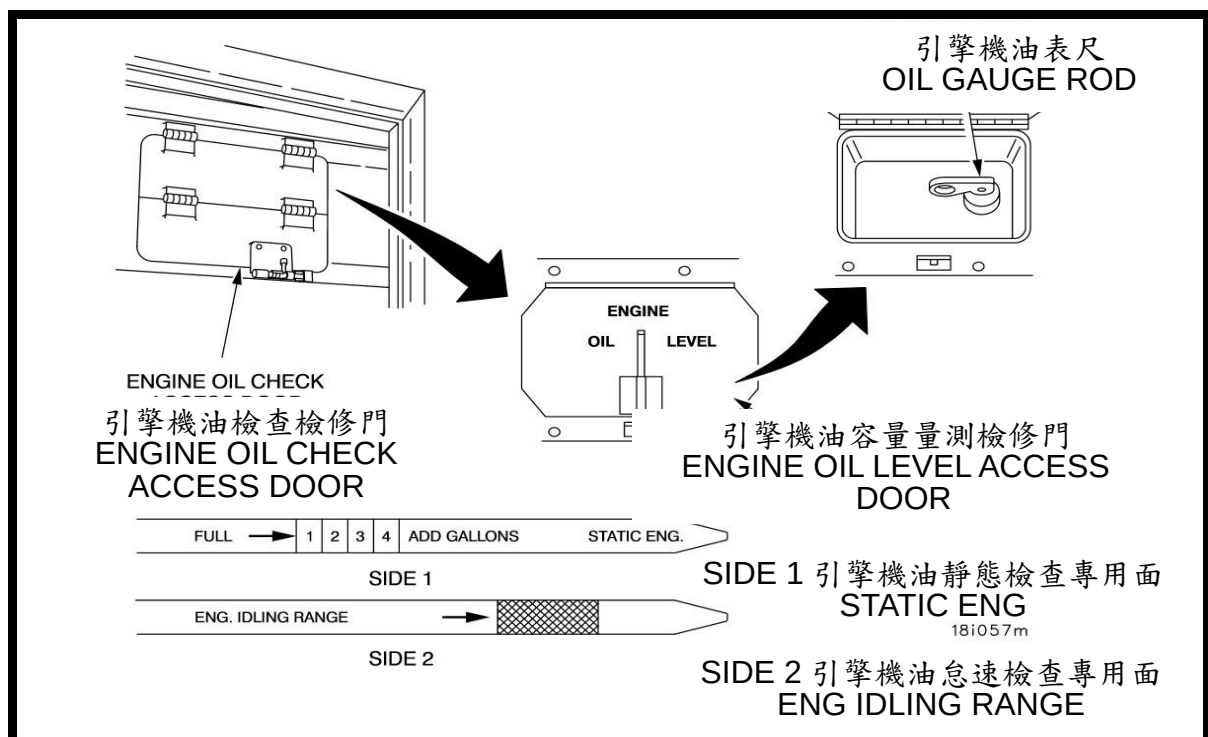


圖18檢修門、外蓋、機油表尺

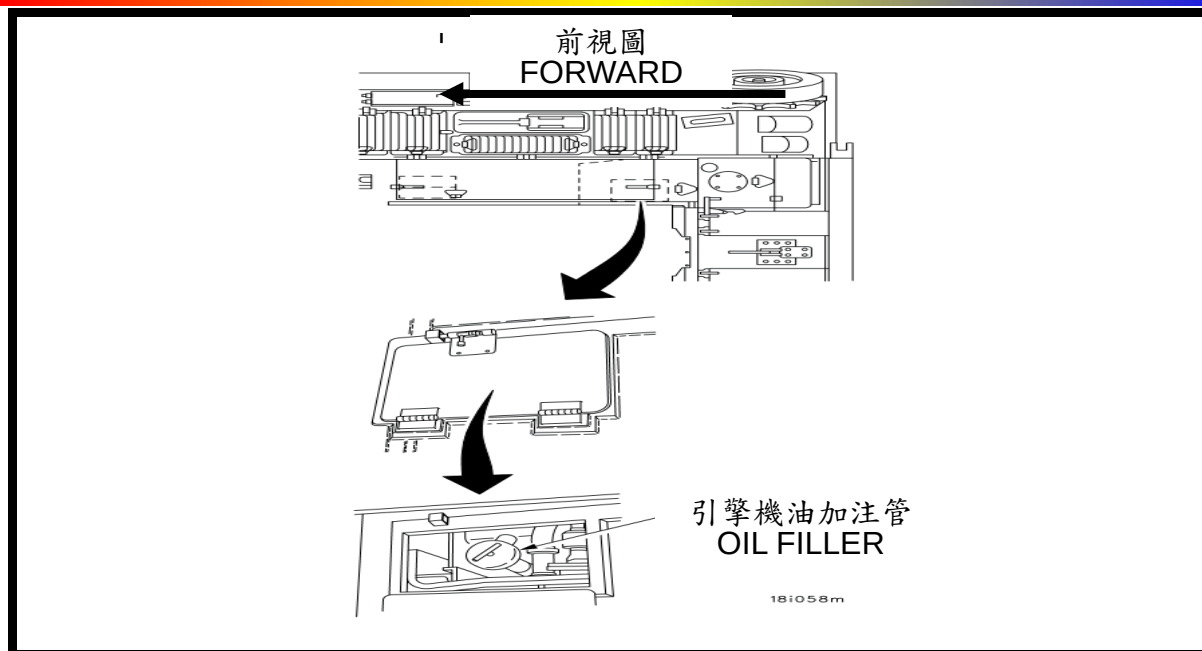


圖19 引擎機油加注

(2)項次6-引擎機油量測檢查(新式)/Item No.5 Gauge Panels(圖 20.21.22)

A.負責乘員/Crewmember :

駕駛/DRIVER

B.檢查流程/Procedure :

(A)慎重/CAUTION

於引擎運轉連續超過2小時以上，且因任務需要而無法將引擎熄火檢查時，須採用下述機油檢查方式。

This engine oil level check method should only be used when it is impractical to wait at least two hours with the engine stopped.

(B)註記/NOTE

a.引擎運轉超過8個小時以上，須立即停止引擎運轉，並以「引擎停止運轉之方式」實施機油量測請參考(表6，WP 0105 00)。

此時引擎須以怠速運轉5分鐘，且機油溫度低於華氏140度(攝氏60度)

Check oil level during extended missions at least every 8 hours with engine running. Verify oil level using engine stopped method (Table 6, WP 0105 00) as soon as possible.

Engine must be idling for at least 5 minutes and oil temperature is less than 140°F (60C).

b.引擎上甲板可能有單檢修門及雙檢修門兩種型式。如屬於雙檢修門車型，則在量測機油容量或加註引擎機油時可選擇打



開其中一個專屬檢修門。

Engine deck cover may be equipped with a single or double door. If vehicle is equipped with double door open the small door only when checking or filling engine oil.

(C)危險/WARNING

發動機表面高溫會點燃機油，為避免發動機起火，請使用偏心漏斗(項目46，表2，WP 0133 00)或量測及添加壺(項目47，表2，WP 0133 00)，來添加機油，並用擦拭布將加油管周邊噴濺之機油加以清潔、參照(WP0135 00 項目45)，加注機油

完畢後，確實將機油加注蓋旋緊，並將加注檢修門關閉及鎖定。
Engine oil can be ignited by hot engine surfaces. To avoid engine fire, use offset funnel (item 46, Table 2, WP 0133 00) and utility jug (item 47, Table 2, WP 0133 00) to add engine oil, clean oil from around oil filler tube area with wiping rags (item 45, WP 0135 00) after filling. Make sure engine oil filler tube cap is tight and engine oil fill access door is closed and latched.

- a. 將車輛停放於平坦地面上。
Park vehicle on a level surface
- b. 打開引擎上甲板門，程序請參照(WP0031 00或0031 01)。
Open engine deck door (WP 0031 00 or WP 0031 01)
- c. 打開引擎機油檢查門。
Open engine oil access door.
- d. 將機油表尺由導管抽出並擦拭乾淨，將其重新插回導管中，再次抽出表尺，檢查表尺上機油平面是否沾附在引擎怠速範圍專用檢查面的引擎怠速範圍記號位置上。
Remove oil gauge rod and wipe clean. Insert oil gauge rod in gauge tube. Remove oil gauge rod. Verify oil level on ENG. IDLING RANGE side of oil gauge rod is within ENG. IDLING RANGE marks
- e. 如果機油低於引擎機油怠速量測專用面之加注線，則按油尺上指示加註適當等級及容量之機油(表6 WP 0105 00)，加註完成後須重新檢查。
If oil level is below hash marks on ENG IDLING RANGE side of oil gauge rod, add proper amount of oil according to oil gauge rod and recheck. To add proper grade oil (Table 6, WP 0105 00):
- f. 拉起機油加注管蓋拉柄，打開機油加注管。
Pull up on engine oil filler tube cap handle and open engine oil filler tube.
- g. 在加油管中插入偏心漏斗(項目46，表2，WP 0133 00)
Insert offset funnel (item 46, Table 2, WP 0133 00) in oil filler tube.
- h. 根據需要使用偏心漏斗(項目46，表2，WP 0133 00)，和2.5加侖機油壺(項目47，表2，WP 0133 00)，添加機油。
Pour quantity of oil as indicated on gauge rod into graduated 2.5 gallon utility jug (item 47, Table 2, WP 0133 00)
- i. 將機油加入引擎，關閉機油加注管蓋和所有檢修門
Pour oil into engine. Close oil filler tube cap and all access doors.

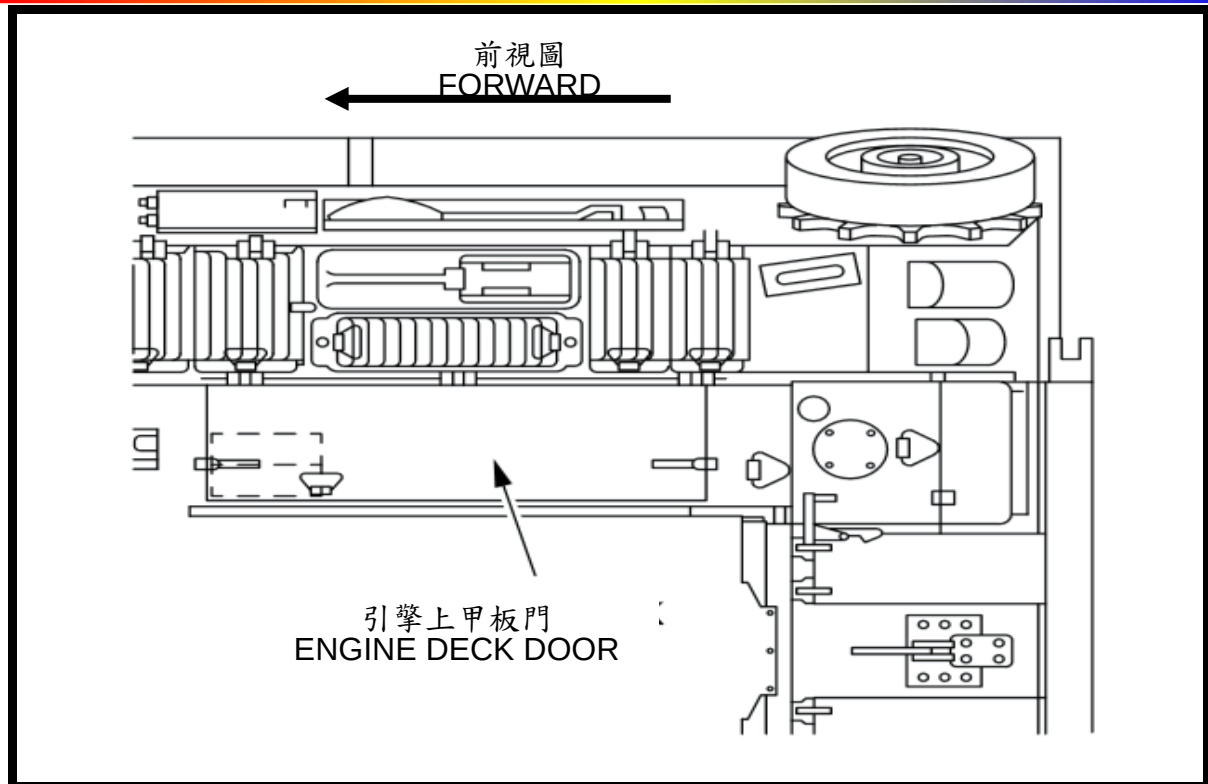


圖20 引擎上甲板門

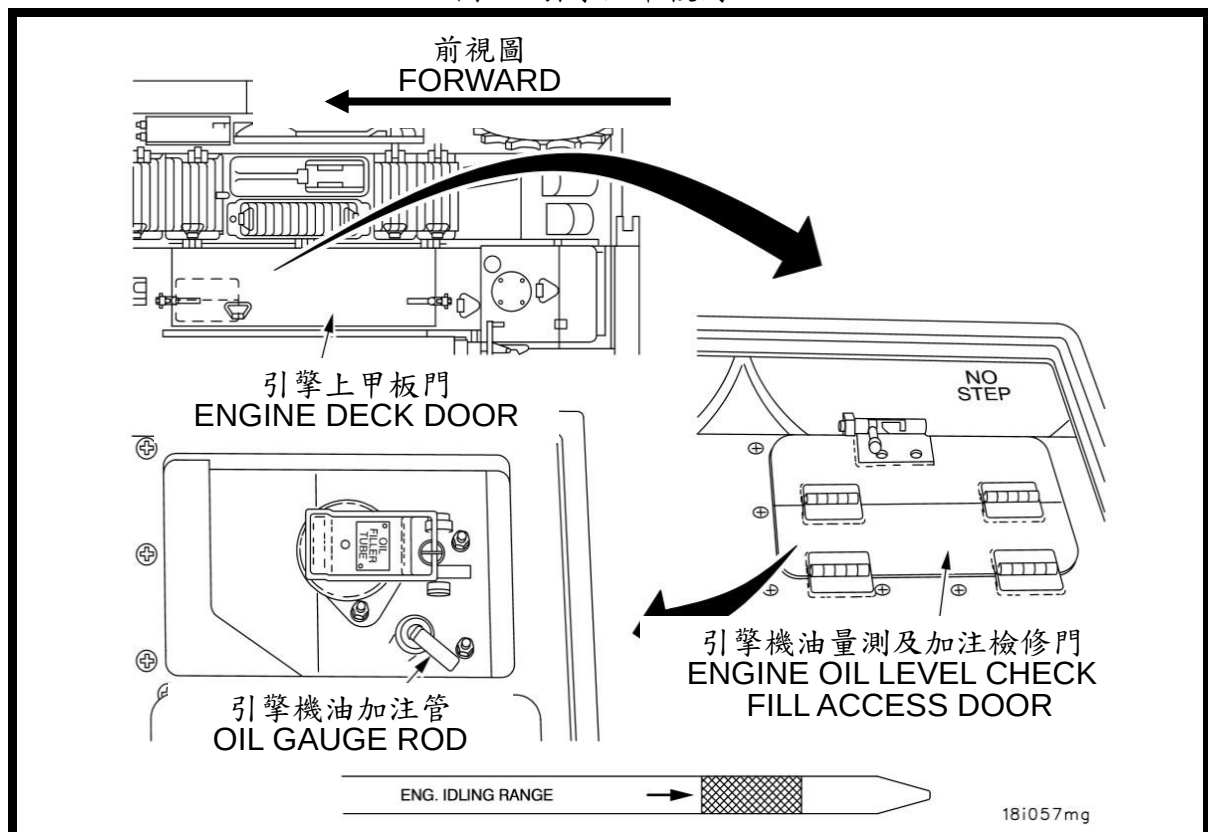


圖21檢修門、外蓋、機油表尺

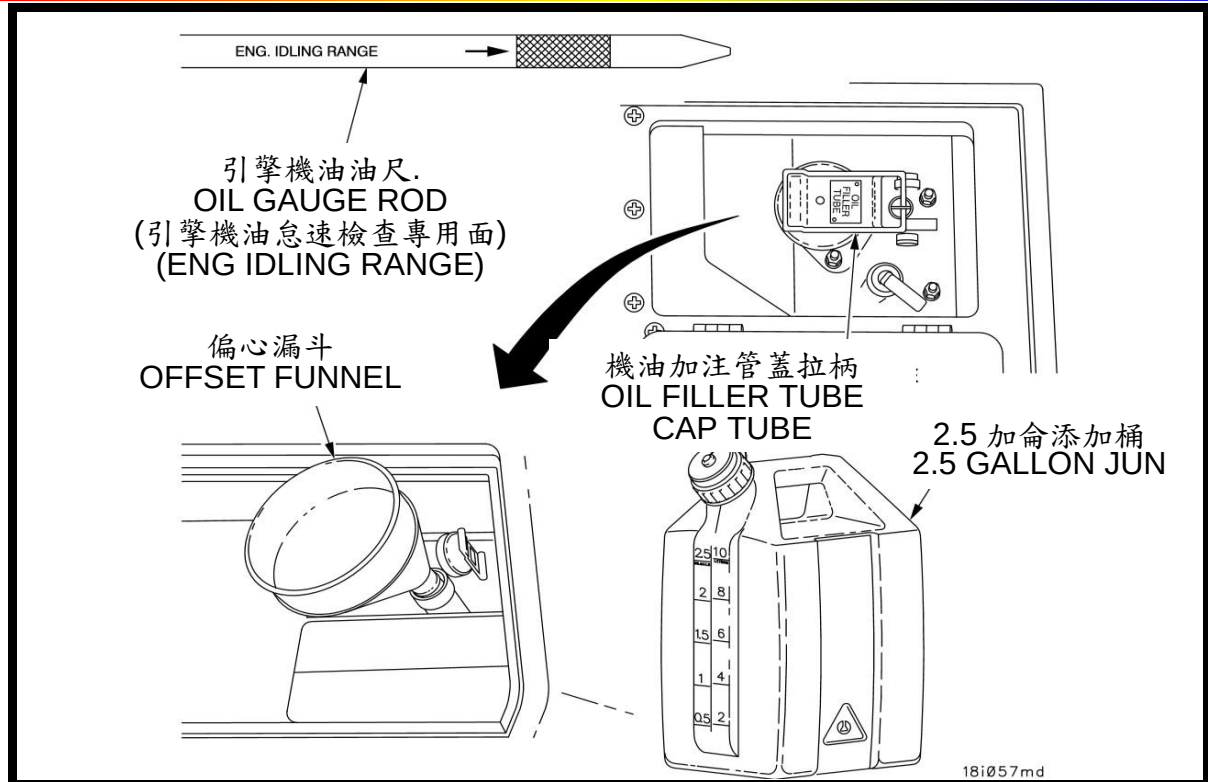


圖22加註機油

3. 位置-乘員艙/CREW COMPARTMENT

(1)項次7-轉速表/Item No.5- Speedometer(圖18.19)

A. 負責乘員/Crewmember :

駕駛/DRIVER

B. 檢查流程/Procedure :

觀察時速表，運轉時不能有異常波動及異音。

Observe speedometer. Should operate without excessive fluctuation or unusual noises.

(2)項次8-空氣濾清器/Item No.5- Speedometer(圖22)

A. 負責乘員/Crewmember :

車長/COMMANDER

B. 檢查流程/Procedure :

(A) 註記/NOTE

於沙漠或多塵環境下操作，需經常檢查灰塵指示器是否於紅色位置。

For desert or extremely dusty operation, check restriction gauge often for red mark.

(B) 依據灰塵指示器指示為紅色時(WP0116 00)，請清潔或更換濾心。

處置完成後請重置灰塵指示器(WP0116 00)。

Observe restriction gauge (WP 0116 00). When color changes to red, clean or replace filter element. Reset restriction gauge (WP 0116 00).



C.以下狀況停用/Not Fully Mission Capable if:

更換濾清心子或重置後，壓力只是仍指示紅色。

Gauge remains in red after being reset or after air cleaners filter elements have been replaced.

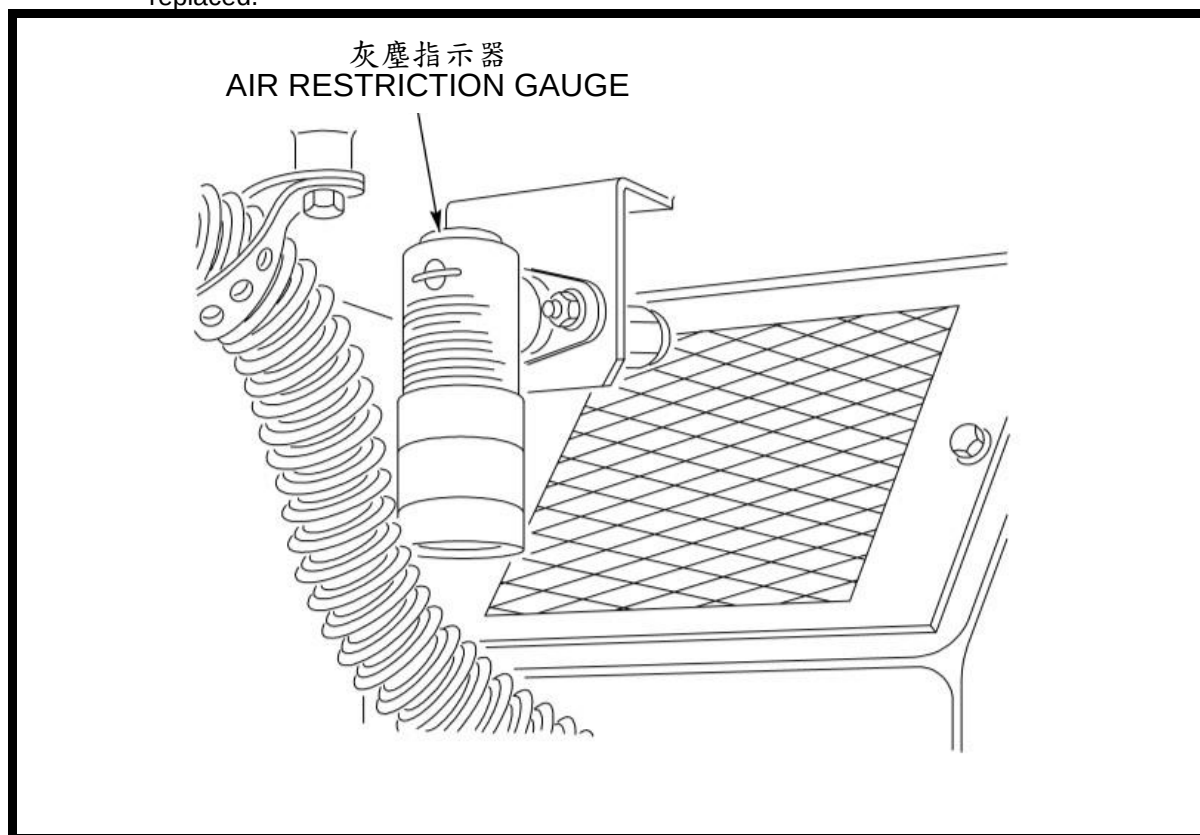


圖22空氣濾清器灰塵指示器

伍、結論

裝備妥善是發揮戰力之憑藉，隨著裝備日新月異且各項系統也越趨複雜化，由其每日預防保養檢查是各項保養中最基礎但也最重要的；在此次翻譯新式裝備M88A2戰車救濟車之操作手冊發現，雖然該裝備不論在底盤承載系統、動力系統等皆比現有之M88A1戰車救濟車更為先進，但唯一不變的是不因為新式裝備之設計精密而放棄保養中最基礎的每日檢查保養，反而更加精確分工讓全車乘員都有自己需要檢查的項目、並逐項逐動的落實檢查，以發揮裝備最大戰力及減少因裝備損壞肇生之人員傷亡，希望藉由此篇譯文可讓裝配M88A2戰車救濟車之保修部隊成員於獲得裝備前可先行了解新式裝備所需保養之項目及要領，期能達到「保養重於保修、保修重於購置」之最終目標。



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