SEN06519-05

Shop Manual

ARTICULATED
DUMP TRUCK

HM400-5

SERIAL NUMBERS 10001 and up

KOMATSU®

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publication SEN06519-05

Order the manual at mid-west-tech.com >

INDEX

00 INDEX AND FOREWORD 00-1
ABBREVIATION LIST 00-21
FOREWORD, SAFETY, BASIC INFORMATION 00-26
HOW TO READ THE SHOP MANUAL 00-26
SAFETY NOTICE FOR OPERATION 00-28
PRECAUTIONS TO PREVENT FIRE 00-36
ACTIONS IF FIRE OCCURS 00-38
PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS 00-39
ACTIONS TAKEN TO MEET EXHAUST GAS REGULATIONS 00-40
PRECAUTIONS FOR DEF 00-41
STORE AdBlue/DEF 00-42
PRECAUTIONS FOR HANDLING HYDRAULIC EQUIPMENT 00-43
PRECAUTIONS FOR DISCONNECTION AND CONNECTION OF PIPINGS 00-46
PRECAUTIONS FOR HANDLING ELECTRICAL EQUIPMENT 00-52
PRECAUTIONS FOR HANDLING FUEL SYSTEM EQUIPMENT 00-54
PRECAUTIONS FOR HANDLING INTAKE SYSTEM EQUIPMENT 00-55
PRACTICAL USE OF KOMTRAX 00-56
DISCONNECT AND CONNECT PUSH-PULL TYPE COUPLER 00-57
PRECAUTIONS FOR DISCONNECTION AND CONNECTION OF CONNECTORS 00-61
METHOD FOR DISCONNECTING AND CONNECTING DEUTSCH CONNECTOR 00-65
METHOD FOR DISCONNECTING AND CONNECTING SLIDE LOCK TYPE CONNECTOR 00-66
METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH LOCK TO PULL ... 00-68
METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH LOCK TO PUSH .. 00-69
METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH HOUSING TO ROTATE 00-71
HOW TO READ ELECTRICAL WIRE CODE 00-72
EXPLANATION OF TERMS FOR MAINTENANCE STANDARD 00-76
STANDARD TIGHTENING TORQUE TABLE 00-79
CONVERSION TABLE 00-86
01 SPECIFICATIONS 01-1
CONTENTS 01-2
ABBREVIATION LIST 01-3
SPECIFICATIONS 01-8
SPECIFICATION DRAWING 01-8
SPECIFICATIONS 01-10
WEIGHT TABLE 01-16
TABLE OF FUEL, COOLANT, AND LUBRICANTS 01-18
10 STRUCTURE AND FUNCTION 10-1
CONTENTS 10-2
ABBREVIATION LIST 10-6
UREA SCR SYSTEM 10-11
LAYOUT DRAWING OF UREA SCR SYSTEM 10-11
UREA SCR SYSTEM DIAGRAM 10-13
FUNCTION OF UREA SCR SYSTEM 10-14
COMPONENT PARTS OF UREA SCR SYSTEM 10-31
BOOT-UP SYSTEM 10-40
LAYOUT DRAWING OF BOOT-UP SYSTEM 10-40
SYSTEM OPERATING LAMP SYSTEM 10-42
BATTERY DISCONNECT SWITCH 10-43
ENGINE SYSTEM 10-45
LAYOUT DRAWING OF ENGINE SYSTEM 10-45
AUTOMATIC IDLE STOP SYSTEM 10-48
COMPONENT PARTS OF ENGINE SYSTEM 10-50
COOLING SYSTEM 10-68
LAYOUT DRAWING OF COOLING SYSTEM 10-68
RADIATOR FAN CONTROL SYSTEM 10-70

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

AFTERCOOLER FAN CONTROL SYSTEM 10-72
COMPONENT PARTS OF COOLING SYSTEM 10-74
CONTROL SYSTEM 10-101
LAYOUT DRAWING OF CONTROL SYSTEM 10-101
RETARDER AND HOIST CONTROL SYSTEM 10-102
MACHINE MONITOR SYSTEM 10-103
REARVIEW MONITOR SYSTEM 10-105
KOMTRAX SYSTEM 10-106
PAYLOAD METER SYSTEM 10-107
COMPONENT PARTS OF CONTROL SYSTEM 10-111
HYDRAULIC SYSTEM 10-163
LAYOUT DRAWING OF HYDRAULIC SYSTEM 10-163
COMPONENT PARTS OF HYDRAULIC SYSTEM 10-164
POWER TRAIN SYSTEM 10-183
LAYOUT DRAWING OF POWER TRAIN SYSTEM 10-183
TRANSMISSION CONTROL SYSTEM 10-185
GEAR SHIFT CONTROL SYSTEM 10-190
SHIFT HOLD SYSTEM 10-193
DIRECTION CONTROL SYSTEM 10-194
KOMATSU TRACTION CONTROL SYSTEM (KTCS) 10-195
COMPONENT PARTS OF POWER TRAIN SYSTEM 10-198
WORK EQUIPMENT SYSTEM 10-253
WORK EQUIPMENT CONTROL 10-253
HOIST CONTROL 10-254
COMPONENT PARTS OF WORK EQUIPMENT SYSTEM 10-256
STEERING SYSTEM 10-264
LAYOUT DRAWING OF STEERING SYSTEM 10-264
FUNCTION OF STEERING SYSTEM 10-265
STEERING COLUMN 10-266
COMPONENT PARTS OF STEERING SYSTEM 10-267
BRAKE SYSTEM 10-279
LAYOUT DRAWING OF BRAKE SYSTEM 10-279
RETARDER CONTROL 10-281
PARKING BRAKE INTERLOCK FUNCTION 10-284
ARAC SYSTEM 10-285
COMPONENT PARTS OF BRAKE SYSTEM 10-286
UNDERCARRIAGE AND FRAME 10-311
FRONT SUSPENSION 10-311
CENTER AND REAR SUSPENSIONS 10-313
SUSPENSION CYLINDER 10-315
OSCILLATION HITCH 10-318
WORK EQUIPMENT 10-320
STRUCTURE OF WORK EQUIPMENT 10-320
FUNCTION OF WORK EQUIPMENT 10-321
CAB AND ITS ATTACHMENTS 10-322
ROPS CAB 10-322
CAB TILT 10-323
20 STANDARD VALUE TABLE 20-1
CONTENTS 20-2
ABBREVIATION LIST 20-3
STANDARD VALUE TABLE FOR ENGINE 20-8
STANDARD VALUE TABLE FOR ENGINE: HM400-5 20-8
STANDARD VALUE TABLE FOR MACHINE 20-12
STANDARD VALUE TABLE FOR MACHINE: HM400-5 20-12
MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE 20-26
STANDARD VALUE TABLE FOR ELECTRICAL 20-27
STANDARD VALUE TABLE FOR ELECTRICITY 20-27
30 TESTING AND ADJUSTING 30-1

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

CONTENTS 30-2
ABBREVIATION LIST 30-5
RELATED INFORMATION ON TESTING AND ADJUSTING 30-10
TOOLS FOR TESTING AND ADJUSTING 30-10
SKETCH OF TOOLS FOR TESTING AND ADJUSTING 30-17
ENGINE AND COOLING SYSTEM 30-18
TEST ENGINE SPEED 30-18
TEST BOOST PRESSURE 30-21
TEST EXHAUST GAS TEMPERATURE 30-23
TEST EXHAUST GAS COLOR 30-26
TEST AND ADJUST VALVE CLEARANCE 30-29
TEST COMPRESSION PRESSURE 30-31
TEST BLOWBY PRESSURE 30-34
TEST ENGINE OIL PRESSURE 30-36
TEST EGR VALVE AND VGT OIL PRESSURE 30-38
TEST FUEL PRESSURE 30-40
TEST FUEL RETURN RATE AND LEAKAGE 30-42
BLEED AIR FROM FUEL SYSTEM 30-48
TEST FUEL CIRCUIT FOR LEAKAGE 30-50
HANDLE CYLINDER CUT-OUT MODE OPERATION 30-52
HANDLE NO-INJECTION CRANKING OPERATION 30-53
CLEAN FUEL DOSER 30-54
WRITE INJECTOR COMPENSATION VALUE TO ENGINE CONTROLLER 30-57
WRITE ASH IN SOOT ACCUMULATION CORRECTION TO ENGINE CONTROLLER 30-64
TEST SCR RELATED FUNCTIONS 30-65
CLEAN AdBlue/DEF TANK 30-96
TEST TORQUE CONVERTER STALL SPEED 30-101
TEST RADIATOR FAN AND AFTERCOOLER FAN SPEED 30-106
POWER TRAIN 30-108
TEST POWER TRAIN OIL PRESSURE 30-108
ADJUST TRANSMISSION SPEED SENSOR 30-126
ADJUST TRANSMISSION CONTROLLER 30-129
MOVE MACHINE WHICH HAS A TROUBLE IN ELECTRICAL SYSTEM 30-130
MOVE MACHINE WHICH HAS A TROUBLE IN TRACTION CONTROL SYSTEM (KTCS) 30-137
STEERING SYSTEM 30-140
TEST AND ADJUST STEERING CIRCUIT OIL PRESSURE 30-140
BRAKE SYSTEM 30-142
TEST AND ADJUST BRAKE OIL PRESSURE 30-142
TEST AND CHARGE ACCUMULATOR NITROGEN GAS PRESSURE FOR BRAKE 30-148
TEST BRAKE PERFORMANCE 30-153
BLEED AIR FROM BRAKE CIRCUIT 30-157
TEST WEAR OF WHEEL BRAKE DISC 30-159
RELEASE PARKING BRAKE MANUALLY 30-161
TEST AND ADJUST WEAR OF PARKING BRAKE PAD 30-162
HYDRAULIC SYSTEM 30-165
TEST AND ADJUST SUSPENSION CYLINDER 30-165
TEST AND ADJUST DUMP CIRCUIT OIL PRESSURE 30-170
WORK EQUIPMENT 30-173
TEST AND ADJUST DUMP BODY POSITIONER SENSOR 30-173
TEST AND ADJUST DUMP BODY MOUNT 30-176
CAB AND ITS ATTACHMENTS 30-178
CAB TILT UP 30-178
ELECTRICAL SYSTEM 30-185
SET AND ADJUST EACH EQUIPMENT 30-185
SET AND OPERATE OF MACHINE MONITOR 30-201
METHOD FOR STARTING UP KOMTRAX TERMINAL 30-316
HANDLE VOLTAGE CIRCUIT OF ENGINE CONTROLLER 30-321
HANDLE BATTERY DISCONNECT SWITCH 30-322

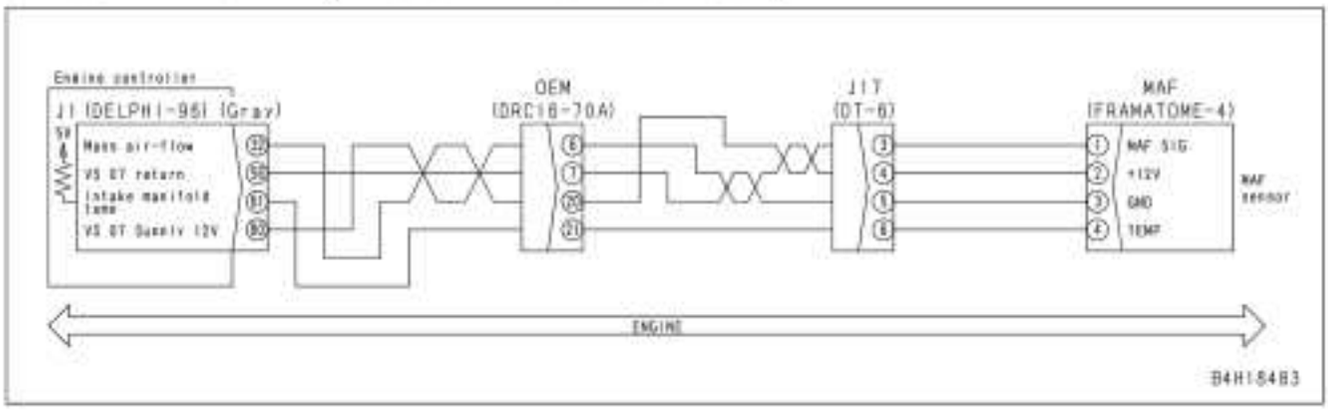
MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

Equipment name	Procedure, measuring location, criteria, and remarks			
Steering oil temperature sensor	1. Turn the starting switch to OFF position. 2. Disconnect connector B11, and connect T-adapter to male side. Sensor resistances at various temperatures are average figures and they may vary depending on sensor.			
	Resistance	Between B11 (male) (1) and (2)	Center brake oil temperature: 25 °C	42.7 kΩ
			Center brake oil temperature: 30 °C	35.1 kΩ
			Center brake oil temperature: 80 °C	6.6 kΩ
			Center brake oil temperature: 90 °C	4.9 kΩ
			Center brake oil temperature: 100 °C	3.8 kΩ
Piston pump oil temperature sensor	1. Turn the starting switch to OFF position. 2. Disconnect connector PPOT, and connect T-adapter to male side. Sensor resistances at various temperatures are average figures and they may vary depending on sensor.			
	Resistance	Between PPOT (male) (1) and (2)	Piston pump oil temperature: 25 °C	4.18 kΩ
			Piston pump oil temperature: 30 °C	3.46 kΩ
			Piston pump oil temperature: 40 °C	2.41 kΩ
			Piston pump oil temperature: 50 °C	1.71 kΩ
Main flow select valve pressure sensor	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector V.P(CN26). 3. Turn the starting switch to ON position.			
	Voltage	Between V.P(CN26) (B) and (A)		0.4 to 3.0 V
Steering oil pressure sensor	1. Turn the starting switch to OFF position. 2. Disconnect connector B08 and connect T-adapter to female side. 3. Turn the starting switch to ON position.			
	Voltage	Between B08 (female) (C) and (A)		0.56 to 4.42 V

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

No.	Cause	Procedure, measuring location, criteria and remarks		
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and MAF, and connect T-adapter to either female side.		
		Resistance	Between ground and J1 (female) (61) or MAF (female) (4)	Min. 1 MΩ
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and MAF, and connect T-adapters to female side of J1.		
		Continuity	Between J1 (female) (61) and each pin other than J1 (61) pin.	No continuity
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

CIRCUIT DIAGRAM (MASS AIR FLOW SENSOR)



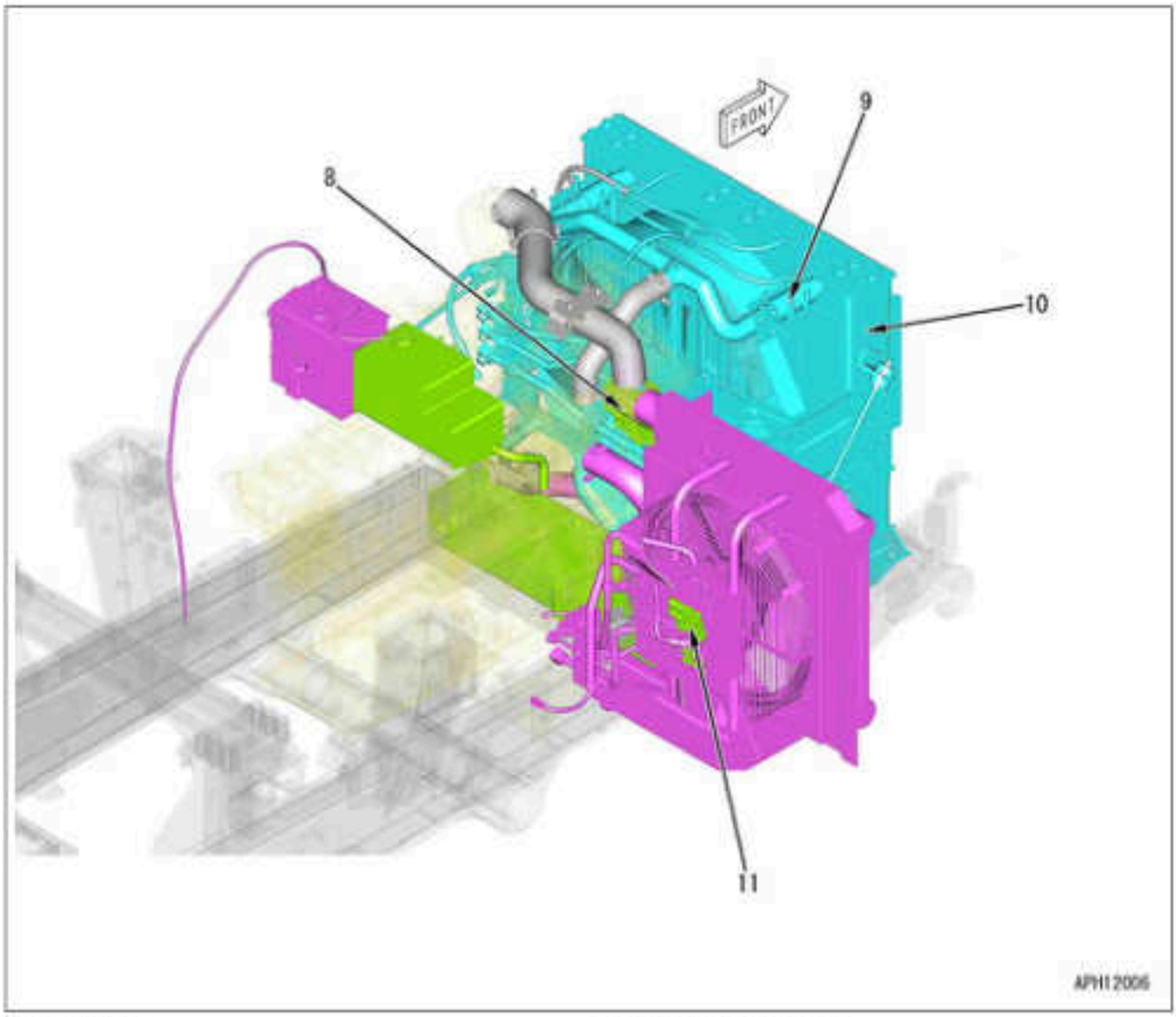
MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

FAILURE CODE [DAQQKR]

Action level	Failure code	Failure	CAN2 Defective Communication (Transmission controller) (Detected by monitor controller) (Machine monitor system)
L03	DAQQKR		
Detail of failure	Monitor controller does not recognize transmission controller over CAN communication-2 line (KOMNET/c).		
Action of controller	Communication information is not updated.		
Phenomenon on machine	• Failure codes related to transmission controller are not displayed. • Monitoring data related to transmission controller are not updated. • Fan rotation direction cannot be reverse. • Adjustment function is not available.		
Related information	• ACC signal of starting switch is the command to start CAN communication for each controller. • 6 different failure codes, [D8AQK*], [DAQQKR], [DB1QKR], [DB2QKR], [DAZQKR] and [DSJ0KR] are used for defective CAN communication by CAN2 when it is detected by monitor controller. When all of these 6 failure codes are displayed, ground fault, short circuit or hot short circuit in wiring harness (CAN communication line) can be suspected. Since air conditioner is also operated through CAN communication, you must, in such case, check on air conditioner screen whether air conditioner is operable (ON/OFF and air flow adjustment). (For the machine with payload meter, [DBSQKR] is also used for defective CAN communication by CAN2.) • If air conditioner is operable, wiring harness (CAN communication line) does not have ground fault, short circuit, or hot short circuit. • Since each controller and machine monitor (meter unit) are connected directly to battery, they are supplied with power even after starting switch is turned to OFF position. • Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter. • After repair is completed, check if the failure code is cleared by the following procedure. Method: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective power supply to transmission controller	Perform troubleshooting for failure code [DAQ0KK].
2	Defective CAN2 communication system	Perform checks on causes 4 to 9 in troubleshooting for failure code [DB2QKR].
3	Defective transmission controller	If no failure is found by preceding checks, transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
4	Defective monitor controller	If no failure is found by preceding checks, monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed).

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >



1: Aftercooler
2: Aftercooler outlet hose
3: Aftercooler inlet hose
4: Sub-tank
5: Reservoir tank
6: Torque converter and steering oil cooler
7: Radiator outlet hose
8: Radiator fan motor
9: Radiator inlet hose
10: Radiator
11: Aftercooler fan motor
12: Oil cooler bypass valve

SPECIFICATIONS OF COOLING SYSTEM

Radiator

Core type: CF79

Relief pressure of pressure valve: 90±15 kPa {0.9±0.15 kg/cm^2}

Torque converter oil cooler

Core type: PTO-LS

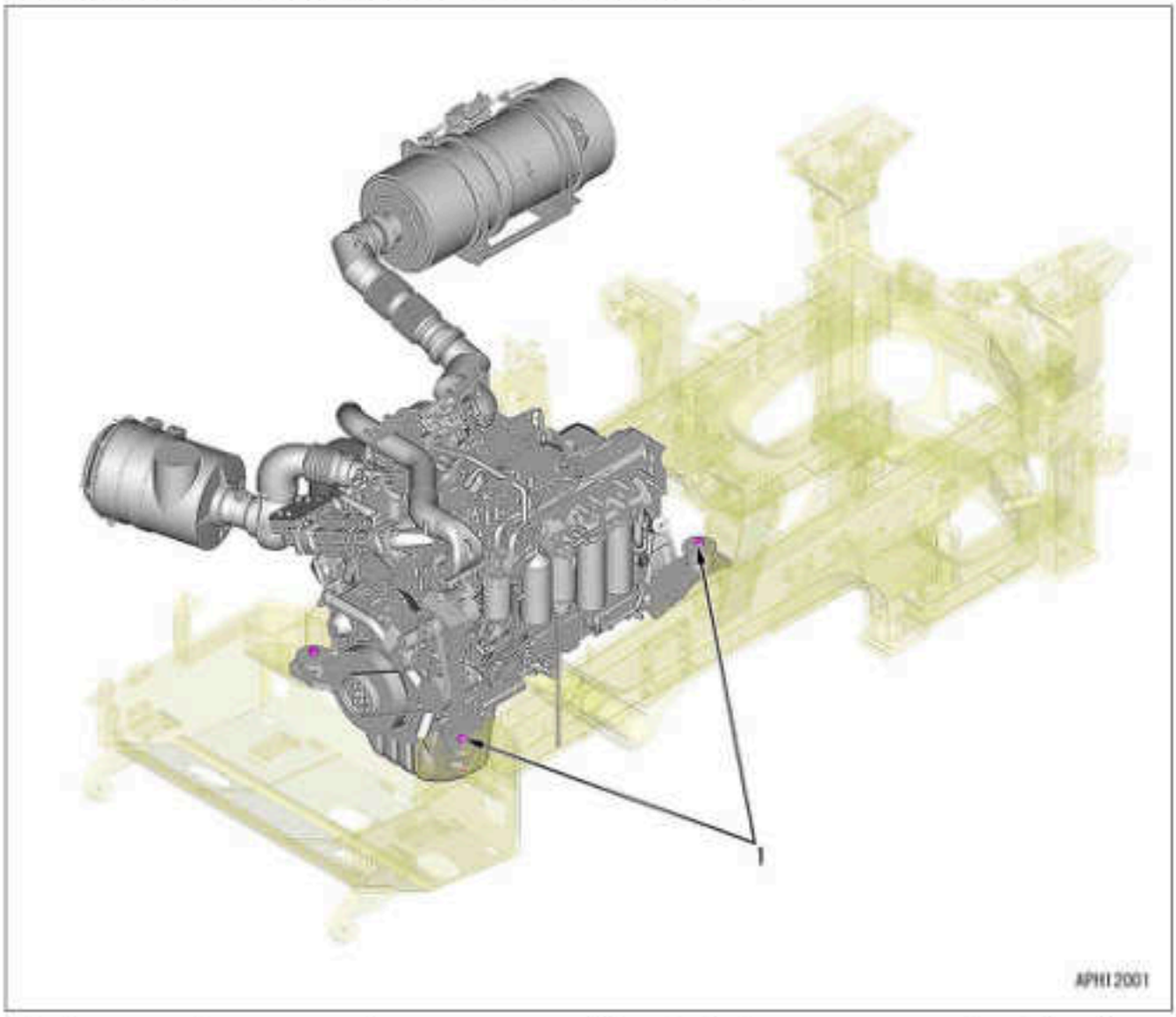
Steering oil cooler

Core type: PTO-LS

MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

ENGINE AND COOLING SYSTEM

MAINTENANCE STANDARD OF ENGINE MOUNT



No.	Item	Judgment criteria	Remedy
1	Tightening torque of bolt	662 to 829 Nm {67.5 to 84.5 kgm}	Retighten

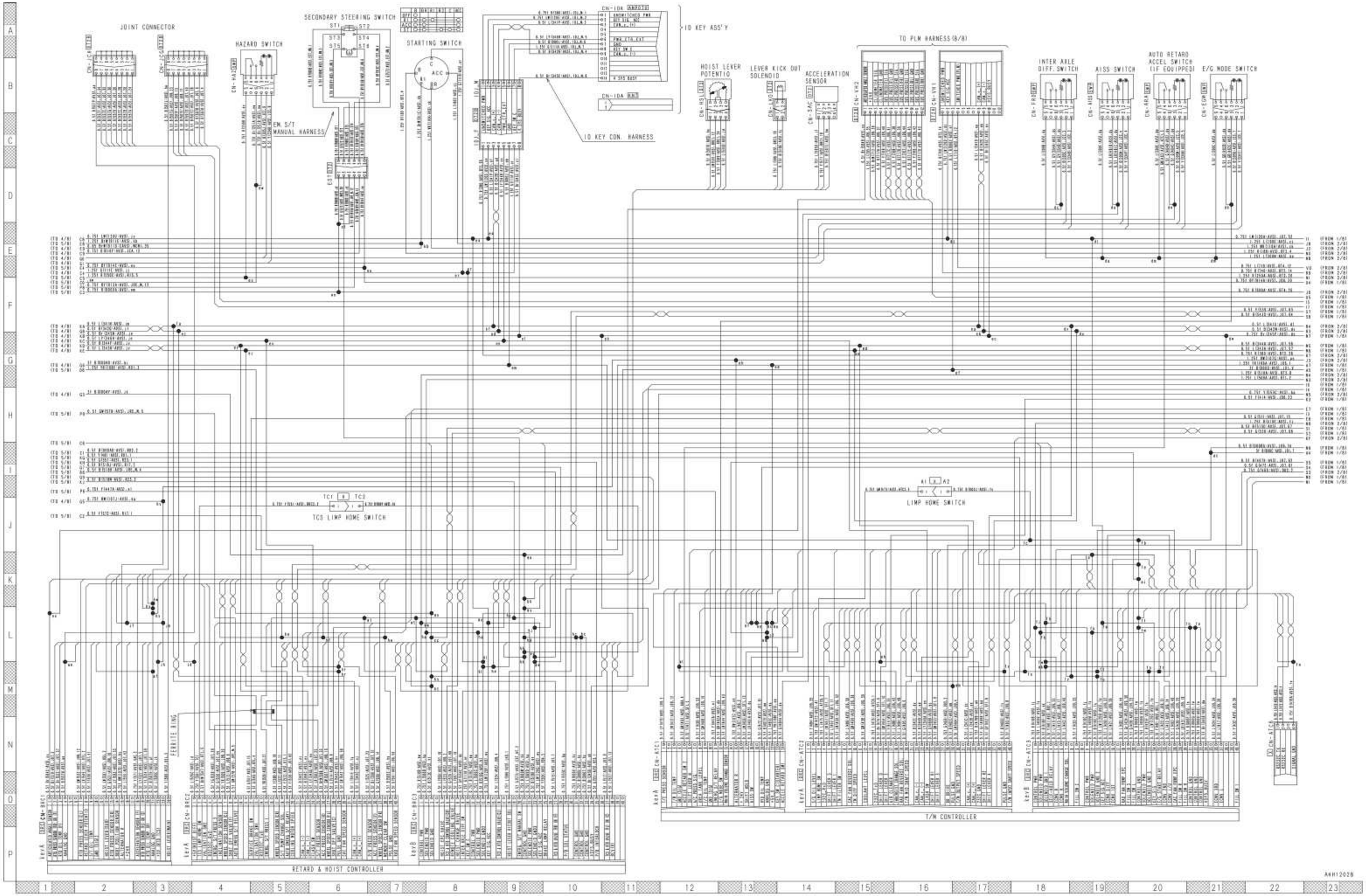
MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publicatio... Order the manual at mid-west-tech.com >

INSIDE CAB ELECTRICAL CIRCUIT DIAGRAM (3/8)

HM400-5

REMARK

This figure covers the equipment and devices that are unavailable as optional items in some areas.



MidWestTech | Komatsu HM400-5 Articulated Dump Truck Service Manual | Publication SEN06519-05 Order the manual at mid-west-tech.com >