Safety notice

(Rev. 2007/03)

Important safety notice

Proper service and repair are extremely important for safe machine operation. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe. Some of these techniques require the use of tools specially designed by Komatsu for the specific purpose.

To prevent injury to workers, the symbol ⚠ is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

1. General precautions

⚠ **Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully before operating the machine.**

1) Before carrying out any greasing or repairs, read all the safety plates stuck to the machine. For the locations of the safety plates and detailed explanation of precautions, see the Operation and Maintenance Manual.
2) Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt, water, or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.
3) When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
4) When carrying out any operation with 2 or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR warning signs in the operator's compartment.
5) Only qualified workers must carry out work and operation which require license or qualification.
6) Keep all tools in good condition, learn the correct way to use them, and use the proper ones of them. Before starting work, thoroughly check the tools, machine, forklift, service car, etc.
7) If welding repairs are needed, always have a trained and experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, shielding goggles, cap and other clothes suited for welding work.
8) Before starting work, warm up your body thoroughly to start work under good condition.

Safety points

1	Good arrangement
2	Correct work clothes
3	Following work standard
4	Making and checking signs
5	Prohibition of operation and handling by unlicensed workers
6	Safety check before starting work
7	Wearing protective goggles (for cleaning or grinding work)
8	Wearing shielding goggles and protectors (for welding work)
9	Good physical condition and preparation
10	Precautions against work which you are not used to or you are used to too much

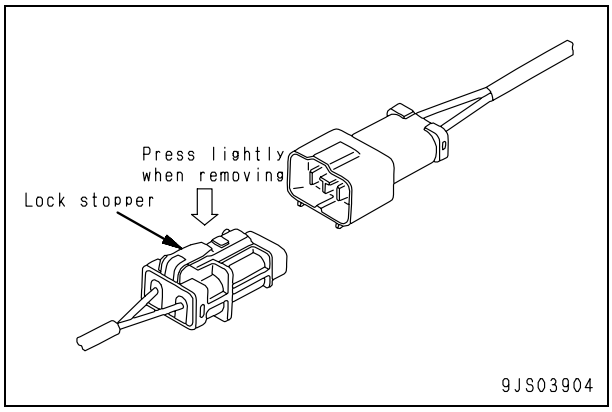
2. Preparations for work

1) Before adding oil or making any repairs, park the machine on hard and level ground, and apply the parking brake and block the wheels or tracks to prevent the machine from moving.
2) Before starting work, lower the work equipment (blade, ripper, bucket, etc.) to the ground. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.

3. Removing, installing, and drying connectors and wiring harnesses

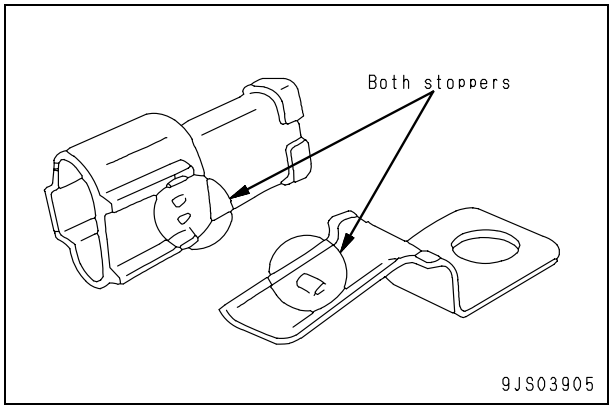
1) Disconnecting connectors

1] Hold the connectors when disconnecting.
When disconnecting the connectors, hold the connectors. For connectors held by a screw, loosen the screw fully, then hold the male and female connectors in each hand and pull apart. For connectors which have a lock stopper, press down the stopper with your thumb and pull the connectors apart.
★ Never pull with one hand.

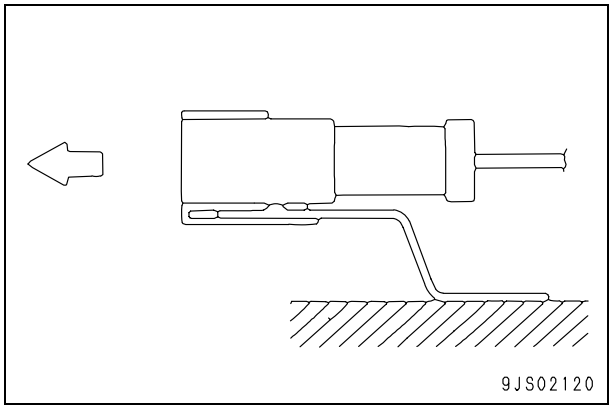


2] When removing from clips

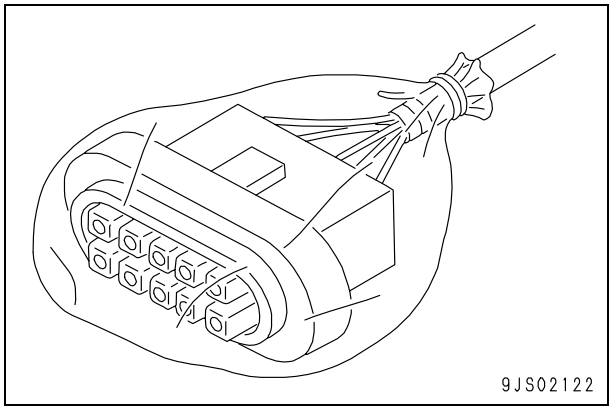
- Both of the connector and clip have stoppers, which are engaged with each other when the connector is installed.



- When removing a connector from a clip, pull the connector in a parallel direction to the clip for removing stoppers.
★ If the connector is twisted up and down or to the left or right, the housing may break.



3] Action to take after removing connectors
After removing any connector, cover it with a vinyl bag to prevent any dust, dirt, oil, or water from getting in the connector portion.
★ If the machine is left disassembled for a long time, it is particularly easy for improper contact to occur, so always cover the connector.



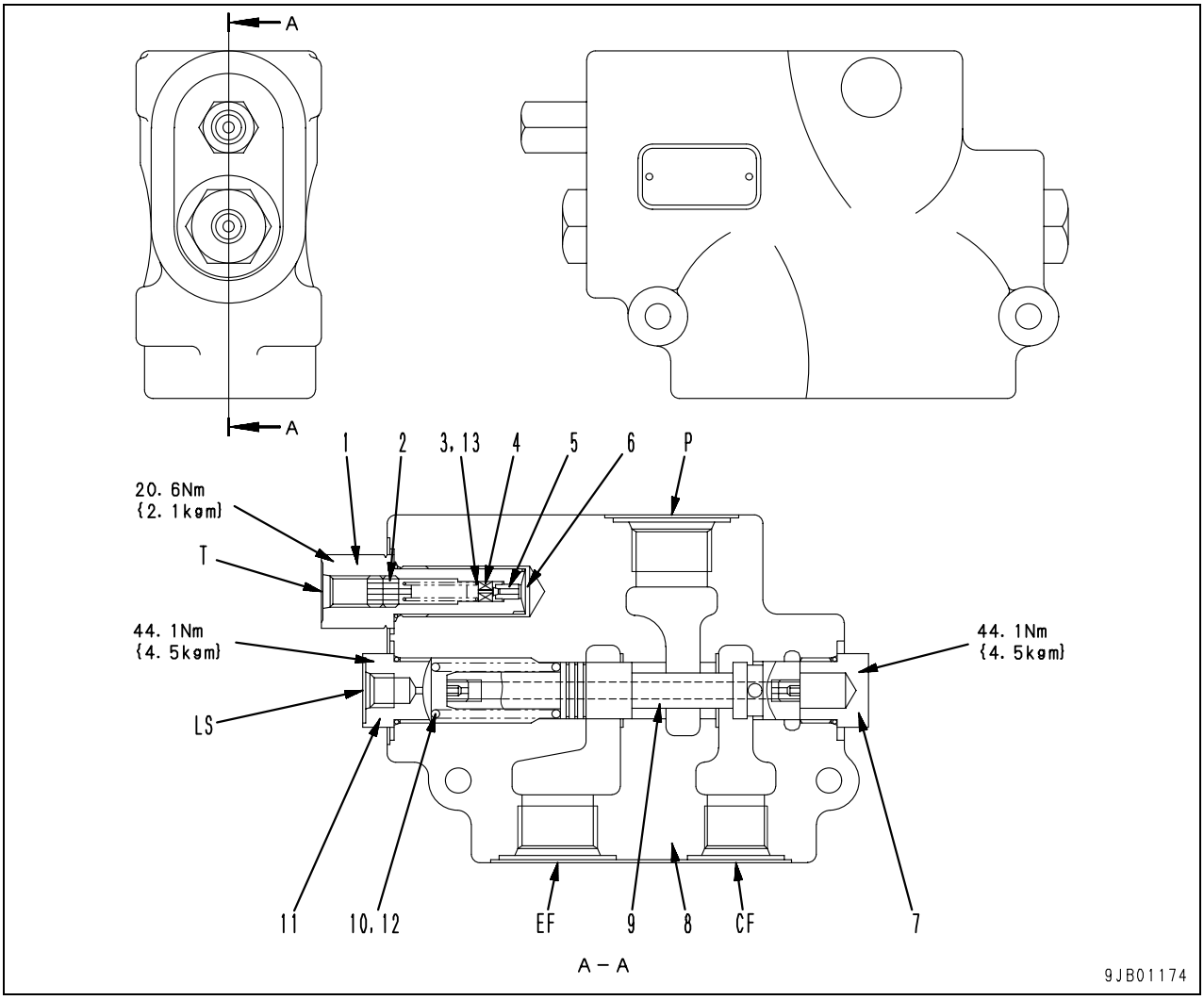
Temperature

Fahrenheit-Centigrade conversion: A simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vice versa is to enter the accompanying table in the center (boldface column) of figures. These figures refer to the temperature in either Fahrenheit or Centigrade degrees.
When convert from Fahrenheit to Centigrade degrees, consider the center column to be a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.
When convert from Centigrade to Fahrenheit degrees, consider the center column to be a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

1°C = 33.8°F

°C		°F	°C		°F	°C		°F	°C		°F
–40.4	**–40**	–40.0	–11.7	**11**	51.8	7.8	**46**	114.8	27.2	**81**	177.8
–37.2	**–35**	–31.0	–11.1	**12**	53.6	8.3	**47**	116.6	27.8	**82**	179.6
–34.4	**–30**	–22.0	–10.6	**13**	55.4	8.9	**48**	118.4	28.3	**83**	181.4
–31.7	**–25**	–13.0	–10.0	**14**	57.2	9.4	**49**	120.2	28.9	**84**	183.2
–28.9	**–20**	–4.0	–9.4	**15**	59.0	10.0	**50**	122.0	29.4	**85**	185.0
–28.3	**–19**	–2.2	–8.9	**16**	60.8	10.6	**51**	123.8	30.0	**86**	186.8
–27.8	**–18**	–0.4	–8.3	**17**	62.6	11.1	**52**	125.6	30.6	**87**	188.6
–27.2	**–17**	1.4	–7.8	**18**	64.4	11.7	**53**	127.4	31.1	**88**	190.4
–26.7	**–16**	3.2	–7.2	**19**	66.2	12.2	**54**	129.2	31.7	**89**	192.2
–26.1	**–15**	5.0	–6.7	**20**	68.0	12.8	**55**	131.0	32.2	**90**	194.0
–25.6	**–14**	6.8	–6.1	**21**	69.8	13.3	**56**	132.8	32.8	**91**	195.8
–25.0	**–13**	8.6	–5.6	**22**	71.6	13.9	**57**	134.6	33.3	**92**	197.6
–24.4	**–12**	10.4	–5.0	**23**	73.4	14.4	**58**	136.4	33.9	**93**	199.4
–23.9	**–11**	12.2	–4.4	**24**	75.2	15.0	**59**	138.2	34.4	**94**	201.2
–23.3	**–10**	14.0	–3.9	**25**	77.0	15.6	**60**	140.0	35.0	**95**	203.0
–22.8	**–9**	15.8	–3.3	**26**	78.8	16.1	**61**	141.8	35.6	**96**	204.8
–22.2	**–8**	17.6	–2.8	**27**	80.6	16.7	**62**	143.6	36.1	**97**	206.6
–21.7	**–7**	19.4	–2.2	**28**	82.4	17.2	**63**	145.4	36.7	**98**	208.4
–21.1	**–6**	21.2	–1.7	**29**	84.2	17.8	**64**	147.2	37.2	**99**	210.2
–20.6	**–5**	23.0	–1.1	**30**	86.0	18.3	**65**	149.0	37.8	**100**	212.0
–20.0	**–4**	24.8	–0.6	**31**	87.8	18.9	**66**	150.8	40.6	**105**	221.0
–19.4	**–3**	26.6	0	**32**	89.6	19.4	**67**	152.6	43.3	**110**	230.0
–18.9	**–2**	28.4	0.6	**33**	91.4	20.0	**68**	154.4	46.1	**115**	239.0
–18.3	**–1**	30.2	1.1	**34**	93.2	20.6	**69**	156.2	48.9	**120**	248.0
–17.8	**0**	32.0	1.7	**35**	95.0	21.1	**70**	158.0	51.7	**125**	257.0
–17.2	**1**	33.8	2.2	**36**	96.8	21.7	**71**	159.8	54.4	**130**	266.0
–16.7	**2**	35.6	2.8	**37**	98.6	22.2	**72**	161.6	57.2	**135**	275.0
–16.1	**3**	37.4	3.3	**38**	100.4	22.8	**73**	163.4	60.0	**140**	284.0
–15.6	**4**	39.2	3.9	**39**	102.2	23.3	**74**	165.2	62.7	**145**	293.0
–15.0	**5**	41.0	4.4	**40**	104.0	23.9	**75**	167.0	65.6	**150**	302.0
–14.4	**6**	42.8	5.0	**41**	105.8	24.4	**76**	168.8	68.3	**155**	311.0
–13.9	**7**	44.6	5.6	**42**	107.6	25.0	**77**	170.6	71.1	**160**	320.0
–13.3	**8**	46.4	6.1	**43**	109.4	25.6	**78**	172.4	73.9	**165**	329.0
–12.8	**9**	48.2	6.7	**44**	111.2	26.1	**79**	174.2	76.7	**170**	338.0
–12.2	**10**	50.0	7.2	**45**	113.0	26.7	**80**	176.0	79.4	**175**	347.0

Priority valve



P: From steering pump
CF: To Orbit-roll valve
EF: To work equipment control valve
LS: From Orbit-roll valve
T: To hydraulic tank

1. Relief valve body
2. Spring seat
3. Spring
4. Poppet
5. Seat
6. Screen
7. Plug
8. Valve body
9. Spool
10. Spring
11. Plug

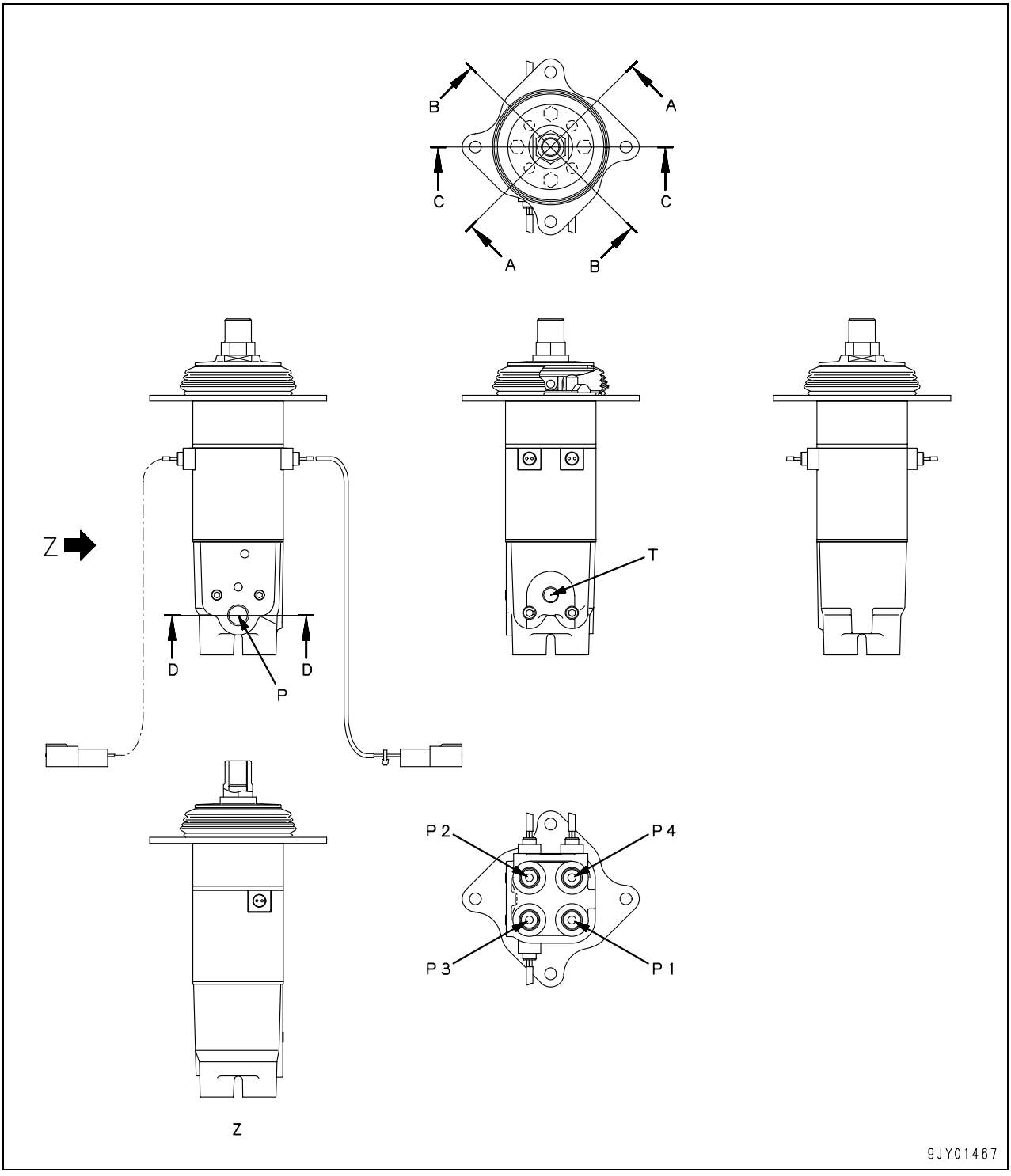
Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
12	Control spring	Free length	Installed length	Installed load	Free length	Installed load	Replace
		63.4	47.6	187 N {19.1 kg}	63.4 ± 1	187 ± 14.7 N {19.1 ± 1.5 kg}	
13	Relief spring	31	27.3	132 N {13.3 kg}	—	132 ± 14.7 N {13.3 ± 1.5 kg}	

PPC valve

★ PPC: Abbreviation for Proportional Pressure Control

Work equipment PPC valve
Mono lever type



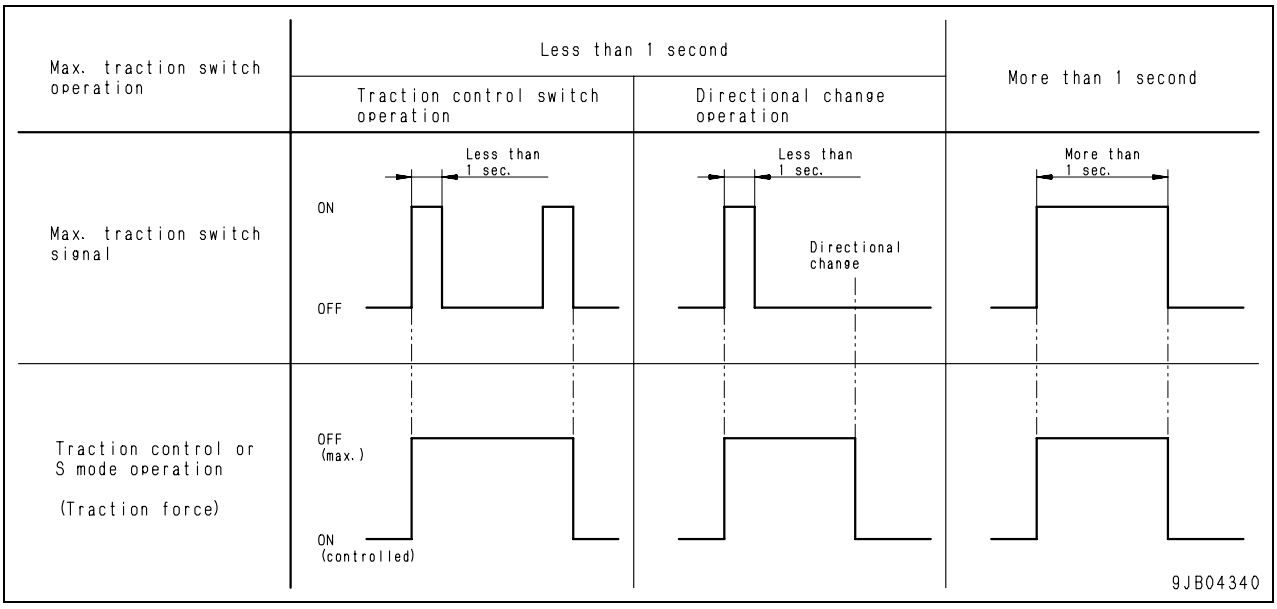
P: From HST charge pump
P1: To bucket valve (tilt)
P2: To bucket valve (dump)
P3: To lift arm valve (raise)
P4: To lift arm valve (lower, float)
T: To hydraulic tank

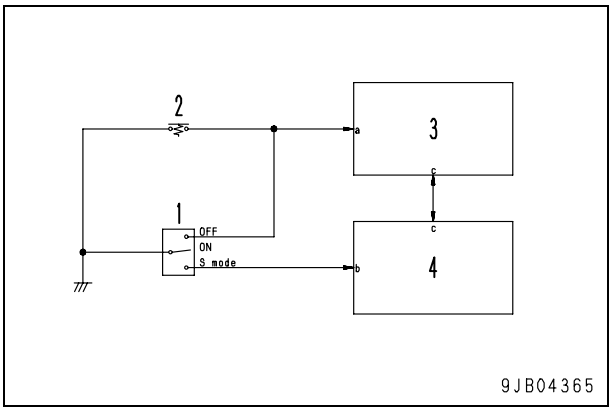
Max. traction function

- Pressing the max. traction switch while the traction control is "ON" or the S mode is selected cancels the traction control or the S mode temporarily to increase the maximum drawbar pull.
- If the directional lever or directional selector switch is operated, or the max. traction switch is pressed again while the traction control or S mode is cancelled from the max. traction switch, the traction "ON" state or S mode is restored.
- As long as the traction control or S mode is cancelled from the max. traction switch, the traction control operation pilot lamp or S mode operation pilot lamp of the machine monitor remains turned off.

★ Holding down the max. traction switch for a second or longer cancels the traction control or S mode as long as it is held down. The traction control or S mode is restored at the moment the switch is released.

★ If the traction control is sequentially turned "ON" and "OFF" in less than a second, the traction control or S mode is cancelled temporarily just like the max. traction switch is held down for less than a second.





1. Traction control switch
2. Max. traction switch
3. HST controller
4. Machine monitor

a. Traction control switch signal
b. S mode signal
c. CAN signal

Testing and adjusting steering wheel

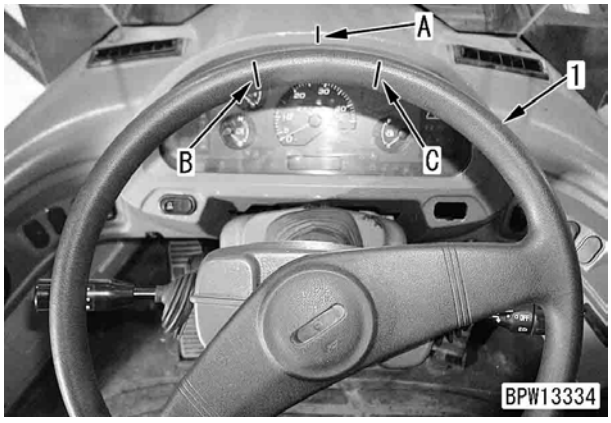
Necessary tools

Symbol	Part No.	Part Name
N	79A-264-0021	Push-pull scale

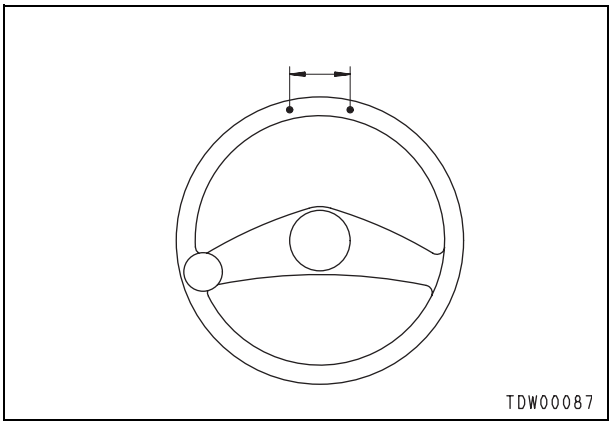
Measuring play of steering wheel

★ Measurement conditions
- Engine speed: Stopped
- Machine posture: Facing straight forward

1. Move the steering wheel (1) 2 or 3 times lightly to the left and right, check that the steering mechanism is at the neutral position, then make mark (A) on the outside frame of the machine monitor.
2. Turn the steering wheel to the right, and make mark (B) at the position where the operating effort starts to become heavy.



3. Turn the steering wheel to the left in the opposite direction from Step 2, and make a mark at the point where the operating effort becomes heavy (when the steering valve lever starts to move). Then measure the distance in a straight line between marks (B) and (C).



Measuring operating force of steering wheel

★ Measurement conditions
- Road surface:
  Flat, horizontal, dry paved surface
- Engine coolant temperature:
  Within green range on engine coolant temperature gauge
- Hydraulic oil temperature:
  45 – 55°C
- Tire inflation pressure:
  Specified pressure
- Engine speed:
  Low idle (bucket empty)

1. Install push-pull scale **N** to the steering wheel knob (2).

2. Start the engine.
   ★ After starting the engine, raise the bucket approx. 400 mm and remove the frame lock bar.

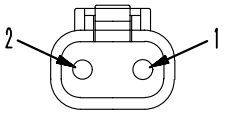
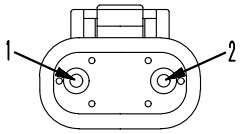
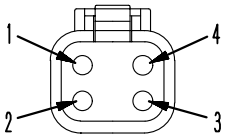
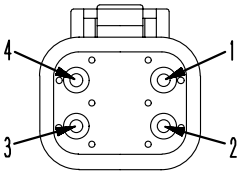
3. Pull push-pull scale **N** in the tangential direction and measure the value when the steering wheel moves smoothly.
   ★ Do not use the valve when the steering wheel starts to move.

4. After finishing the work, remove the measuring instruments and return the removed parts.

MONITOR PANEL [Machine monitor system]				
No.	Monitoring code	Input/Output signal	Displayed item	Contents of ON/OFF switch
1	40900	D-IN-0	Headlamp	Headlamp lighting = ON (24 V)/OFF (OPEN)
		D-IN-1	Cooling fan reverse switch	Switch = ON (24 V)/OFF (OPEN)
		D-IN-2	Starting switch C	Starting motor operation = ON (24 V)/OFF (OPEN)
		D-IN-3	—	—
		D-IN-4	—	—
		D-IN-5	—	—
		D-IN-6	Multi-coupler solenoid (Machine with optional multi-coupler spec.)	Multi-coupler solenoid = ON (24 V)/OFF (OPEN)
		D-IN-7	—	—
2	40901	D-IN-8	ECSS switch (Machine with optional ECSS spec.)	ECSS switch = ON (24 V)/OFF (OPEN)
		D-IN-9	Cooling fan automatic reverse switch	Cooling fan automatic reverse setting = ON (24 V)/ OFF (OPEN)
		D-IN-10	—	—
		D-IN-11	—	—
		D-IN-12	Right winker	Right winker lighting = ON (GND)/OFF (OPEN)
		D-IN-13	Left winker	Left winker lighting = ON (GND)/OFF (OPEN)
		D-IN-14	◇ switch	Pressing switch = ON (24 V)/OFF (OPEN)
		D-IN-15	■ switch	Pressing switch = ON (24 V)/OFF (OPEN)
3	40902	D-IN-16	Brake oil pressure	Normal oil pressure = ON (GND)/OFF (OPEN)
		D-IN-17	(ECSS cut switch)	★ No use (Always “OFF”)
		D-IN-18	—	—
		D-IN-19	—	—
		D-IN-20	(Air cleaner clogging)	★ No use (Always “OFF”)
		D-IN-21	(ECSS cut switch [dummy])	★ No use (Always “OFF”)
		D-IN-22	—	—
		D-IN-23	—	—
4	40903	D-IN-24	HST filter clogging	Clogging detection = ON (GND)/OFF (OPEN)
		D-IN-25	—	—
		D-IN-26	Parking brake	Resetting parking brake = ON (GND)/OFF (OPEN)
		D-IN-27	Engine coolant level	Normal coolant level = ON (GND)/OFF (OPEN)
		D-IN-28	Omission of applying parking brake	Resetting parking brake = ON (GND)/OFF (OPEN)
		D-IN-29	(Engine oil level)	★ No use (Always “OFF”)
		D-IN-30	Normal emergency steering (Machine with optional emergency steering)	Low emergency steering pressure = ON (GND)/OFF (OPEN)
		D-IN-31	—	—

*: “1” is displayed when ON and “0” is displayed when OFF.

[The pin No. is also marked on the connector (electric wire insertion end)]

No. of pins	DTP Series connector		
	Body (plug)	Body (receptacle)	T-adapter part No.
	Pin (female terminal)	Socket (male terminal)	
2			–
	–	–	
4			799-601-4260
	Part No. :6261-81-2810	–	

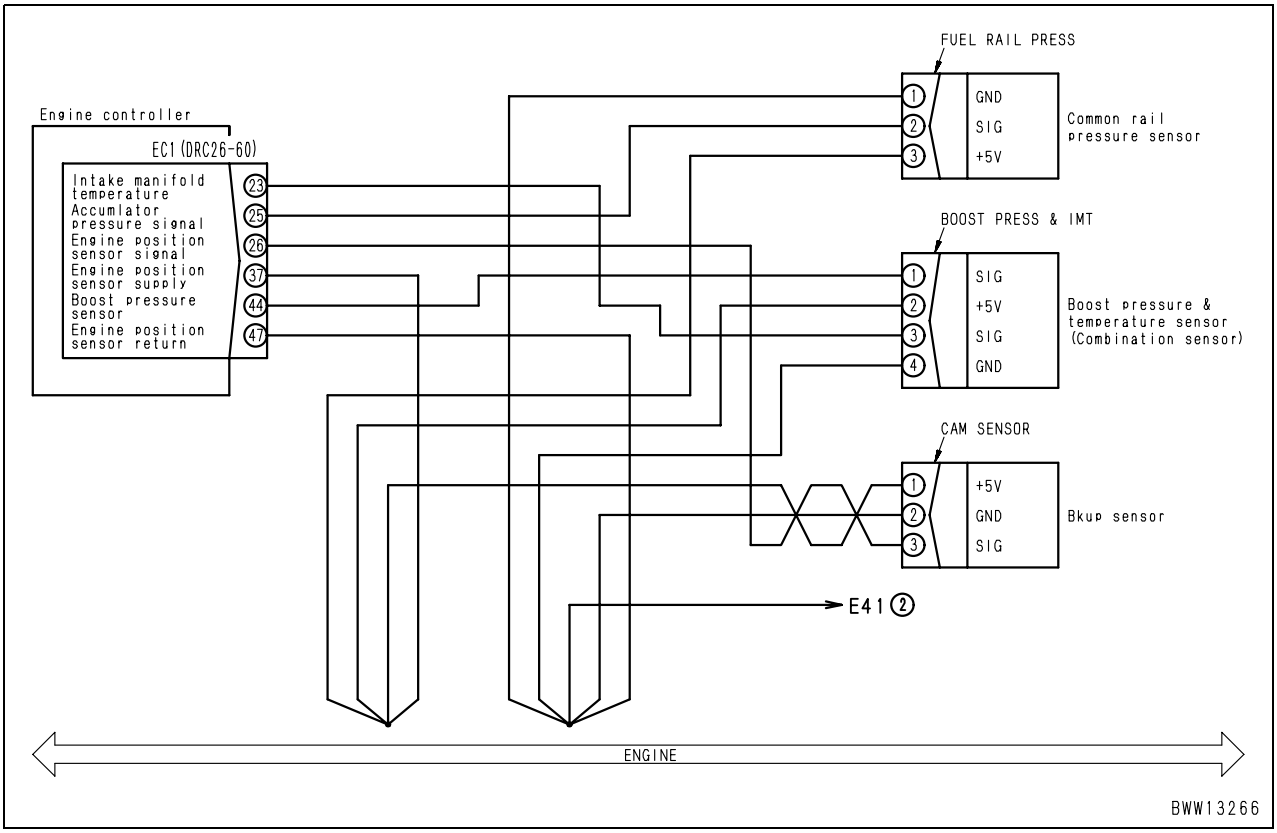
B3D15084

Failure code [CA227] Sensor power supply 2 high error

Action code	Failure code	Trouble	Sensor power supply 2 high error (Engine controller system)
E03	**CA227**		
Contents of trouble	• High voltage is detected in sensor power supply 2 circuit.		
Action of controller	• Fixes boost pressure and continues operation. • Fixes charge temperature and continues operation. • Limits output and continues operation. • Turns the centralized warning lamp and alarm buzzer ON.		
Problem that appears on machine	• Engine output drops.		
Related information	• Method of reproducing failure code: Turn the starting switch ON.		

		Causes	Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state	1	Defective wiring harness connector	Connecting parts among each sensor, engine wiring harness, and engine controller are suspected. Inspect them directly. • Loose connector, broken lock, broken seal • Corrosive, bent, broken, forced-in, or extended pin • Humidity in connector, entry of dirt or dust, poor insulation
	2	Defective engine controller	If cause 1 is not detected, engine controller may be defective. (Since trouble is in system, troubleshooting cannot be carried out.)

Related circuit diagram

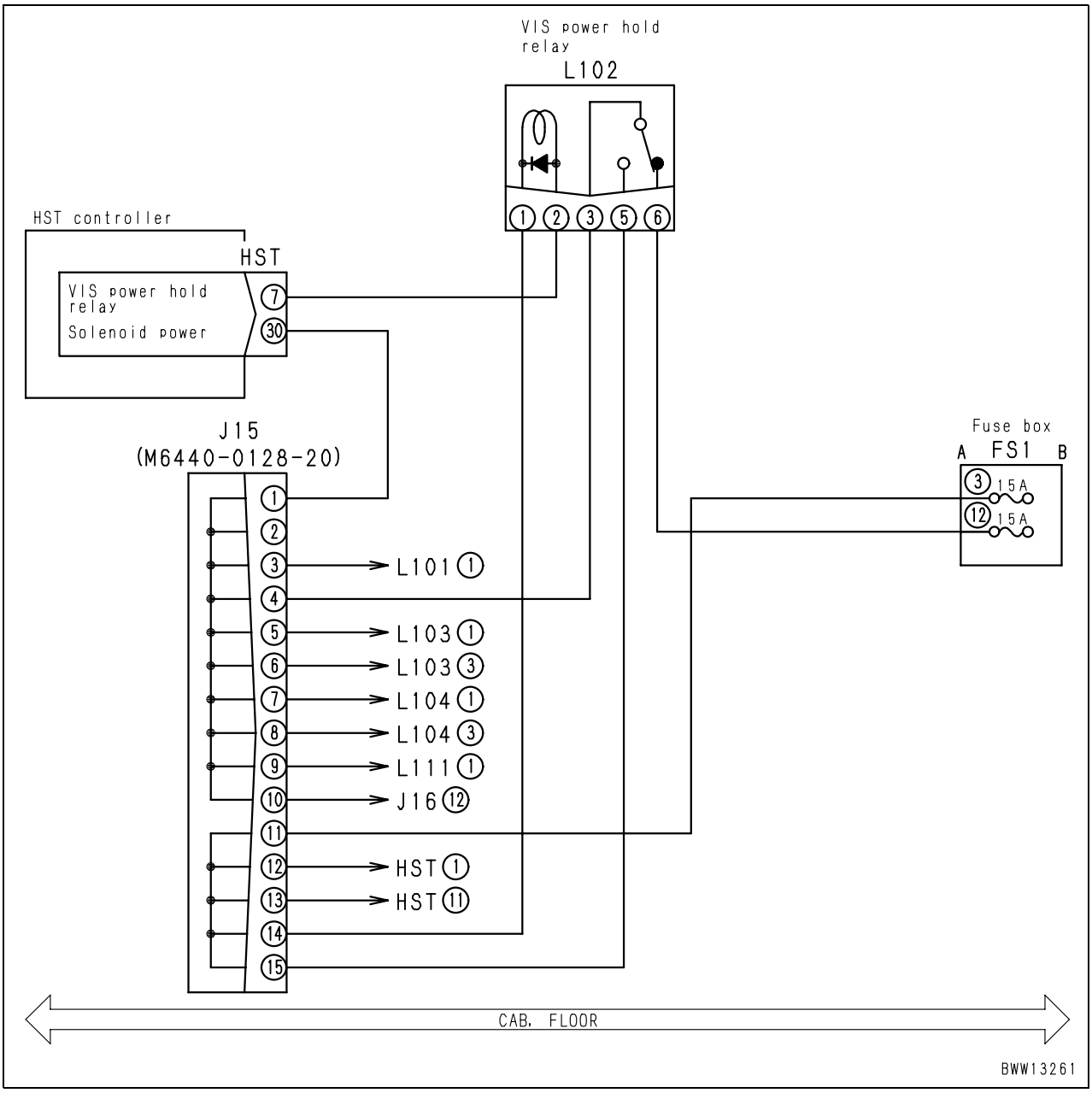


Failure code [CA432] Idle validation action error

Action code	Failure code	Trouble	Idle validation action error (Engine controller system)
E03	**CA432**		
Contents of trouble	• Signals from the idle validation switch and throttle sensor do not agree (they are contradictory)		
Action of controller	1. When the idle validation switch recognized the accelerator pedal is OFF and the throttle sensor, on the contrary, recognized the accelerator pedal is ON: Control the opening ratio of the throttle to 0% after the accelerator pedal is OFF and then control the opening ratio of the throttle to 50% while after the accelerator pedal is ON. 2. When the idle validation switch recognized the accelerator pedal is ON and the throttle sensor, on the contrary, recognized the accelerator pedal is OFF: Control the opening ratio of the throttle to 0% (fix to the low idle). • Turns the centralized warning lamp and alarm buzzer ON.		
Problem that appears on machine	• Engine speed does not rise from low idle.		
Related information	• The input state (ON/OFF) from the idle validation switch 1 can be checked with the monitoring function (Code: ENGINE, 18300, IVS 1). • The input state (ON/OFF) from the idle validation switch 2 can be checked with the monitoring function (Code: ENGINE, 18301, IVS 2). • The input state from throttle position sensor can be checked with the monitoring function (Code: ENGINE, 31701/31707, THROTTLE POS) • Method of reproducing failure code: Turn the starting switch ON.		

	Causes		Standard value in normal state/Remarks on troubleshooting			
Possible causes and standard value in normal state	1	Defective accelerator pedal	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.			
			PD1	Signal name	Voltage	
			Between (2) and (3)	APS sig.	When released	0.50 – 0.80 V
					When pressed	3.70 – 4.00 V
			Between (5) and (4)	IVS 1	See Fig. 1	
			Between (6) and (4)	IVS 2		
			Sensor voltage is measured with wiring harness connected. Accordingly, if voltage is abnormal, check wiring harness and controller for another cause of trouble before judgment			
	2	Disconnection in wiring harness (Disconnection or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between EC2 (female) (22) – PD1 (female) (1)		Resistance	Max. 10 Ω
			Wiring harness between EC2 (female) (9) – PD1 (female) (2)		Resistance	Max. 10 Ω
			Wiring harness between EC2(female) (21) – PD2 (female) (1)		Resistance	Max. 10 Ω

Related circuit diagram



Failure code [DDK6KY] FNR lever: Hot short

Action code	Failure code	Trouble	FNR lever: Hot short (HST controller system)
E03	**DDK6KY**		
Contents of trouble	• Multiple FNR (directional) lever signals are input because of hot short in FNR (directional) lever switch signal system.		
Action of controller	• Sets gear in neutral. • Turns the centralized warning lamp and alarm buzzer ON. • If directional selector switch actuation switch is turned ON, machine is driven according to directional selector switch setting (only machine with directional selector switch actuation switch). • Even if trouble disappears, system does not reset itself until FNR (directional) lever is set in N (Neutral).		
Problem that appears on machine	• Operator cannot travel machine at position other than position having hot short with FNR (directional) lever switch. (Example: When directional lever F system has hot short, if lever is set in F, trouble is reset and machine can travel forward.) • Multiple gear shift lever position lamp lights. • Machine can be driven with directional selector switch (only machine with directional selector switch).		
Related information	• The input state (ON/OFF) from the FNR (directional) lever switch can be checked with the monitoring function (Code: HST – 40977 – D-IN-0, D-IN-1 or D-IN-2). • Method of reproducing failure code: Turn the starting switch ON and operate FNR (directional) lever		

	Causes		Standard value in normal state/Remarks on troubleshooting			
Possible causes and standard value in normal state	1	Defective FNR (directional) lever switch (Internal short circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.			
			L15	FNR (directional) lever	Voltage	
			Between (1) and ground	Constant	20 – 30 V	
			Between (3) and ground	F (Forward)	20 – 30 V	
				Other than above	Max. 1 V	
			Between (2) and ground	N (Neutral)	20 – 30 V	
				Other than above	Max. 1 V	
			Between (4) and ground	R (Reverse)	20 – 30 V	
				Other than above	Max. 1 V	
	2	Hot short in wiring harness (Contact with 24V circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between HST (female) (15) – L15 (female) (4) and ground		Voltage	Max. 1 V
			Wiring harness between HST (female) (5) – L15 (female) (3) and ground		Voltage	Max. 1 V
			Wiring harness between HST (female) (34) – L15 (female) (2) and ground		Voltage	Max. 1 V
	3	Defective HST controller	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.			
			HST	FNR (directional) lever	Voltage	
			Between (5) and ground	N (Neutral)	20 – 30 V	
				Other than above	Max. 1 V	
			Between (34) and ground	F (Forward)	20 – 30 V	
				Other than above	Max. 1 V	
			Between (15) and ground	R (Reverse)	20 – 30 V	
				Other than above	Max. 1 V	

Failure code [DX19KY] Motor 1 solenoid: Hot short

Action code	Failure code	Trouble	Motor 1 solenoid: Hot short (HST controller system)
E03	**DX19KY**		
Contents of trouble	• Hot short was detected in motor 1 solenoid circuit.		
Action of controller	• Turns motor 1 solenoid output OFF. • Turns HST safety relay output OFF. • Turns clutch EPC solenoid output OFF. • Even if trouble disappears, system does not reset itself until starting switch is turned OFF. • Turns the centralized warning lamp and alarm buzzer ON.		
Problem that appears on machine	• Traction force is decreased. • Travel speed is not limited with speed range selector switch and travel speed control dial. • If engine is stopped without applying parking brake securely on slope, machine moves down suddenly.		
Related information	• Following output command values can be checked with monitoring function. Motor 1 solenoid output: HST – 80000 – MOTOR SOL DIR (mA) HST safety relay output: HST – 40979 – D_OUT_15 (ON/OFF) Clutch EPC solenoid output: HST – 80100 – CLUTCH SOL DIR (mA) • [DX19KA], [DX20KA] or [DX20KY] may be also displayed, depending on condition when error was detected.		

	Causes		Standard value in normal state/Remarks on troubleshooting		
Possible causes and standard value in normal state	1	Defective motor 1 solenoid (Internal defect)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			T06 (male)	Resistance	
			Between (1) – (2)	15 – 30 Ω	
			Between (1), (2) – ground	Min. 1 MΩ	
	2	Hot short (Contact with 24V circuit) in wiring harness	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between wiring harness T06 (female) (1) – HST (female) (19)	Voltage	Max. 1 V
			Wiring harness between T06 (female) (2) – L111 (female) (3) and ground.	Voltage	Max. 1 V
			★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting. (Check with traction control OFF and machine stopped.)		
			Between wiring harness HST (female) (19) – T06 (female) (1)	Voltage	10 – 15 V
	3	Defective HST safety relay (L111) (Internal defect)	• If causes 1 – 2 are not detected, HST controller may be defective. (Since trouble is in system, troubleshooting cannot be carried out.)		

Method of using troubleshooting chart

This troubleshooting chart determines the location from the problem occurring on the machine and categorizes the problem under one of the main components, such as the steering system or work equipment hydraulic system. Use the following procedure to carry out accurate troubleshooting swiftly.

Step 1. Ask operator questions

- The questions to ask the operator are given under the problem. If the answer to the question matches the content given, the cause given after the arrow is the probable cause.Keeping the content of the questions in mind, read the matrix and proceed with **Step 2** and **Step 3** to pinpoint the correct cause.

Example: Steering does not turn

Ask the operator and check the following points.

- Did the problem suddenly start?
  → **Related equipment broken**
- Was the steering wheel heavy before?
  → **Wear of related parts, defective seal**

Step 2. Checks before troubleshooting

- Before measuring the oil pressure or starting the troubleshooting, confirm the checks before starting items, check for leakage of oil, or for loose bolts. This will prevent wasting time when troubleshooting. The items given under “Checks before troubleshooting” are checks that are particularly important to make about the condition of the machine before starting the actual troubleshooting.

Example: Checks before starting troubleshooting

- Is oil level and type of oil in hydraulic tank correct?
- Is there any oil leakage from steering valve or demand valve?
- Is steering linkage adjusted properly?

Step 3. Method of reading matrix

1. Operate the machine when carrying out troubleshooting of the items in the Diagnosis column. If any problems occur as the result of the troubleshooting, put a check against the item.
   ★ When carrying out the troubleshooting, check the easier items first. It is not necessary to follow the number order.

   [Example]

No.	Remedy / Diagnosis
1	Steering does not turn in both directions (left and right)
2	Steering turns only in one direction (left or right)
3	Steering is heavy when turned in both directions (left and right)
4	Steering wheel is heavy in one direction (left or right)
5	Work equipment moves

2. Find the matching cause in the Cause column. In the same way as in Step 2), if a problem is found, the Q marks on the same line for the troubleshooting item are the causes. (In Diagnosis item 2 in the same diagram below the cause is (c) or (e).)
   When there is one ○ mark:
   Carry out troubleshooting for the other items marked with ○ in the same Cause column to check if the problem occurs, then make repairs.
   When there are two ○ marks:
   Go to Step 3) to narrow down the cause.