KOBELCO

Grand Beetle SAVER

(Minor Change)

TRAINING TEXT

Model	Production start machine
SK70SR-1E	YT02-04001～
SK115SR-1E	YV02-01701～
SK135SR-1E	YY02-03001～
SK135SRLC-1E	YH02-01301～
SK200SR	YB02-01601～
SK75UR-3E	YR05-05301～
SK130UR-1E	YX03-01601～

KOBELCO CONSTRUCTION MACHINERY CO., LTD.

Book code No.S6YO00213ZE01 01.12 KOCEC

2. Procedure to display trouble history diagnosis

1) Grand Beetle (Except for SK70SR-1E)

(1) Turn starter switch ON.

(2) Press buzzer stop switch 5 times continuously within 10 seconds, and the trouble history mode is displayed.

(3) Send trouble data and data of hour meter to gauge cluster.

* Three data of hour meter and trouble data are displayed on the screen.
* When three or more trouble data are displayed simultaneously, it displays 3 data by 3 data every 5 seconds in order.

(4) Press "Work mode selector switch" on the gauge cluster, and the display proceeds in order.

(5) Press buzzer stop switch, and the display returns in order.

Note: All error items are stored for each hour meter, and the error item due to difference of hour meter is checked on the display appeared by pressing work mode selector switch and buzzer stop switch.

(6) Turn the starter switch OFF, or the display is not cancelled.

Notes:

(1) Switching speed of each displayed item becomes slower than that of conventional machines. (Press switch ON and OFF at interval of 1 second.)

2) Grand Beetle SK70SR-1E (Same as the current machines)

(1) When performing troubleshooting if abnormality is detected on each equipment and harness while the machine is operating, the trouble code is displayed on the error code display (LED) of mechatro-controller.
And the CPU lamp on the gauge cluster flickers, buzzer sounds intermittently.

(2) When the trouble code is displayed, stop the machine and check each equipment and harness.

Notes:

**1. When shipping, hardware check switches A and B are set to "0"."0", and the error occurred is displayed on the error code display section.
And the CPU lamp on the gauge cluster may light up continuously and buzzer may sound continuously. This is caused by failure of mechatro-controller.**

2. For troubleshooting, when each item is displayed on the error code display and many troubles are occurred at the same time, the items are displayed starting with the lower numbers for every two seconds.

3) Saver Series (Same as the current machines)

3. Procedure to delete the contents of trouble history diagnosis

1) Grand Beetle (Except for SK70SR-1E)

(1) Display trouble history mode.

(2) Press "Work mode selector switch" and buzzer stop switch on the gauge cluster for 10 seconds simultaneously.

(3) After the display changes to "NO ERROR", the deletion is terminated.

(4)Turn starter switch OFF.

Note: All stored items are deleted, but is impossible to delete partially.

2) Saver Series (Same as the current machines)

(1) Display trouble history mode.

(2) Press work mode selector switch "H" and buzzer stop switch for 10 seconds simultaneously.

(3) After the display changes to "NO ERROR", the deletion is terminated.

(4) Turn starter switch OFF.

Note: All stored items are deleted, but is impossible to delete partially.

9. PERFORMANCE INSPECTION STANDARD

Table 1 (1/2)

SK70SR-1E

Note ; The mode is already S mode when power is thrown.
Unless otherwise specified,measure it on H mode.

Inspection Item				Measuring Position: Position	Size	Port	Standard value	Hi	Lo	Unit	Adjusting Point	Measuring condition
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil in tank			NAS 8	+1	-1	Class	—	Sampling
	Hydraulic oil temperature			Tank surface			150 (122)	+5 (41)	-5 (23)	℃ (℉)	—	Ambient temp. 50℃to-10℃ (122℉ to14℉)
	Coolant temperature			Radiator surface			75 (167)	+15 (59)	-15 (5)		—	
	Engine speed	Lo idle		Selector switch on the gauge cluster screen or injection pipe			1020	+25	-25	rpm	Adjustment is not required	LOW throttle
		Hi idle					2250	+30	-30			FULL throttle (H mode)
		S mode					2100	+30	-30			Perform all measurement with the air-conditioner "OFF"
		FC mode					1800	+30	-30			
		Decel					1050	+30	-30			
Pilot primary pressure circuit				G pump		a4	35 (500)	+2 (28)	-1 (14)	kgf/cm² (psi)	PR1	HI idle
High pressure circuit	Main relief valve pressure	ATT Travel	P1	Main pump	PF 1/4	a1	300 (4270)	+5 (70)	0		MR1	Boom up
			P2			a2						
		Dozer	P3			a3	200 (2840)	+5 (70)	0		MR3	Dozer up
		—	—	—		—	—	—	—		—	—
	Over load relief valve pressure	Boom	H	Main pump		a1	335 (4760)	5 (70)	0		OR3	Boom up
			R				335 (4760)	5 (70)	0		OR4	Boom down
		Bucket	H			a1	335 (4760)	5 (70)	0		OR1	Bucket digging
			R				335 (4760)	5 (70)	0		OR2	Bucket dump
		Travel RH	Forward			a1	—	—	—		—	Over load relief valve is not equipped
			Reverse								—	
		Travel LH	Forward			a2	—	—	—		—	
			Reverse								—	
		Swing	LH			a2	250 (3560)	+40 (570)	+10 (140)		OR5	Swing LH
			RH				250 (3560)	+40 (570)	+10 (140)		OR6	Swing RH
		Arm	H			a2	335 (4760)	5 (70)	0		OR7	Arm in
			R				335 (4760)	5 (70)	0		OR8	Arm out
		Dozer	H			a5	280 (3980)	0	-80 (1140)		OR9	Dozer down
			R				280 (3980)	0	-80 (1140)		OR10	Dozer up
		—	—			—	—	—	—		—	—
			—				—	—	—		—	—
Secondary pilot pressure circuit	Proportional valve block	P2 cut valve	B	C-1 Mechatro controller	Hard check switch	A・B 2・8	10 (140)	+1.5 (20)	-0.5 (7)		Indicated current value (mA) 400	Performs proportional calculation from actual current reading on display No.Valueswhich are calculated by converting pressure values in the left figure to current values are shown. E/G Hi,Lever on neutral position
		Travel straight valve	C			3・0						
		P1 cut valve	D			2・6						
		P2 cut valve	B			2・8	16 (230)	+2 (30)	-1.5 (20)		700	E/G Hi Full lever stroke
		Travel straight valve	C			3・0						
		P1 cut valve	D			2・6						

Table 1 (2/2)

	Inspection Item	Measuring Position			Standard value	Hi	Lo	Unit	Adjusting point	Measuring condition
		Position	Screen code							
Secondary pilot pressure circuit	P1 pump proportional valve & P2 pump proportional valve	Gauge cluster multi display C-2	Service diagnosis screen No.	No.24 & No.25	350	+5	-5	mA	Adjustment is not required E/G Hi	E/G Hi Lever on neutral position
				No.24 & No.25	750	+5	-5			E/G Hi Lever on full

Inspection item				Standard value	Unit	Remarks
Operating speed	Track link revolution (RH,LH)	H mode	1-speed	29.5 ~ 32.5	sec/3revs.	
			2-speed	16.8 ~ 18.5		
		S mode	2-speed	17.7 ~ 19.6		
		FC mode	2-speed	21.9 ~ 24.2		
	Operating time of cylinder (At no load)	Boom	Raise	2.5 ~ 3.1	sec	
			Lower	2.6 ~ 3.2		
		Arm	In	2.9 ~ 3.5		
			Out	2.2 ~ 2.8		
		Bucket	Digging	3.2 ~ 3.8		
			Dumping	1.8 ~ 2.4		
		—	—	—		
			—	—		
		—	—	—		
			—	—		
	Swing speed	Variable speed		—	sec/1rev	
		STD speed		5.7 ~ 4.9		
	Travel speed	1st.-speed	Rubber	—	sec/20m	
			Iron	20.1 ~ 22.1		
		2nd.speed	Rubber	—		
			Iron	11.8 ~ 13.2		
Performance	Amount of travel deviation	2nd-speed		0 ~ 0.24	m/20m	
	Parking brake drift	1/5 Gradient		0	mm/5min	
	Performance of Swing brake	Neutral position after 180° full speed swing		55 ~ 75	degree	
	Performance of Swing parking brake	1/5 Gradient		0	mm(in)	
	ATT amount of drift	Tip of the bucket tooth		90	mm/5min	(At no load)
		Boom cylinder		3		
		Arm cylinder		4		
		Dozer cylinder		—		
	Amount of horizontal play at the bucket tooth			30 ~ 50 (1.2 ~ 2.0)	mm(in)	

11. ENGINE

SK70SR-1E • SK75UR-3E

SPECIFICATIONS

ITEM \ MODEL			SK70SR-1E·SK75UR-3E		
Engine model		Unit	ISUZU CC - 4JG1		
Type			4 - cycle water - cooled, direct injection		
Cylinder No. - Bore × Stroke		mm	4 - 45.4 × 107.0		
Total displacement		cc	3,059		
Compression ratio			18.6		
Output rating		kW/min^{-1} {PS/rpm}	40.5 / 2,100 {55 / 2,100}		
Max. torque		N·m/min^{-1} {kgf·m/rpm}	187 ± 8.0 / 1,800 {19.1 ± 0.8 / 1,800}		
High idling (at no load)		min^{-1} {rpm}	2,310 ± 25 {2,310 ± 25}		
Low idling		min^{-1} {rpm}	1,000 ± 25 {1,000 ± 25}		
Ignition order			1 - 3 - 4 - 2		
Rotating direction			Clockwise as seen from fan side		
Cooling fan drive method			φ450 - Suction type - 7 Plastic blades Belt drive, Pulley ratio = Crank / Fan = 1.12		
Starter capacity		V/kW	24 / 3.2		
Generator capacity		V/A	24 / 30		
Allowable tilting angles		degree	Back and forth,right and left 35°		
Engine oil volume (Oil pan capacity)		L	Max : 9.6, Min : 7.6		
Coolant volume (Engine only)		L	4.6		
Valve clearance, valve action timing			Valve clearance	Open	Close
	Intake valve		In cold condition 0.4mm	24.5° before the top dead point	55° affter the bottom dead point
	Exhaust valve		In cold condition 0.4mm	54° before the bottom dead point	26° affter the top dead point
Injection timing		degree	10° before the top dead point		
Injection start pressure		MPa {kgf/cm^2}	18.1 {185}		
Compression pressure		MPa {kgf/cm^2}	2.9 {30} at 200rpm		
Thermostat action		℃	Opening : 82° , Full open : 95°		
Fuel consumption rate (at 2100rpm)		g/kW·h {g/PS·h}	240 {176}		
Engine oil consumption (at rated rpm)		g/kW·h {cc/PS·h}	23 {21} or less		
Engine dimension (L × W × H)		mm	760 × 610 × 710		
Dry weight		kg	Approx. 250		

2. ITEMS FOR MINOR CHANGE OF MACHINES IN GRAND BEETLE /SAVER SERIES

○: The circle mark shows mi/c performed, △: The mark triangle shows the not performed items.

Device	Component	Contests	Machine model						Comment
			SK60SR-1E	SK75UR-3E	SK115SR-1E	SK135SR-1E	SK130UR-1E	SK200SR	
UPP	① High-reach crane	Block for piping is provided as standard equipment to make modification easy.	○	○	○	○	○	○	S200SR is equipped with bracket for N&B as standard equipment.
EXT	① Rear mirror	Installed on the right rear side of cab. Installed on the center rear side of counterweight.	○	○	○	○	○	○	
	② Fuel tank	Remove tank and clean it. Add cover on the bottom of tank for cleaning.	○	○	○	○	○	○	
	③ Hyd.oil tank	Change the size of drain plug (PT-PF) and the form of head (Square to hexagon).	○	○	○	○	○	○	
	④ Under cover	Change the hole position under cover of the fuel tank.			○	○	○	○	
ELE	① Gauge cluster	Meter type is employed because semi-mechatro controller is used. Switch panel is cancelled because switches are collected on the gauge cluster. Same as the current model because cab interference preventive device is installed	○	△	○	○	△	○	
	② Hour meter	Change Maker (Kansei - Hobbs), consequently the installation method is also changed.	○	○	○	○	○	○	
	③ Proportional valve	Change maker of connectors. (Sumitomo - AMP).	○	○	○	○	○	○	
	④ Press.sensor	Change maker of connectors. (Sumitomo - AMP).	○	○	○	○	○	○	
	⑤ Throttle potentio	Change maker of connectors. (Sumitomo - AMP).	○	○	○	○	○		
	⑥ Upper harness (floor)	Change harness of control box to take a measure against the disconnection.	○	○	○	○	○	○	
	⑦ Upper harness	Change it to take a measure for heat resistance.	○	○	○	○	○	○	
	⑧ Mechatro-controller	Change the software, and add dummy connector.	○	○	○	○	○	○	
	⑨ Fuse	Unify the size from 4 kinds to 2 kinds (10A,20A).	○	○	○	○	○	○	
	⑩ High-reach crane	Change ATT harness fixing method to make the modification easy.	○	○	○	○	○	○	
HYD	① Main control valve	The internal construction is changed to take a measure against noise. Add shuttle valve on the swing pilot section, and change the number of sensors to one.	○	○	○	○	○	○	
	② Multi control valve	The new multi control valve made in KOBELCO is employed. (Running change:02/01 -)	○	○	○	○	○	○	In the beginning of mi/c, the present multi control valve is employed.
	③ Main pump	Change maker of connectors. (Sumitomo - AMP). Add air bleeder plug.	○	○	○	○	○	○	The availability in Europe is increased.
	④ Solenoid	Change maker, and the measure is taken against the clicking noise due to swinging.	○	○	○	○	○		
	⑤ Pilot valve (ATT)	Change the type. (Same as Beetle 2)	○	○					However, the inside spring is changed.
	⑥ Pilot valve (Travel)	Change maker.	○	○					
	⑦ Travel motor	Add auto deceleration function.	○	○					
	⑧ Cylinder	Change maker. (Change the port position on the rod side.)	○	○				○	
ATT	① High-reach crane	The pipe block is installed as standard equipment to make the modification easier. Change the construction for installation of boom top.	○	○	○ ○	○ ○	○	○ ○	
	② Looseness adjustment of bucket	Change the pin length and in the method for Beetle 2.	○	○	○	○	○	○	
INT	① Cup holder	Add	○	○	○	○	○	○	
	② Seat	Change maker. (Tokyo Seat → KAB)	○		○	○		○	DA and equivalent (But, without suspension and height riser)
	③ Floor plate	Due to the change of maker of travel pilot valve	○	○					
	④ Floor Mat	Change maker of pilot valve.	○	○					
	⑤ Travel lever	Change maker of pilot valve.	○	○					
	⑥ Control box	Change it to take a measure against disconnection of harness.	○	○	○	○	○	○	
CAB	① Wiper	Change the length because the wiping area is expanded.	○		○	○		○	
	② Sky light	Change it to the reinforced coating type.	○		○	○		Glass	
	③ Door glass	Change it in adhering type.	○		○	○		○	
	④ Rear left triangle glass	Change it in adhering type.	○		○	○		○	
	⑤ Wiper limit SW	Shift it from left side to right side of cab. (DA type)	○		○	○		○	
PIP	① Travel pilot line	Change maker of travel pilot valve.	○	○					
	② Solenoid piping	Change proportional valve under the floor. (Measure against noise)	○	○	○	○	○	○	
	③ ATT Pilot line	Change connectors of pressure sensor.	○	○	○	○	○	○	
	④ Shuttle valve	Add shuttle valve in control valve.			○	○	○	○	
	⑤ Hose clamp	Change the hose fixing method for ATT.						○	
	⑥ Multi C/V piping	The new multi control valve made in KOBELCO is employed. (Running change: 02/01-)	○	○	○	○	○	○	In the beginning of mi/c, the present multi control valve is employed.
POW	① Engine	The engine observing the regulation of secondary exhaust gas emission Japan is mounted.	○	○	○	○	○	Already changed.	
	② Noise	Secondary limiting noise emission complied with EU	○		○	○		Already changed.	
	③ Oil cooler	Change it to one made of aluminium to take measure against corrosion.	○	○	○	○	○	○	
LOW	① Lower frame	Change the frame into the new X type frame. (Running change) Measure taken against the slipping out of upper roller.	○ ○	○ ○	○ ○	○ ○	○ ○	○	In the beginning of mi/c, the present frame is employed.
	② Upper roller	Change the shaft length.	○	○	○	○	○		
	③ Crawler adjuster	Add cover for prevention to the breakage of spring.	○	○	○	○	○		

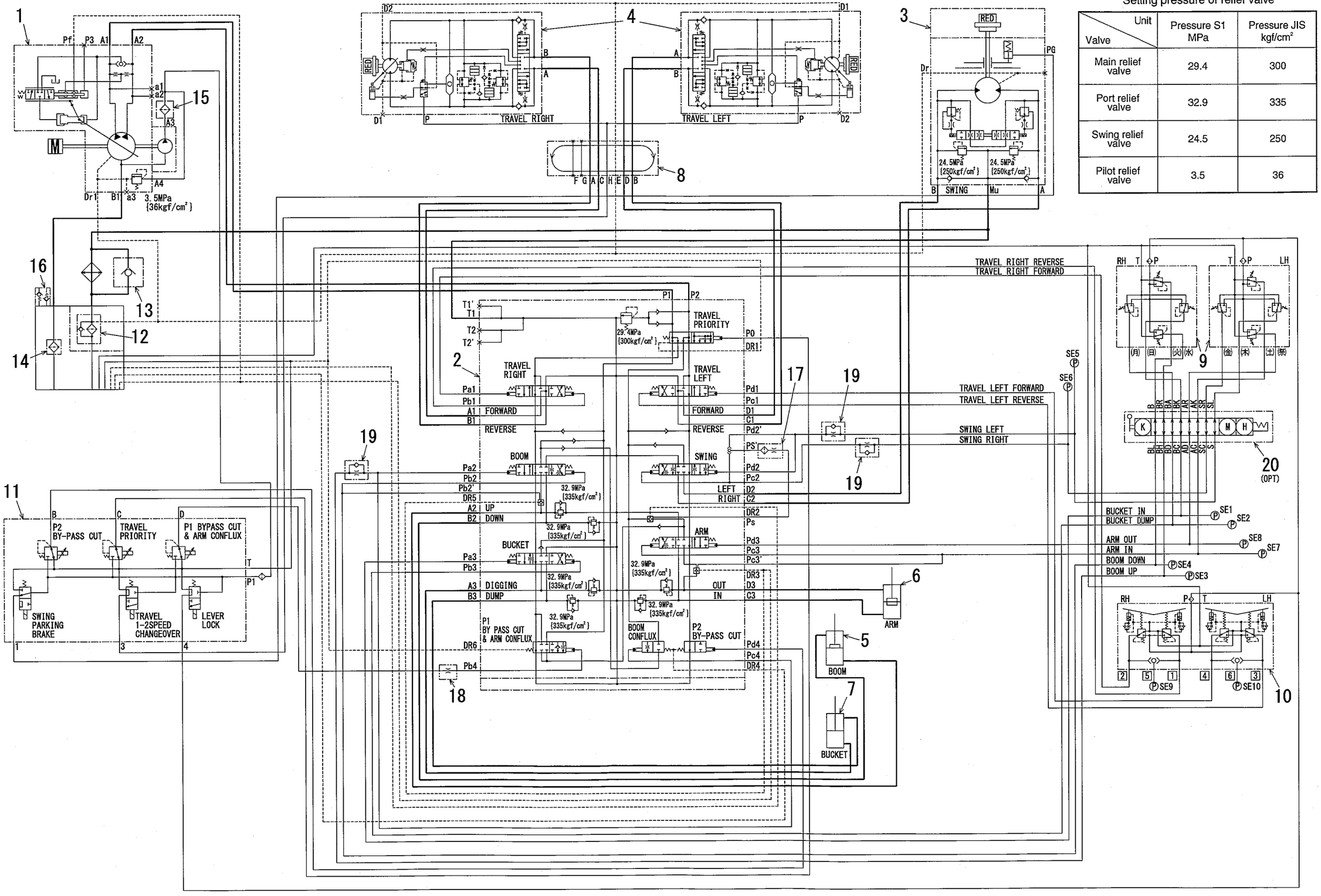
6. HYDRAULIC DIAGRAM

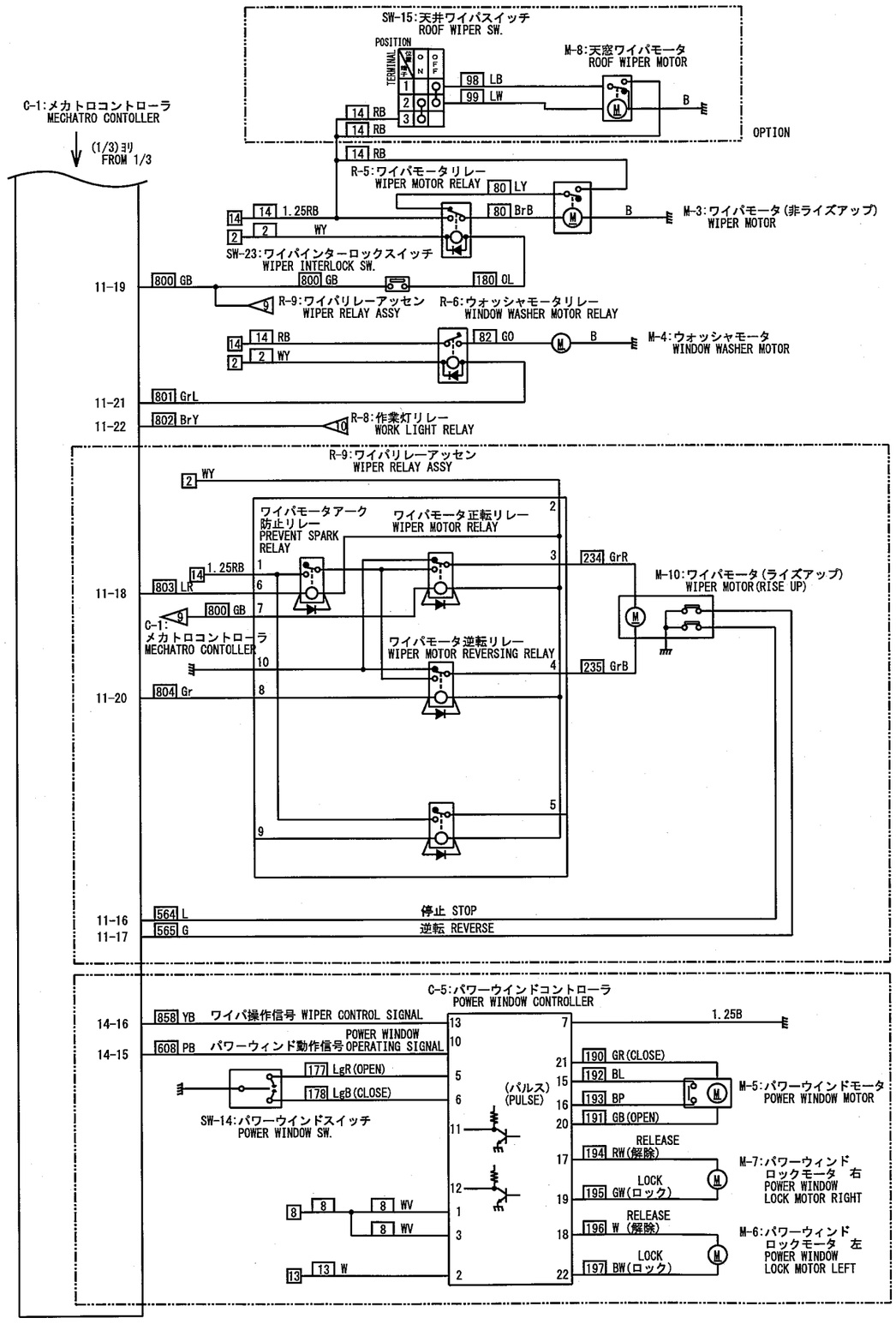
SK70SR-1E

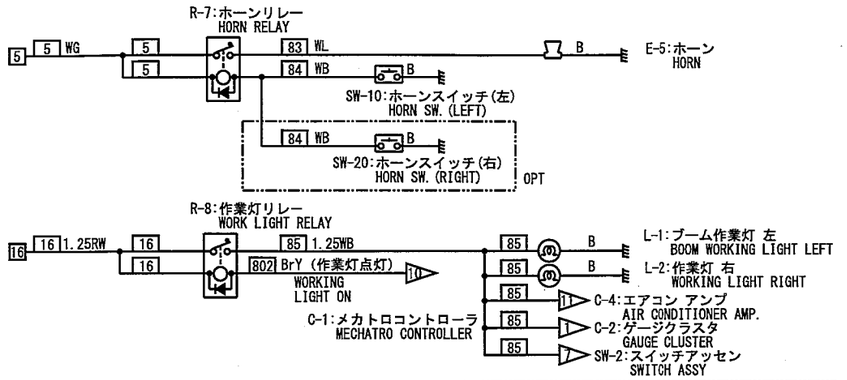
Applicable machine YT02-04001～

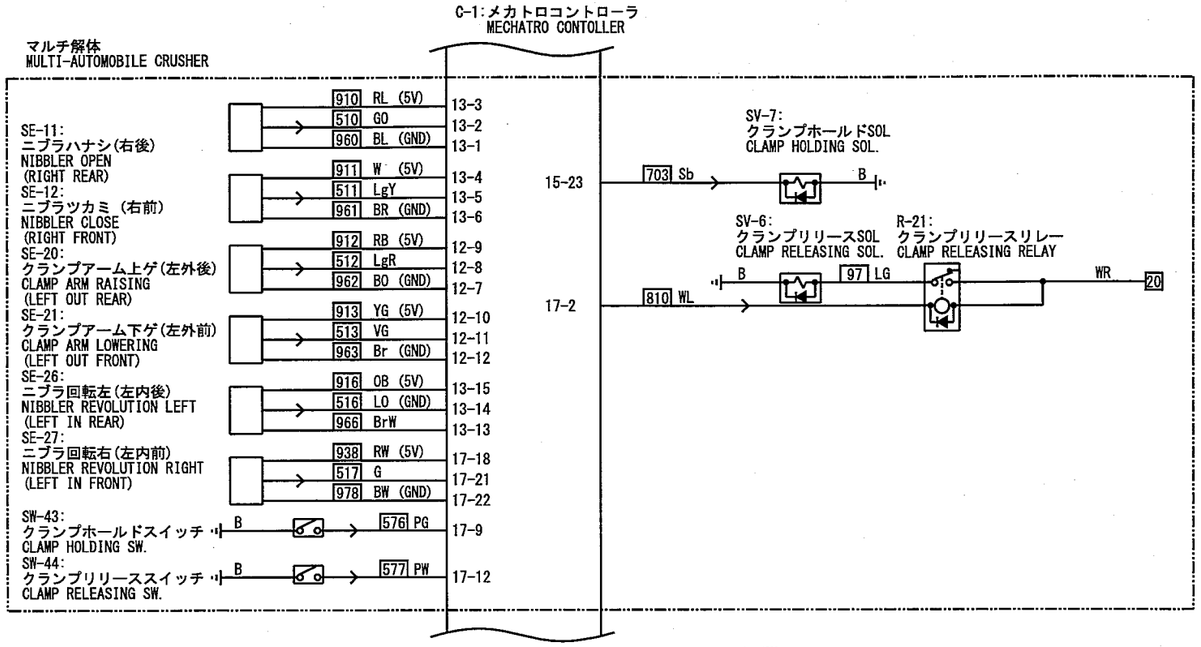
Setting pressure of relief valve

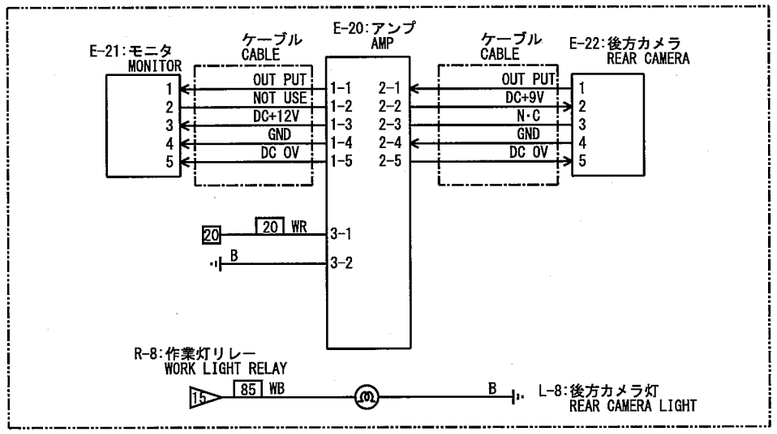
Valve \ Unit	Pressure S1 MPa	Pressure JIS kgf/cm²
Main relief valve	29.4	300
Port relief valve	32.9	335
Swing relief valve	24.5	250
Pilot relief valve	3.5	36

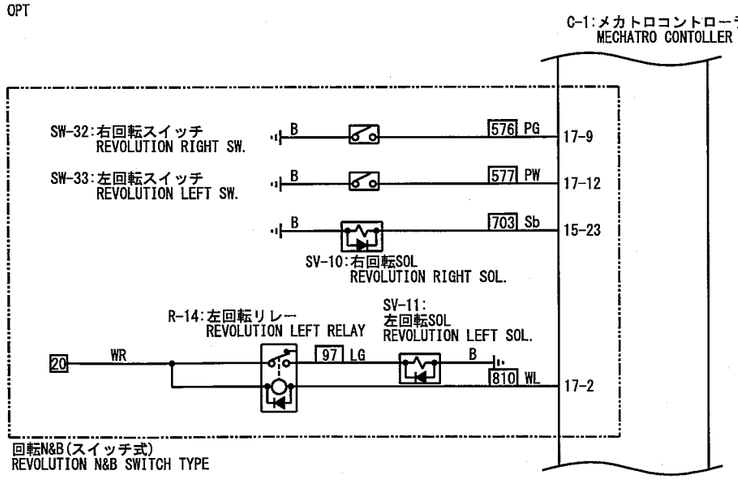


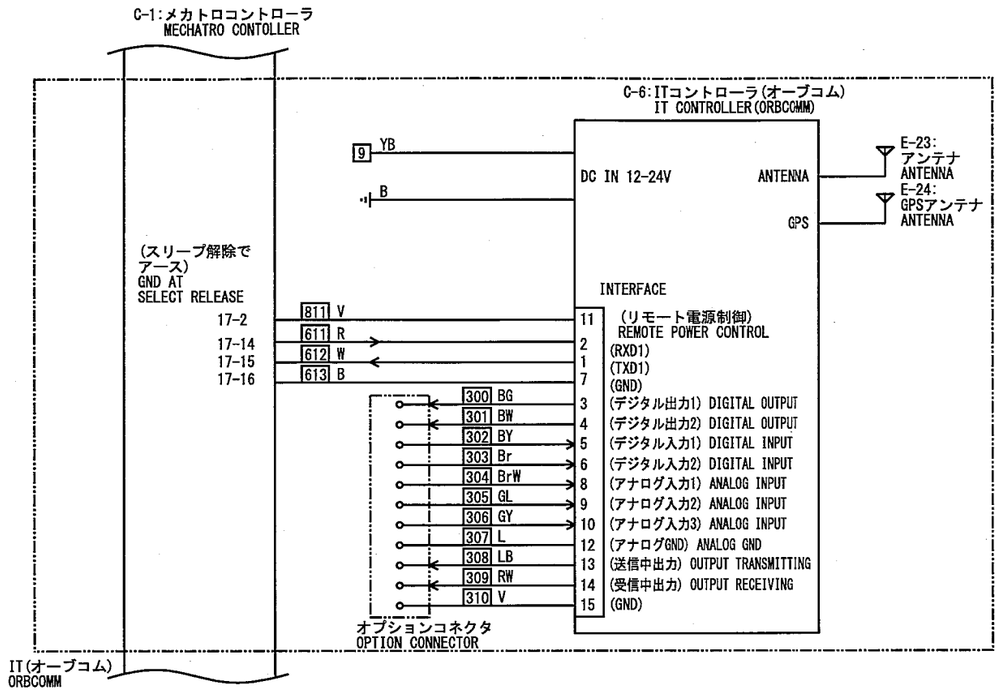

SW-15:天井ワイパスイッチ
ROOF WIPER SW.
POSITION
TERMINAL
INT
ON
OFF
1
2
3
M-8:天窓ワイパモータ
ROOF WIPER MOTOR
98 LB
99 LW
B
14 RB
14 RB
OPTION
14 RB
R-5:ワイパモータリレー
WIPER MOTOR RELAY
80 LY
14 1.25RB
2 WY
80 BrB
B
M-3:ワイパモータ(非ライズアップ)
WIPER MOTOR
SW-23:ワイパインターロックスイッチ
WIPER INTERLOCK SW.
C-1:メカトロコントローラ
MECHATRO CONTOLLER
(1/3)ヨリ
FROM 1/3
11-19
800 GB
800 GB
180 OL
9
R-9:ワイパリレーアッセン
WIPER RELAY ASSY
R-6:ウォッシャモータリレー
WINDOW WASHER MOTOR RELAY
14 RB
2 WY
82 GO
B
M-4:ウォッシャモータ
WINDOW WASHER MOTOR
11-21
801 GrL
11-22
802 BrY
10
R-8:作業灯リレー
WORK LIGHT RELAY
R-9:ワイパリレーアッセン
WIPER RELAY ASSY
2 WY
ワイパモータアーク
防止リレー
PREVENT SPARK
RELAY
ワイパモータ正転リレー
WIPER MOTOR RELAY
2
3
234 GrR
14 1.25RB
1
6
11-18
803 LR
9
800 GB
7
C-1:
メカトロコントローラ
MECHATRO CONTOLLER
M-10:ワイパモータ(ライズアップ)
WIPER MOTOR(RISE UP)
ワイパモータ逆転リレー
WIPER MOTOR REVERSING RELAY
10
4
235 GrB
11-20
804 Gr
8
5
9
11-16
564 L
停止 STOP
11-17
565 G
逆転 REVERSE
OPTION
C-5:パワーウインドコントローラ
POWER WINDOW CONTROLLER
14-16
858 YB
ワイパ操作信号 WIPER CONTROL SIGNAL
14-15
608 PB
パワーウィンド動作信号
POWER WINDOW
OPERATING SIGNAL
13
10
5
6
11
12
1
3
2
7
21
15
16
20
17
19
18
22
1.25B
177 LgR(OPEN)
178 LgB(CLOSE)
SW-14:パワーウインドスイッチ
POWER WINDOW SW.
(パルス)
(PULSE)
190 GR(CLOSE)
192 BL
193 BP
191 GB(OPEN)
M-5:パワーウインドモータ
POWER WINDOW MOTOR
RELEASE
194 RW(解除)
LOCK
195 GW(ロック)
M-7:パワーウィンド
ロックモータ 右
POWER WINDOW
LOCK MOTOR RIGHT
RELEASE
196 W (解除)
LOCK
197 BW(ロック)
M-6:パワーウィンド
ロックモータ 左
POWER WINDOW
LOCK MOTOR LEFT
8 8 WV
8 WV
13 13 W
OPTION


R-7:ホーンリレー
HORN RELAY
5 5 WG
5
5
83 WL
B
E-5:ホーン
HORN
84 WB
B
SW-10:ホーンスイッチ(左)
HORN SW. (LEFT)
84 WB
B
SW-20:ホーンスイッチ(右)
HORN SW. (RIGHT)
OPT
R-8:作業灯リレー
WORK LIGHT RELAY
16 16 1.25RW
16
16
85 1.25WB
B
L-1:ブーム作業灯 左
BOOM WORKING LIGHT LEFT
802 BrY (作業灯点灯)
10
WORKING
LIGHT ON
85
B
L-2:作業灯 右
WORKING LIGHT RIGHT
85
11
C-4:エアコン アンプ
AIR CONDITIONER AMP.
C-1:メカトロコントローラ
MECHATRO CONTROLLER
85
7
C-2:ゲージクラスタ
GAUGE CLUSTER
85
SW-2:スイッチアッセン
SWITCH ASSY
R-10:CAB作業灯リレー(OPT)
CAB WORK LIGHT RELAY(OPT)
17 17 1.25WL
17
17
179 L
179
B
L-4:CAB作業灯(OPT)
CAB WORKING LIGHT(OPT)
185 LY
B
179
B
L-5:CAB作業灯(OPT)
CAB WORKING LIGHT(OPT)
SW-16:作業灯スイッチ(OPT)
WORK LIGHT SW. (OPT)
OPTION
15 15 WB
87 WL
B
SV-4:レバーロックSOL
SAFETY LOCK LEVER SOL.
SW-11:レバーロックスイッチ
LEVER LOCK SW.
L-3:室内灯
ROOM LIGHT
9 9 YB
3 3 RL
1.25B
E-6:シガライター
CIGARETTE LIGHTER
15 15 WB
100 LY
97 G
6
SW-18:OPT. ペダル圧力スイッチ (白)
OPT. PEDAL PRESS.
SWITCH (白)
SW-17:合・単切換スイッチ
DOUBLE-SINGLE
SELECT SW.
SV-2:合・単切換SOL
DOUBLE-SINGLE SELECT SOL.
OPTION
11 11 O
B
M-9:燃料ポンプ
FUEL PUMP
OPTION

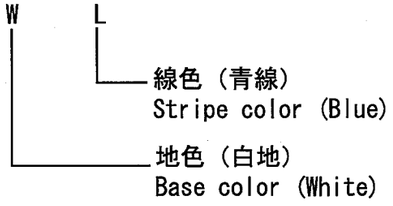








配線色例
EXAMPLE OF WIRE COLOR

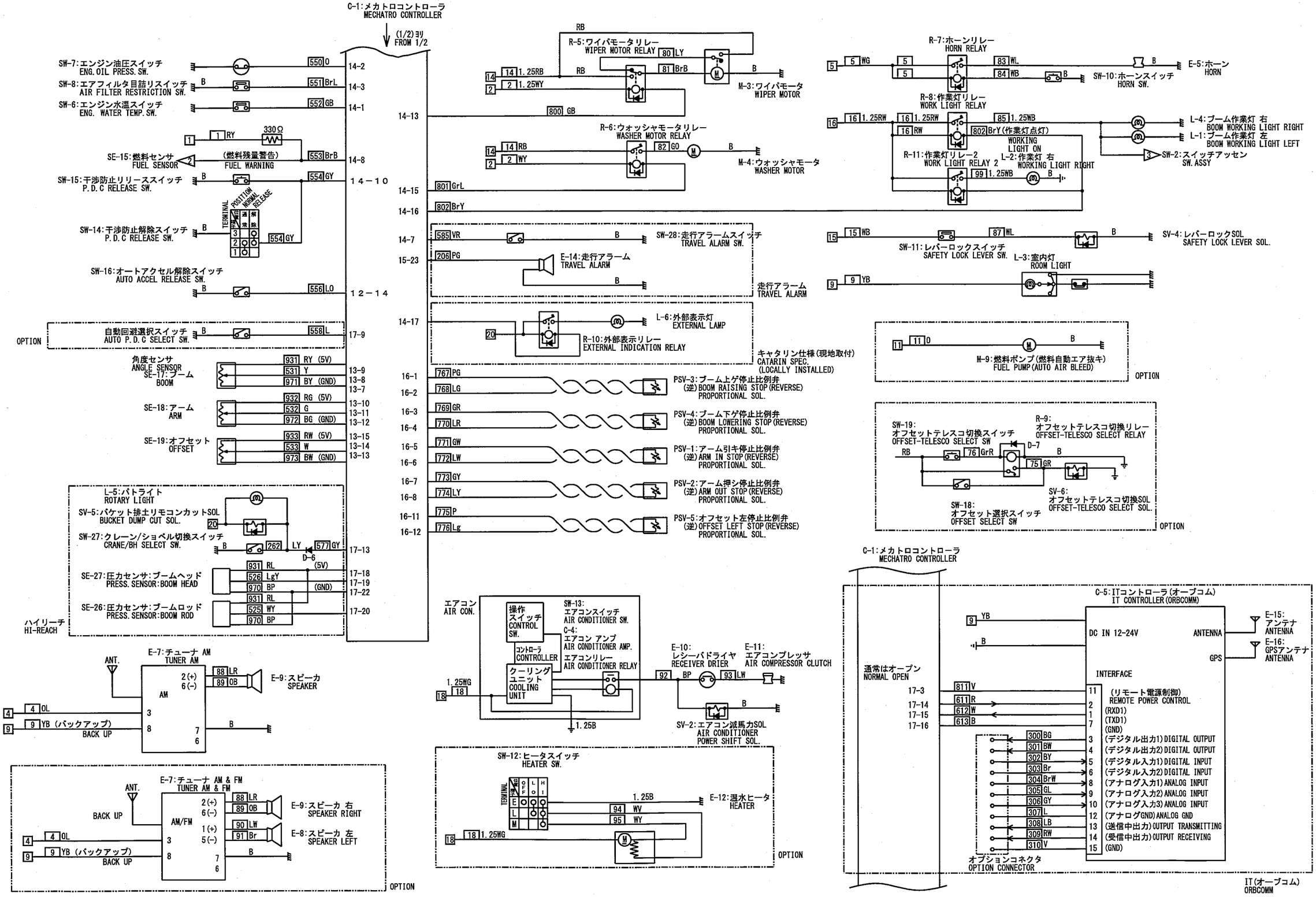


配線色別表
WIRE COLOR CODING TABLE

符号 Sign	色 Color	符号 Sign	色 Color	符号 Sign	色 Color	符号 Sign	色 Color
B	黒 Black	W	白 White	Br	茶 Brown	V	紫 Violet
G	緑 Green	Y	黄 Yellow	Lg	若葉 Light Green		
L	青 Blue	P	ピンク Pink	Gr	灰 Gray		
R	赤 Red	O	オレンジ Orange	Sb	空 Sky Blue		

注記：
1. 使用する電線は、
   1) 0.75Sq, 1.25SqをAVSS線、もしくはAVX線
   2) 2Sq, 5SqをAVS線
   3) その他はAV線
   とする。
2. 指示なき電線サイズは0.75Sqとする。
3. 電線色の図示なき接地は機器ケースで接地する。
4. 回路図において□で囲まれた数字は線番を示す。

NOTES
1. Wires used to be
   1) " AVSS" or " AVX" for 0.75Sq and 1.25Sq.
   2) " AVS" for 2Sq, 5Sq.
   3) " AV" for others.
2. Wires to be 0.75Sq unless otherwise specified.
3. Grounding for which wire color is not shown to be performed with component case.
4. Number in square shows line No.


C-1:メカトロコントローラ
MECHATRO CONTROLLER
(1/2)ヨリ
FROM 1/2
SW-7:エンジン油圧スイッチ
ENG. OIL PRESS. SW.
550 O 14-2
SW-8:エアフィルタ目詰リスイッチ
AIR FILTER RESTRICTION SW.
551 BrL 14-3
SW-6:エンジン水温スイッチ
ENG. WATER TEMP. SW.
552 GB 14-1
330Ω
SE-15:燃料センサ
FUEL SENSOR
(燃料残量警告)
FUEL WARNING
553 BrB 14-8
SW-15:干渉防止リリーススイッチ
P.D.C RELEASE SW.
554 GY 14-10
POSITION
NORMAL
RELEASE
TERMINAL
SW-14:干渉防止解除スイッチ
P.D.C RELEASE SW.
554 GY
SW-16:オートアクセル解除スイッチ
AUTO ACCEL RELEASE SW.
556 LO 12-14
OPTION
自動回避選択スイッチ
AUTO P.D.C SELECT SW.
558 L 17-9
角度センサ
ANGLE SENSOR
SE-17:ブーム
BOOM
931 RY (5V)
531 Y 13-9
971 BY (GND) 13-8 13-7
SE-18:アーム
ARM
932 RG (5V)
532 G 13-10 13-11
972 BG (GND) 13-12
SE-19:オフセット
OFFSET
933 RW (5V)
533 W 13-15 13-14
973 BW (GND) 13-13
L-5:パトライト
ROTARY LIGHT
SV-5:バケット排土リモコンカットSOL
BUCKET DUMP CUT SOL.
SW-27:クレーン/ショベル切換スイッチ
CRANE/BH SELECT SW.
262 LY
577 GY 17-13
D-6
SE-27:圧力センサ:ブームヘッド
PRESS. SENSOR:BOOM HEAD
931 RL (5V)
526 LgY 17-18
970 BP (GND) 17-19 17-22
SE-26:圧力センサ:ブームロッド
PRESS. SENSOR:BOOM ROD
931 RL
525 WY 17-20
970 BP
ハイリーチ
HI-REACH
RB
R-5:ワイパモータリレー
WIPER MOTOR RELAY
80 LY
81 BrB
M-3:ワイパモータ
WIPER MOTOR
14 1.25RB
2 1.25WY
800 GB 14-13
R-6:ウォッシャモータリレー
WASHER MOTOR RELAY
82 GO
M-4:ウォッシャモータ
WASHER MOTOR
14 RB
2 WY
801 GrL 14-15
802 BrY 14-16
585 VR 14-7
SW-28:走行アラームスイッチ
TRAVEL ALARM SW.
206 PG 15-23
E-14:走行アラーム
TRAVEL ALARM
走行アラーム
TRAVEL ALARM
L-6:外部表示灯
EXTERNAL LAMP
20 14-17
R-10:外部表示リレー
EXTERNAL INDICATION RELAY
キャタリン仕様(現地取付)
CATARIN SPEC.
(LOCALLY INSTALLED)
767 PG 16-1
768 LG 16-2
PSV-3:ブーム上ゲ停止比例弁
(逆)BOOM RAISING STOP(REVERSE)
PROPORTIONAL SOL.
769 GR 16-3
770 LR 16-4
PSV-4:ブーム下ゲ停止比例弁
(逆)BOOM LOWERING STOP(REVERSE)
PROPORTIONAL SOL.
771 GW 16-5
772 LW 16-6
PSV-1:アーム引キ停止比例弁
(逆)ARM IN STOP(REVERSE)
PROPORTIONAL SOL.
773 GY 16-7
774 LY 16-8
PSV-2:アーム押シ停止比例弁
(逆)ARM OUT STOP(REVERSE)
PROPORTIONAL SOL.
775 P 16-11
776 Lg 16-12
PSV-5:オフセット左停止比例弁
(逆)OFFSET LEFT STOP(REVERSE)
PROPORTIONAL SOL.
R-7:ホーンリレー
HORN RELAY
5 WG
83 WL
84 WB
SW-10:ホーンスイッチ
HORN SW.
E-5:ホーン
HORN
R-8:作業灯リレー
WORK LIGHT RELAY
16 1.25RW
16 RW
85 1.25WB
802 BrY(作業灯点灯)
WORKING
LIGHT ON
L-4:ブーム作業灯 右
BOOM WORKING LIGHT RIGHT
L-1:ブーム作業灯 左
BOOM WORKING LIGHT LEFT
SW-2:スイッチアッセン
SW. ASSY
R-11:作業灯リレー2
WORK LIGHT RELAY 2
L-2:作業灯 右
WORKING LIGHT RIGHT
99 1.25WB
15 WB
87 WL
SV-4:レバーロックSOL
SAFETY LOCK LEVER SOL.
SW-11:レバーロックスイッチ
SAFETY LOCK LEVER SW.
L-3:室内灯
ROOM LIGHT
9 YB
11 O
M-9:燃料ポンプ(燃料自動エア抜キ)
FUEL PUMP(AUTO AIR BLEED)
OPTION
SW-19:
オフセットテレスコ切換スイッチ
OFFSET-TELESCO SELECT SW
R-9:
オフセットテレスコ切換リレー
OFFSET-TELESCO SELECT RELAY
RB
76 GrR
D-7
75 GR
SV-6:
オフセットテレスコ切換SOL
OFFSET-TELESCO SELECT SOL.
SW-18:
オフセット選択スイッチ
OFFSET SELECT SW
OPTION
E-7:チューナ AM
TUNER AM
ANT.
AM
88 LR
89 OB
E-9:スピーカ
SPEAKER
4 OL
9 YB (バックアップ)
BACK UP
E-7:チューナ AM & FM
TUNER AM & FM
AM/FM
90 LW
91 Br
E-9:スピーカ 右
SPEAKER RIGHT
E-8:スピーカ 左
SPEAKER LEFT
OPTION
エアコン
AIR CON.
操作
スイッチ
CONTROL
SW.
コントローラ
CONTROLLER
クーリング
ユニット
COOLING
UNIT
SW-13:
エアコンスイッチ
AIR CONDITIONER SW.
C-4:
エアコン アンプ
AIR CONDITIONER AMP.
エアコンリレー
AIR CONDITIONER RELAY
1.25WG 18
1.25B
E-10:
レシーバドライヤ
RECEIVER DRIER
E-11:
エアコンプレッサ
AIR COMPRESSOR CLUTCH
92 BP
93 LW
SV-2:エアコン減馬力SOL
AIR CONDITIONER
POWER SHIFT SOL.
SW-12:ヒータスイッチ
HEATER SW.
94 WV
95 WY
E-12:温水ヒータ
HEATER
18 1.25WG
OPTION
C-1:メカトロコントローラ
MECHATRO CONTROLLER
通常はオープン
NORMAL OPEN
C-5:ITコントローラ(オーブコム)
IT CONTROLLER(ORBCOMM)
DC IN 12-24V
ANTENNA
GPS
E-15:
アンテナ
ANTENNA
E-16:
GPSアンテナ
ANTENNA
INTERFACE
811 V
611 R
612 W
613 B
(リモート電源制御)
REMOTE POWER CONTROL
(RXD1)
(TXD1)
(GND)
(デジタル出力1)DIGITAL OUTPUT
(デジタル出力2)DIGITAL OUTPUT
(デジタル入力1)DIGITAL INPUT
(デジタル入力2)DIGITAL INPUT
(アナログ入力1)ANALOG INPUT
(アナログ入力2)ANALOG INPUT
(アナログ入力3)ANALOG INPUT
(アナログGND)ANALOG GND
(送信中出力)OUTPUT TRANSMITTING
(受信中出力)OUTPUT RECEIVING
(GND)
300 BG
301 BW
302 BY
303 Br
304 BrW
305 GL
306 GY
307 L
308 LB
309 RW
310 V
オプションコネクタ
OPTION CONNECTOR
IT(オーブコム)
ORBCOMM

12. INTERCHANGEABILITY BETWEEN THE MINOR CHANGE AND CURRENT MACHINE IN GRAND BEETLE SERIES

SK70SR-1E & SK70SR

Group	Component	Interchan-geability	Cause why being not interchangeable	Method to put in common
Upper structure	Engine assy.	×	Engine complied with Japanese Secondary Exhaust Gas Emission mounted.	Replace rod ends of air cleaner hose and stop cable. (New → Former) Installable as above mentioned, but impossible to comply with regulation of Secondary exhaust gas emission (Former → New)
	Engine mount	○		
	Radiator	×	Measure to be taken for heat balance observing Japanese Secondary exhaust gas emission.	Replace radiator group (upper hose, partition bracket, etc.).
	Oil cooler	×	Changed to that made of aluminium for measures against corrosion.	Replace radiator group and return tube.
	Air cleaner	×	Change of hose to have measure against resistance caused by intake air.	Replace air cleaner hose.
	Hydraulic tank	×	Change of installation pitch by internal fabrication.	
	Fuel tank	×	Change of installation pitch by internal fabrication.	
	Instrument panel	×	Replacement of hour meter. Addition of cup holder.	Change the hour meter and plastic cover with modification of harness. Installable as above mentioned, but without cup holder. (Former→New)
	Working light	○		
	Horn	○		
	Upper frame	×	Change of installation pitch by internal fabrication.	
	Cab	○	Consequently, rear mirror is added, wiper length and limit switch position are changed,and, sky light is changed to that made of acryl.	Installable as it is. (No problem on performance.) (New → Former) Installable as it is. (Rear mirror is cancelled.) (Former→New)
	Guard	×	Change of structure and construction, addition of damper to mud cover, but panel and around weight are in common.	Replace guard pillar. (To add gas damper, the replacement of hydraulic tank return tube is required.)
	Operator seat	×	Change of maker.	Replace bracket under the seat.
	Piping	×	Change of return tube because of the use of oil cooler made of aluminium, change of travel and ATT (Required spacer) P/V .	Replace return tube and travel/ATT pilot valve.
	Counter weight	○		
	Air conditioner	×	Change of condenser bracket, but unit is in common.	Replace bracket for condenser.
Undercarriage	Lower frame	×	Change of shape of upper roller support to take measure against slipping out.	Add washers of bolts for upper roller.(New →Former) Remove washers of bolts for upper roller.(Former →New)
	Sprocket	○		
	Front idler	○		
	Crawler adjuster	○	With cover preventing spring from breakage.	Installable as it is (No problem on performance), without cover to breakage (Former →New)
	Lower roller	○		
	Upper roller	×	Change of material and shaft length to take measure against slipping out and bending	Remove washers of bolts for upper roller.(New →Former) Add washers of bolts for upper roller.(Former →New)
	Rubber crawler (Option)	○		
	Track link,shoe	○		
	Slewing ring	○		
	Piping	×	Change of port position due to change of travel motor.	Remove travel motor.
Hydraulic component	Main pump	○	Change of proportional valve connector, addition of air bleeder plug.	Installable as it is (No problem on performance), without air bleeder plug. (Former →New)
	Control valve	○	Change of internal construction for measure against noise.	Installable as it is (No problem on performance), without measure taken against noise. (Former →New)
	Sub pump (option)	○		
	Swing motor	○		
	Travel motor	×	Addition of auto speed reduction function.	Replace travel motor together with lower piping.
	Swivel joint	○		
	Multi-control valve	○		
	Pilot valve (ATT)	×	Change of type. (same as the valve for Beetle-2) (However, the inside spring is changed.)	Replace control box.
	Pilot valve (Travel)	×	Change of maker.	Replace travel P/V installing plate with travel lever..
	Solenoid valve	×	Change of maker. For swing operation, measure against clicking is taken.	Change the software and simultaneously modify the connectors.
	Cylinder (Boom)	×	Change of port position on rod side because of change of type.	Replace piping on the rod side.
	Cylinder (Arm)	○		
	Cylinder (Bucket)	×	Change of port position because of change of type.	Replace piping on the rod side.
	Cylinder (Dozer:Option)	○	However, port position on rod side is changed because of change of type.	Installable as it is (possible to correspoud to change the length of hose)
Attachment	Boom	×	Clamping method of bucket tube is changed.	Change the bucket tube, and add the tapped block for clamping.
	Arm	○		
	Bucket	○	However, pin length and gap adjustment system are changed.	Installable as it is.
	Bucket link	○		
	Idler link	○		
	Tooth	○		
	Dozer blade (Option)	○		
Filter & element	Fuel filter	○		
	Main return filter	○		
	Suction filter (strainer)	○		
	Engine oil filter (element)	○		

SK130UR-1E & SK130UR

Group	Component	Interchangeability	Cause why being not interchangeable	Method to put in common
Upper structure	Engine assy.	×	Engine complied with Japanese Secondary Exhaust Gas Emission mounted.	Change the software and replace of air cleaner. (New→Former) Installable as above mentioned, but impossible to comply with Japanese regulation of Secondary exhaust gas emission. (Former→New)
	Engine mount	○		
	Radiator	○	Measure to be taken for heat balance observing Secondary exhaust gas emission.	Replace radiator Gr (upper hose, Insulation, etc.).
	Oil cooler	○	Changed to that made of aluminum for measures against corrosion.	Replace radiator Gr (upper hose, Insulation, etc.).
	Air cleaner	×	Change of hose to have measure against resistance caused by intake air.	Replace intake air hose.
	Hydraulic tank	○	Change of drain plug PT→PF reinforcement is reguired.	Installable as it is. (New→Former), without reinforcement. (Former→New)
	Fuel tank	○	Capacity up, provide flange for cleaning on bottom.	Change of guard installation. (New→Former) Modification of fuel tank. (Add seat for guard) (New→Former)
	Instrument panel	×	Replacement of hour meter.	Change of hour meter and control stand with modification of harness. (New→Former) If upper items are performed, installable from former to new.
	Working light	○		
	Horn	○		
	Upper frame	×	Change position of guard and C/W attaching hole etc.	
	Cab	○	However, add cup holder.	Installable as it is. (No problem on performance) (New→Former) Installable as it is. (Without cup holder) (Former→New)
	Guard	×	Change of structure, but panel and C/W are in common.	Replace guard pillar.
	Operator seat	○		
	Piping	×	Piping change according to change of P/V for ATT.	
	Counter weight	○	Rear mirror is added.	Installable as it is. (No problem on performance) (New→Former). Installable as it is.(Without rear mirror) (Former→New))
	Air conditioner	×	Change of condenser bracket.(Unit is in common)	Replace bracket for condenser.
	Mechatro contoroller	×	Change of soft ware.	Down load of soft ware.
Undercarriage	Lower frame	×	Welded track guide, change of bolt size for upper roller.	Add washers of bolts for upper roller.(New →Former) Remove washer of roller attaching bolt, and make bolt hole larger. (Former→New)
	Sprocket	○		
	Front idler	○		
	Crawler adjuster	○	However,with cover preventing spring from breakage.	Installable as it is. (No problem on performance) (New→Former). Without cover preventing spring from breakage. (Former→New)
	Lower roller	○		
	Upper roller	○		
	Rubber crawler (Option)	○		
	Track link,shoe	○		
	Slewing ring	○		
	Piping	○		
Hydraulic component	Main pump	○	Change of proportional valve connector, Common in assembly.	Modification of harness.
	Sub pump (Dozer)	○		
	Control valve	○		
	Swing motor	○	Grease nipple is equipped or not.	Installable as it is. (New→Former). Without grease nipple. (Former→New)
	Travel motor	○	New type measures against oil leak.	No problem (New→Former). No measure against oil leak. (Former→New)
	Swivel motor	○		
	Multi-control valve	○		
	Pilot valve (ATT)	○		
		○		
	Pilot valve (Travel)	○		
	Solenoid valve	×	Change of maker. For swing operation, measure against clicking is taken.	Change of connector. (New→Former) Change of connector. Add rubber cap to valve for swing. (Former→New)
	Cylinder (Boom)	○		
	Cylinder (Arm)	○		
	Cylinder (Bucket)	○		
	Cylinder (Dozer)	○		
Attachment	Boom	○		
	Arm	○		
	Bucket	○	Pin length and backlash adjustment system are changed.	Installable as it is.
	Bucket link	○	However, position of grease nipple is changed. (Improvement in maintenance)	Installable as it is.
	Idler link	○		
	Tooth	○		
	Dozer blade	○		
Filter & element	Fuel filter	○		
	Engine oil element	○		
	Air cleaner element	○		
	Suction strainer	○		
	Return filter	○		