PART NO. TOJBM-EN-00

HITACHI

Reliable solutions

Technical Manual

Operational Principle

ZX
870-5A
870LC-5A
890H-5A
890LCH-5A

Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TOJBM-EN
Technical Manual (Troubleshooting)	: Vol. No.TTJBM-EN
Workshop Manual	: Vol. No.WJBM-EN
Engine Manual	: Vol. No.ETJBM-EN,EWJBM-EN

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SECTION 1

GENERAL

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FRONT ATTACHMENT PILOT VALVE	Plunger Stroke	Ports 1, 3: 6.5 mm, Ports 2, 4: 8.0 mm
TRAVEL PILOT VALVE	Plunger Stroke	Ports 1, 2, 3, 4: 4.6 mm
AUXILIARY/ COUNTERWEIGHT PILOT VALVE	Plunger Stroke	Ports 1, 2: 3.7 mm
4-SPOOL SOLENOID VALVE UNIT	Type	4-Spool Proportional Solenoid valve
	Rated Voltage	DC 24 V
	Coil Resistance	22 Ω
2-SPOOL SOLENOID VALVE UNIT	Type	2-Spool Proportional Solenoid Valve
	Rated Voltage	DC 24 V
	Coil Resistance	22 Ω
SIGNAL CONTROL VALVE	Rated Pressure	3.72 MPa
PILOT SHUT-OFF SOLENOID VALVE	Type	ON/OFF Solenoid Valve
	Rated Voltage	DC 24V
	Coil Resistance	49 Ω
LOW-PRESSURE RELIEF VALVE	Relief Set Pressure	100±50 kPa at 40 L/min
BYPASS CHECK VALVE	Relief Set Pressure	340±50 kPa at 40 L/min
FILTER	Air Cleaner (Filtration)	-
	Full-Flow Filter (Filtration)	β10≥2.0
	Suction Filter (Filtration)	177 µm (80 mesh)
	Drain Filter (Filtration)	10 µm
	Pilot Filter (Filtration)	β10≥1.4

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Output Power Control

Purpose:
The output power control controls each pump delivery flow rate so that the sum of the pump driving torque assigned to pump 1, pump 2, and fan pump do not exceed the engine output torque, and efficiently utilizes the engine output power.

Operation:

1. When operating pump 1 and pump 2, some difference between each delivery pressure occurs under normal conditions.
2. The load of the higher delivery pressure side pump is high, and the load of the lower delivery pressure side pump is low.
3. Pump 1 and pump 2 delivery pressure sensors ((26), (27)) and pump 1 and pump 2 control pressure sensors ((31), (29)) detect this status and send the signals to MC (14).
4. MC (14) calculates the maximum target pump displacement angle from the signals of pump 1 and pump 2 delivery pressure sensors ((26), (27)) within the range that the sum of the pump driving torque assigned to pump 1, pump 2, and fan pump do not exceed the engine output power.
5. MC (14) compares the actual pump displacement angle detected by pump 1 and pump 2 control pressure sensors ((31), (29)) with the target pump displacement angle.
6. MC (14) drives the higher load side pump control solenoid valve in order to accord the actual pump displacement angle with the target pump displacement angle, and increases the pump delivery flow rate of the higher load side.

NOTE: The fan pump delivery flow rate is controlled by the fan pump flow rate control regardless of the engine output torque. (Refer to T2-2-52.)

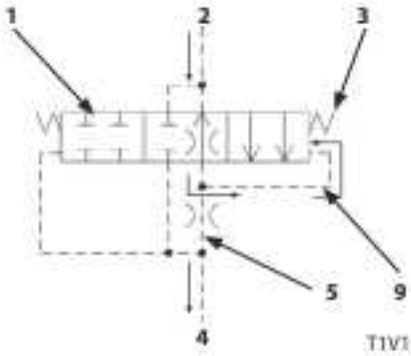
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Shockless Valve

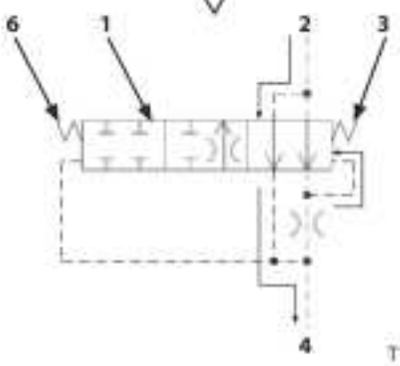
The shockless valve is provided in the boom raise circuit and functions during boom lowering operation or when stopping boom raise operation.

During boom raise operation

1. Boom raise pilot pressure acts on spool (1) through port A (2).
2. Immediately after operation is started, low pilot pressure oil is routed to the spring B (3) chamber through clearance C between spool (1) and housing (7) and inner passage 3 (9). In addition, pilot pressure oil is also routed to port 1 (4) through inner passage 2 (5) at the same time.
3. When pilot pressure increases, pressure in the spring B (3) chamber also increases. Spool (1) pushes spring A (6) and is moved to the left.
4. As spool (1) is moved, port A (2) is connected to port 1 (4) and pressure in the port 1 (4) side increases, and the control valve spool is moved.



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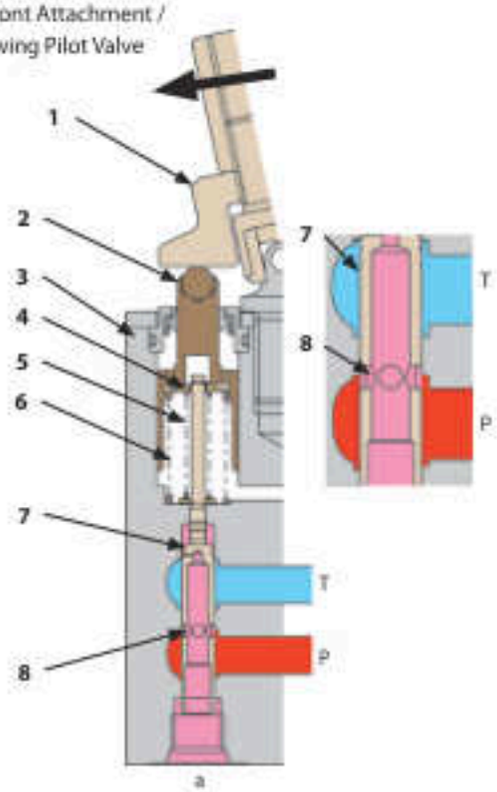


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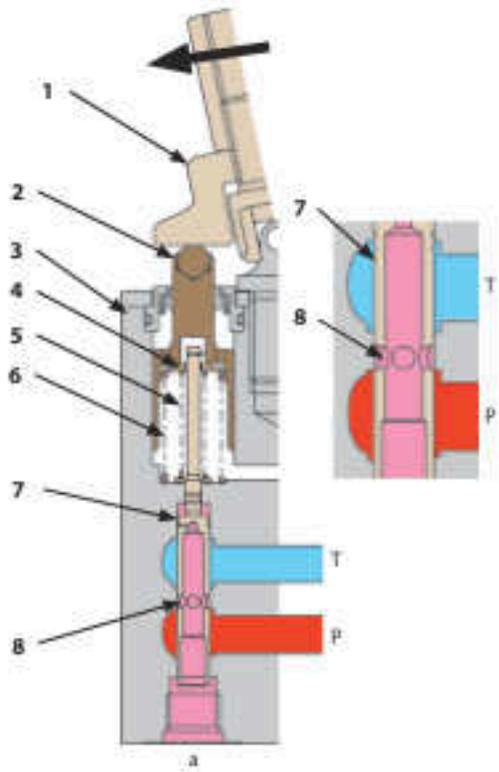
1- Spool
2- Port A
3- Spring B
4- Port 1
5- Inner Passage 2
6- Spring A
9- Inner Passage 3

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Front Attachment /
Swing Pilot Valve

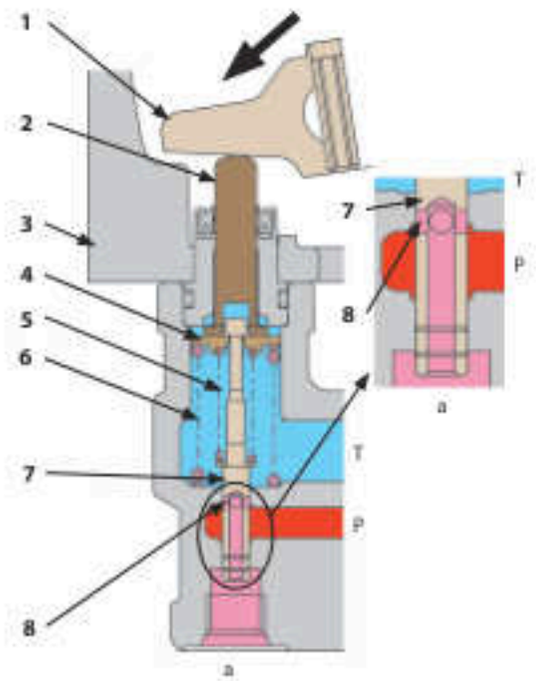


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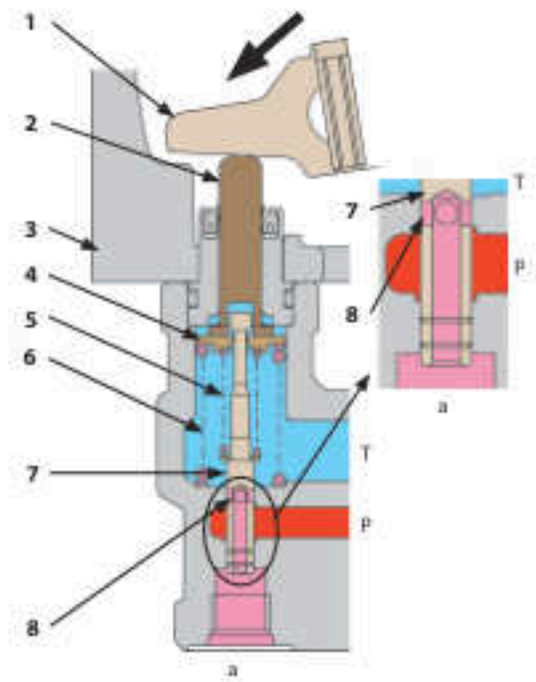


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Travel Pilot Valve



TPPP-03-04-012

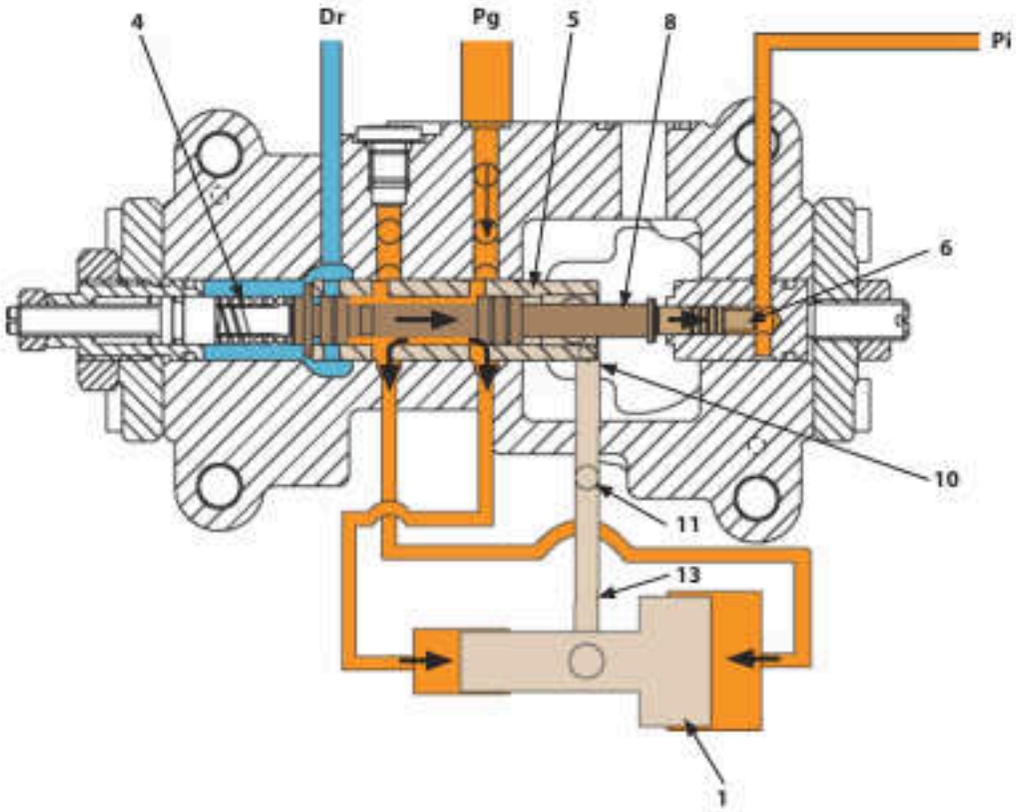


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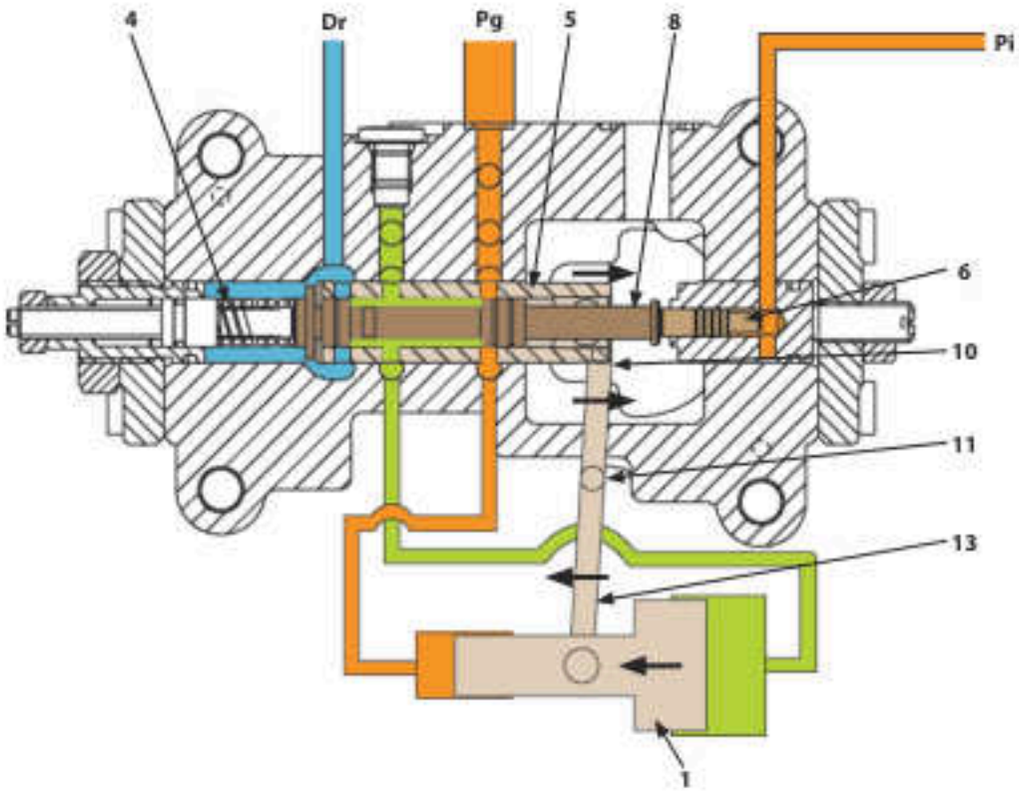
P- Port P
T- Port T
a- Output Port

1- Cam
2- Pusher
3- Casing
4- Spring Guide
5- Balance Spring
6- Return Spring
7- Spool
8- Hole

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TJBA-03-01-021



TJBA-03-01-022

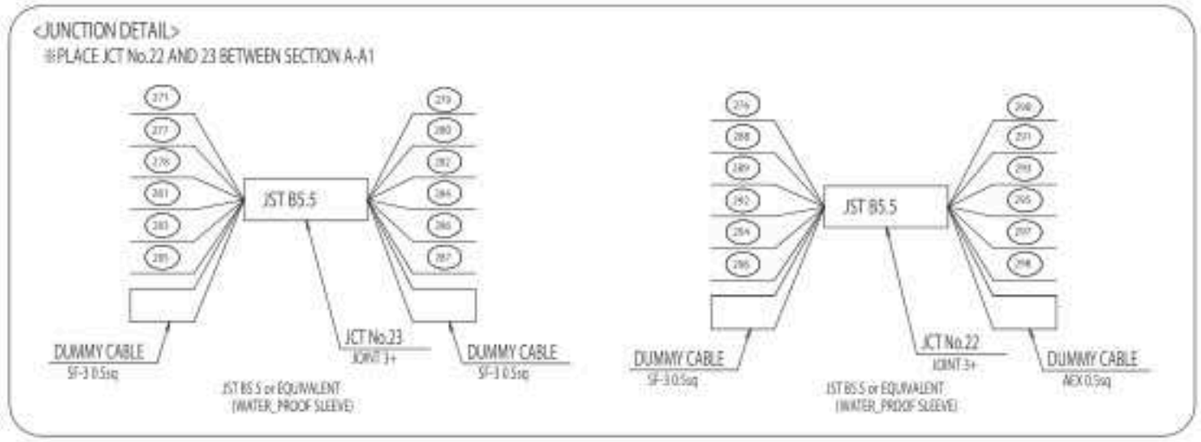
Dr- Returning to Hydraulic Oil Tank
Pi- Flow Rate Control Pressure
Pg- Primary Pilot Pressure (From Pilot Pump)

1- Servo Piston
4- Spring
5- Sleeve
6- Piston
8- Spool
10- Pin
11- Pin
13- Link

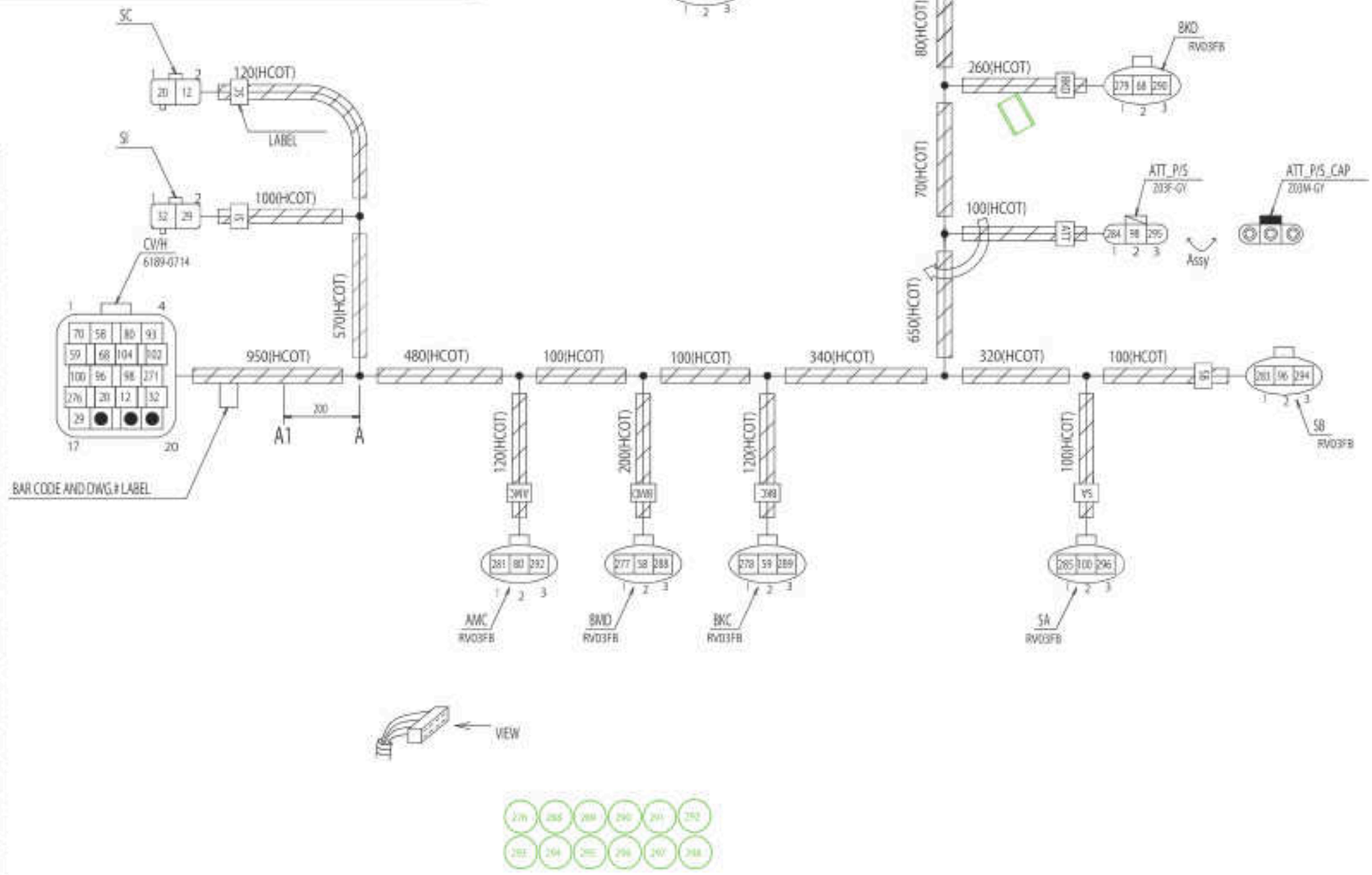
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Attach to Part No. : TTJBM-EN-00

ZX870-5A • 870LC-5A • 890H-5A • 890LCH-5A CONTROL VALVE HARNESS



⚠ CAUTION: Parts numbers on the drawing are provided only for reference purpose.
To order parts on the drawing, be sure to consult the Parts Catalog.



NO.	SIZE	COL.	CIRCUIT FROM		CIRCUIT TO		KIND	COMMENT
12	0.5	L	SC	2	CV/H	15	SF-3	
20	0.5	P	SC	1	CV/H	14	SF-3	
29	0.5	Y	SI	2	CV/H	17	SF-3	
32	0.5	Gy	SI	1	CV/H	16	SF-3	
58	0.5	Br	BMD	2	CV/H	2	SF-3	
59	0.5	G	BKC	2	CV/H	5	SF-3	
68	0.5	O	BKD	2	CV/H	6	SF-3	
70	0.5	L	BMU	2	CV/H	1	SF-3	
80	0.5	P	AMC	2	CV/H	3	SF-3	
93	0.5	W	AMD	2	CV/H	4	SF-3	
96	0.5	G	SB	2	CV/H	10	SF-3	
98	0.5	O	ATT_P/S	2	CV/H	11	SF-3	
100	0.5	Br	SA	2	CV/H	9	SF-3	
102	0.5	Y	TR	2	CV/H	8	SF-3	
104	0.5	Gy	S3	2	CV/H	7	SF-3	
271	0.5	R	JOINT_3+		CV/H	12	SF-3	JCT No.23
276	0.5	B	JOINT_3-		CV/H	13	SF-3	JCT No.22
277	0.5	R	BMD	1	JOINT_3+		SF-3	JCT No.23
278	0.5	R	BKC	1	JOINT_3+		SF-3	JCT No.23
279	0.5	R	BKD	1	JOINT_3+		SF-3	JCT No.23
280	0.5	R	BMU	1	JOINT_3+		SF-3	JCT No.23
281	0.5	R	AMC	1	JOINT_3+		SF-3	JCT No.23
282	0.5	R	AMD	1	JOINT_3+		SF-3	JCT No.23
283	0.5	R	SB	1	JOINT_3+		SF-3	JCT No.23
284	0.5	R	ATT_P/S	1	JOINT_3+		SF-3	JCT No.23
285	0.5	R	SA	1	JOINT_3+		SF-3	JCT No.23
286	0.5	R	TR	1	JOINT_3+		SF-3	JCT No.23
287	0.5	R	S3	1	JOINT_3+		SF-3	JCT No.23
288	0.5	B	BMD	3	JOINT_3-		SF-3	JCT No.22
289	0.5	B	BKC	3	JOINT_3-		SF-3	JCT No.22
290	0.5	B	BKD	3	JOINT_3-		SF-3	JCT No.22
291	0.5	B	BMU	3	JOINT_3-		SF-3	JCT No.22
292	0.5	B	AMC	3	JOINT_3-		SF-3	JCT No.22
293	0.5	B	AMD	3	JOINT_3-		SF-3	JCT No.22
294	0.5	B	SB	3	JOINT_3-		SF-3	JCT No.22
295	0.5	B	ATT_P/S	3	JOINT_3-		SF-3	JCT No.22
296	0.5	B	SA	3	JOINT_3-		SF-3	JCT No.22
297	0.5	B	TR	3	JOINT_3-		SF-3	JCT No.22
298	0.5	B	S3	3	JOINT_3-		SF-3	JCT No.22

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