

# SYSTEMATIC CHECK SEQUENCE CHART BRAKE HYDRAULIC CIRCUIT

## LEFT-HAND WARNING LAMP ILLUMINATED (INTERMITTENTLY OR CONTINUOUSLY)

BEFORE CARRYING OUT THIS SYSTEMATIC CHECK, THE RESERVOIR FLUID LEVEL SHOULD BE CHECKED AND TOPPED-UP IF NECESSARY. THE CAR SHOULD ALSO BE CHECKED UNDERNEATH FOR ANY SIGNS OF LEAKAGE FROM HOSES OR HYDRAULIC UNITS, ETC. IF NO LEAKS ARE APPARENT FROM THIS BRIEF VISUAL CHECK CARRY OUT THE FOLLOWING PROCEDURE.

### STEP 1

DE-PRESSURISE THE SYSTEM AND INSERT A PRESSURE CHECKING GAUGE INTO THE FRONT ACCUMULATOR BLEED VALVE TAPPING.

DE-PRESSURISING THE SYSTEM NORMALLY REQUIRES BETWEEN 40 AND 90 PUMPS OF THE BRAKE PEDAL.

### STEP 2

START THE ENGINE AND ALLOW IT TO IDLE AT APPROXIMATELY 1000 r.p.m. CAREFULLY OBSERVE THE BEHAVIOUR OF THE GAUGE.

THE CORRECT BEHAVIOUR OF THE GAUGE IS AS FOLLOWS:

THE PRESSURE GAUGE NEEDLE SHOULD BOUNCE BETWEEN 900 lb/sq.in. AND 1000 lb/sq.in. (63.25 kg/sq.cm. AND 70.31 kg/sq.cm.) EITHER IMMEDIATELY, OR AFTER TWO OR THREE FLICKS.

THE PRESSURE RECORDED AT THIS POINT INDICATES THE NITROGEN PRESSURE IN THE ACCUMULATOR SPHERE.

THE NEEDLE SHOULD THEN RISE STEADILY, PULSING AT CAMSHAFT SPEED, TO BETWEEN 2200 lb/sq.in. AND 2500 lb/sq.in. (154.7 kg/sq.cm. AND 175.8 kg/sq.cm.). THE NEEDLE WILL THEN DROP TO BETWEEN 1800 lb/sq.in. AND 2000 lb/sq.in. (126.6 kg/sq.cm. AND 140.6 kg/sq.cm.) AND THEN REMAIN STEADY.

THIS INDICATES THE NORMAL BUILD UP AND CORRECT CUT-OFF POINT OF THE ACCUMULATOR VALVE AND INDICATES THAT THE SYSTEM IS FUNCTIONING CORRECTLY.

#### SYMPTOM 2(1)

THE PRESSURE GAUGE NEEDLE RISES SLOWLY FROM ZERO, OR BOUNCES UP TO AN INITIAL PRESSURE OF LESS THAN 900 lb/sq.in. (63.25 kg/sq.cm.).

CHARGE THE ACCUMULATOR SPHERE WITH NITROGEN TO THE CORRECT PRESSURE OF BETWEEN 900 lb/sq.in. AND 1000 lb/sq.in. (63.25 kg/sq.cm. AND 70.31 kg/sq.cm.). BEFORE REFITTING THE CHARGING CAP ENSURE THAT THE SEALING RING AND NYLON BALL (IF FITTED) IS INTACT AND NOT DAMAGED IN ANY WAY.

AS DESCRIBED OPPOSITE, THE FIGURE TO WHICH THE GAUGE NEEDLE BOUNCES UP TO INITIALLY, INDICATES THE NITROGEN PRESSURE IN THE ACCUMULATOR SPHERE. IF THE PRESSURE RISES SLOWLY FROM ZERO, PULSING AT ENGINE CAMSHAFT SPEED, IT INDICATES THAT THERE IS NO NITROGEN PRESSURE IN THE ACCUMULATOR SPHERE AT ALL AND USUALLY CAUSES THE LAMP TO BE ILLUMINATED AFTER ONLY A FEW PUMPS OF THE BRAKE PEDAL (BETWEEN 2 AND 5 PUMPS). IF THE NEEDLE BOUNCES UP TO A PRESSURE OF BETWEEN 900 lb/sq.in. AND 1000 lb/sq.in. (63.25 kg/sq.cm. AND 70.31 kg/sq.cm.) THIS MEANS THAT THE NITROGEN PRESSURE IS CORRECT.

#### SYMPTOM 2(2)

THE LAMP REMAINS ON OR GOES OUT BUT THE PRESSURE DOES NOT BUILD UP CORRECTLY.

### STEP 3

DE-PRESSURISE THE SYSTEMS. REMOVE THE PRESSURE GAUGE FROM THE BLEED VALVE HOLE AND INSERT IT IN THE MAIN OUTLET FROM THE ACCUMULATOR AFTER FIRST REMOVING THE FLEXIBLE HOSE. REFIT THE BLEED VALVE. START THE ENGINE AND OBSERVE THE PRESSURE GAUGE BEHAVIOUR.

#### SYMPTOM 2(3)

THE WARNING LAMP REMAINS ON AND HYDRAULIC PRESSURE BUILDS UP NORMALLY. THIS SHOWS THAT THE HYDRAULIC SYSTEM IS OPERATING CORRECTLY AND THAT THE FAULT IS IN THE WARNING LAMP CIRCUIT.

CHECK THE WARNING LAMP SWITCH AND ITS ELECTRICAL CIRCUIT

THIS ACTION SEPARATES THE ACCUMULATOR FROM THE REST OF THE SYSTEM AND ALLOWS THE ACCUMULATOR AND HYDRAULIC PUMP ON THE ENGINE TO BE CHECKED THOROUGHLY. IF THE PRESSURE IS CORRECT AFTER THIS CHECK, IT MEANS THAT THE FAULT IS NOT IN THE ACCUMULATOR BUT ELSEWHERE IN THE HYDRAULIC SYSTEM.

#### SYMPTOM 3(1)

PRESSURE DOES NOT BUILD UP AT ALL.

STOP THE ENGINE. CONNECT A BLEED TUBE TO THE BLEED VALVE ON THE ACCUMULATOR, OPEN THE BLEED VALVE, RUN THE ENGINE TO SEE IF FLUID FLOWS OUT. IF FLUID FLOWS OUT, CLOSE THE BLEED VALVE AND CHECK AGAIN. IF PRESSURE STILL DOES NOT BUILD UP, THE HYDRAULIC PUMP IS FAULTY AND MAY REQUIRE OVERHAULING. IF FLUID DOES NOT FLOW OUT, CHECK THAT THE HYDRAULIC PUMP IS NOT AIR LOCKED.

THIS MEANS THAT THE HYDRAULIC PUMP IS NOT FUNCTIONING CORRECTLY BECAUSE EITHER THE PUMP IS AIR LOCKED OR BECAUSE THERE IS DIRT UNDER THE PUMP MAIN DELIVERY VALVE SEAT.

#### SYMPTOM 3(2)

PRESSURE NOW BUILDS UP NORMALLY AND CUTS OFF AT THE CORRECT PRESSURE.

### STEP 4

DE-PRESSURISE THE SYSTEM AND REFIT THE PRESSURE GAUGE INTO THE BLEED VALVE TAPPING. RECONNECT THE FLEXIBLE HOSE AND CONFIRM THAT THE FAULT EXISTS AS AT STEP 2.

#### SYMPTOM 3(3)

PRESSURE BUILDS UP TO BETWEEN 300 lb/sq.in. AND 1200 lb/sq.in. (21.1 kg/sq.cm. AND 84.4 kg/sq.cm.) BUT WILL NOT INCREASE FURTHER.

STOP THE ENGINE AND REMOVE THE RETURN PIPE FROM BETWEEN THE ACCUMULATOR AND RESERVOIR. BLANK OFF THE HOSE TO STOP THE RESERVOIR FROM DRAINING, CONNECT THE BLEED PIPE TO THE RETURN OUTLET PIPE, RUN THE ENGINE AND CHECK TO SEE IF FLUID RUNS OUT OF THE RETURN PIPE. IF FLUID RUNS OUT OF THE RETURN PIPE BEFORE PRESSURE HAS BUILT UP TO BETWEEN 2200 lb/sq.in. AND 2500 lb/sq.in. (154.7 kg/sq.cm. AND 175.8 kg/sq.cm.), THEN THE MAIN CHARGING VALVE IS BEING HELD OFF ITS SEAT BY DIRT.

THIS CHECK REVEALS THAT THE MAIN CHARGING VALVE IS FAULTY OR THAT AN INTERNAL LEAK IS PRESENT. TO CORRECT THIS FAULT THE ACCUMULATOR VALVE SHOULD BE REMOVED FROM THE ENGINE AND STRIPPED AND CLEANED AS DESCRIBED IN SECTION G6—THE HYDRAULIC ACCUMULATORS.

### STEP 5

IN THE MAJORITY OF CASES THE ACTIONS NOTED ABOVE WILL RECTIFY THE FAULT IN THE HYDRAULIC POWER SYSTEMS. IF, HOWEVER, A FAULT STILL EXISTS IN THE BRAKE SYSTEM A CHECK SHOULD BE MADE FOR MAJOR FLUID LEAKS, PAD AND DISC CONDITIONS OR FOR AIR IN THE HYDRAULIC SYSTEM.

IF FLUID DOES NOT RUN OUT OF THE RETURN PIPE AND PRESSURE DOES NOT BUILD UP, OVERHAUL THE ACCUMULATOR VALVE.