

Every 15,000 km (10,000 miles)

All gasoline engines

Note

If no oscillograph is available, a complete evaluation of the ignition system is impossible. In such a case, check resistances of the individual ignition circuits (ignition distributor rotor, interference suppressor plug, ignition cable) with an ohmmeter.

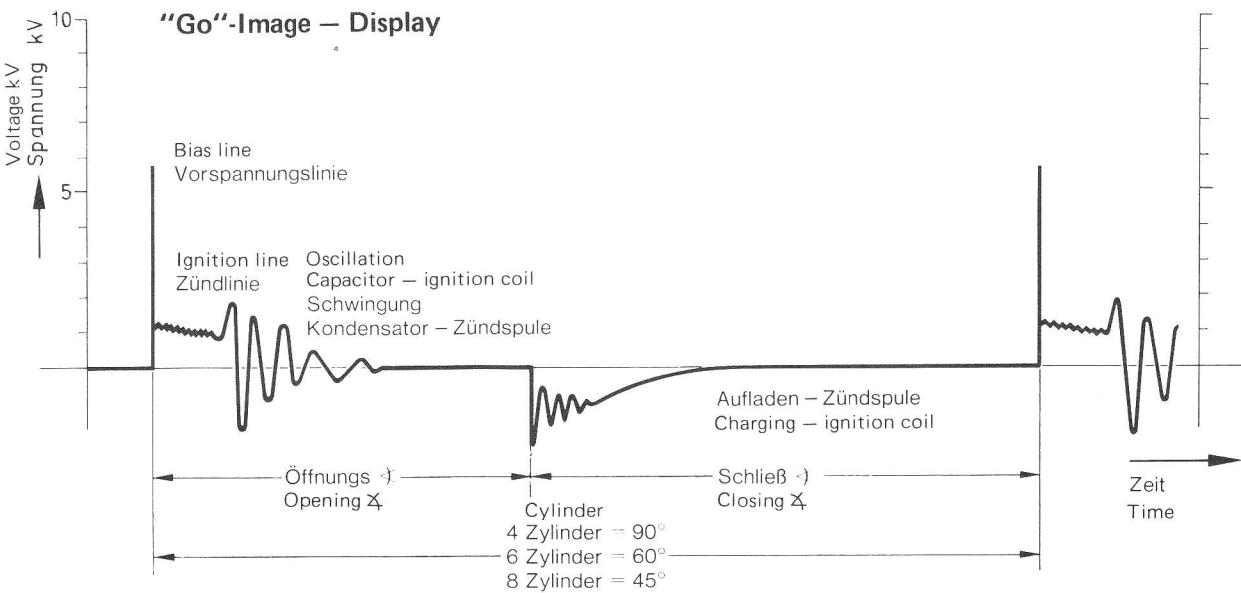


Image selection Display. Image shown expanded in horizontal direction

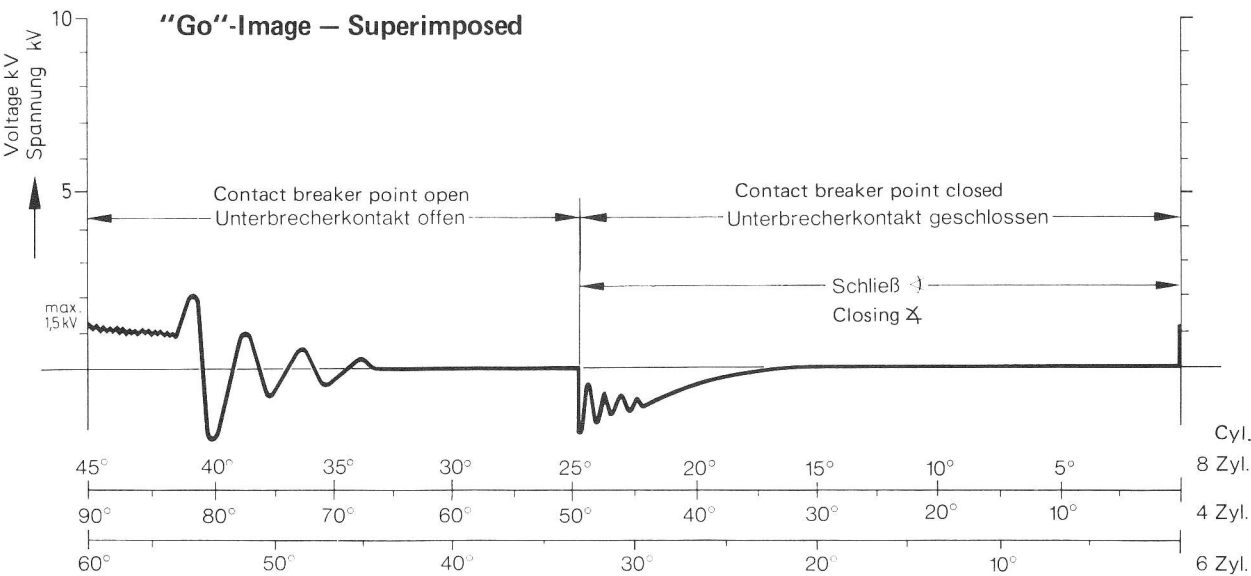
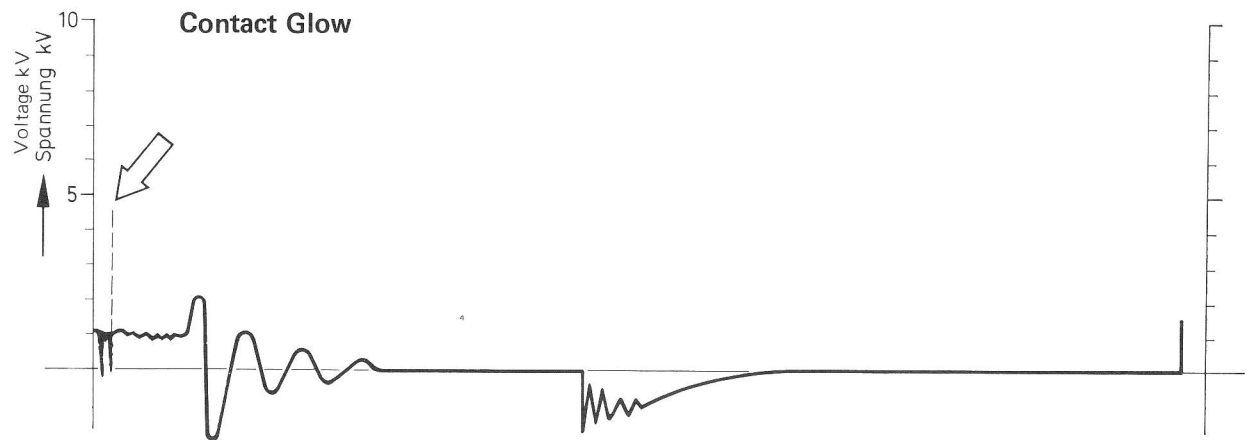


Image selection Superimposed. For this purpose, set begin and end of ignition sequence left and right on calibration line

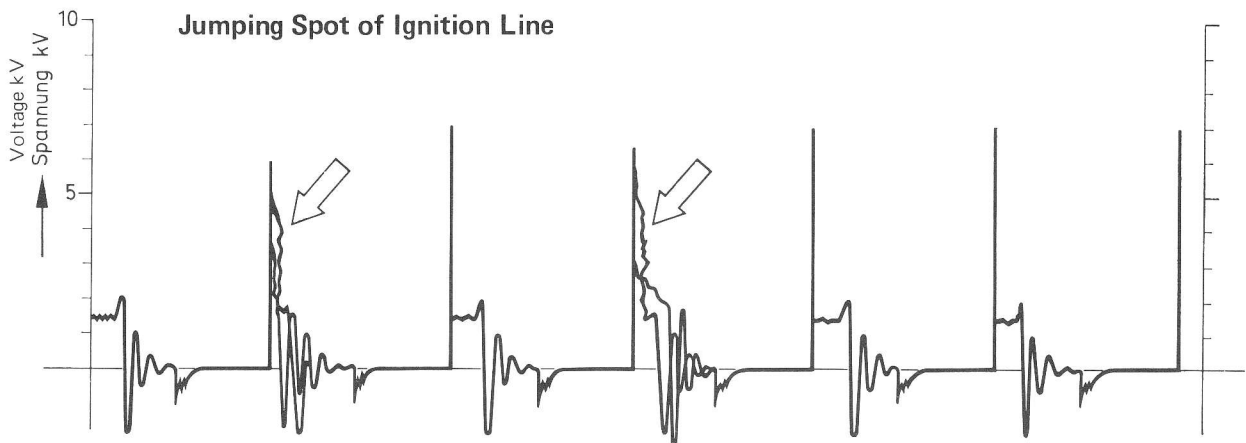
Z 151 - 4824



The following oscillograms are showing faults deviating from "Go" image.



- Image selection** Superimposed
- Image fault** Temporary voltage peaks at beginning of ignition line in upward and downward direction
- Visible** Idling speed
- Cause** Contact breaker point burned, oiled up, dirty. In very rare cases series resistance in capacitor
- Remedy** Renew contact breaker point, complete separate capacitor test, if required



- Image selection** Display
- Image fault** Spot of ignition line changes, jumps
- Visible** May occur at all speeds with or without engine load
- Cause** Spark plug sooted, oiled-up, lead-coated
- Remedy** Clean or replace spark plug

Z 151 - 4825

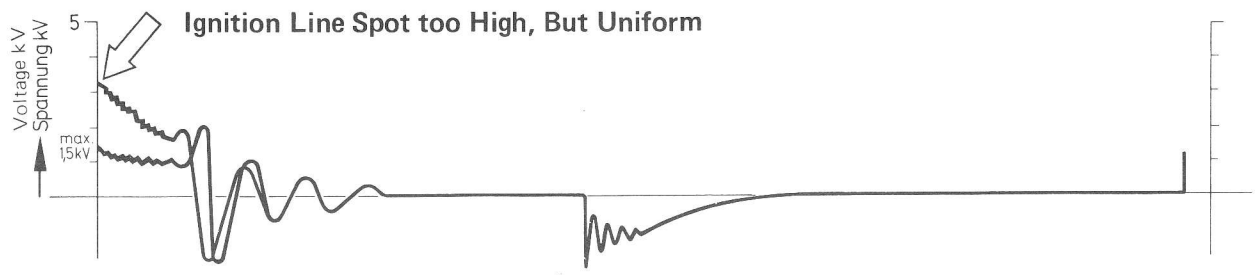


Image selection Superimposed
Visible Idle speed, at one or several cylinders

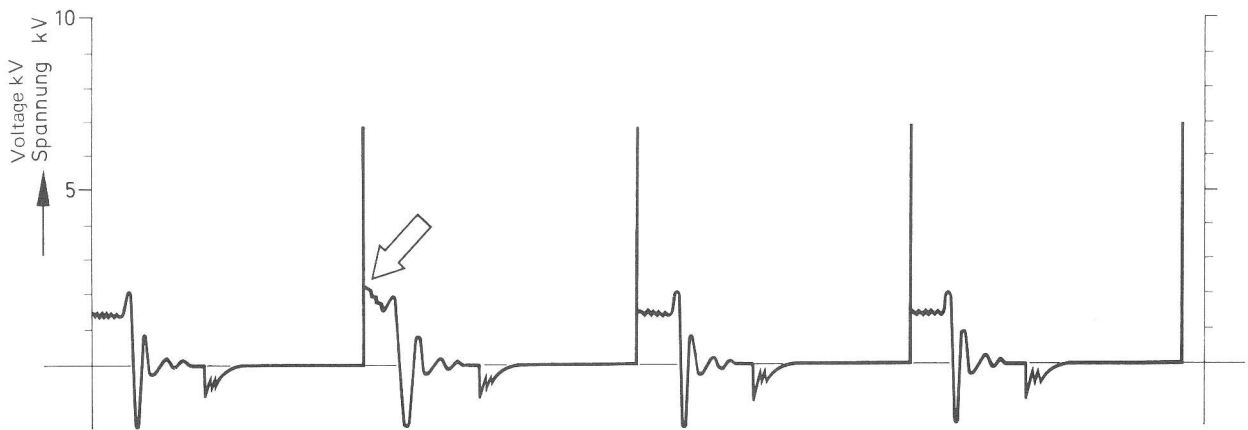


Image selection Display
Image fault Ignition line spot above 1,5 kV
Visible Idle speed at one or several cylinders
Cause Ohmic resistance at secondary end too high, caused by interference suppressor plug on spark plug or ignition distributor disc, ignition cable, distributor disc, spark plug
Remedy Renew parts where ohmic resistance is too high (use ohmmeter)

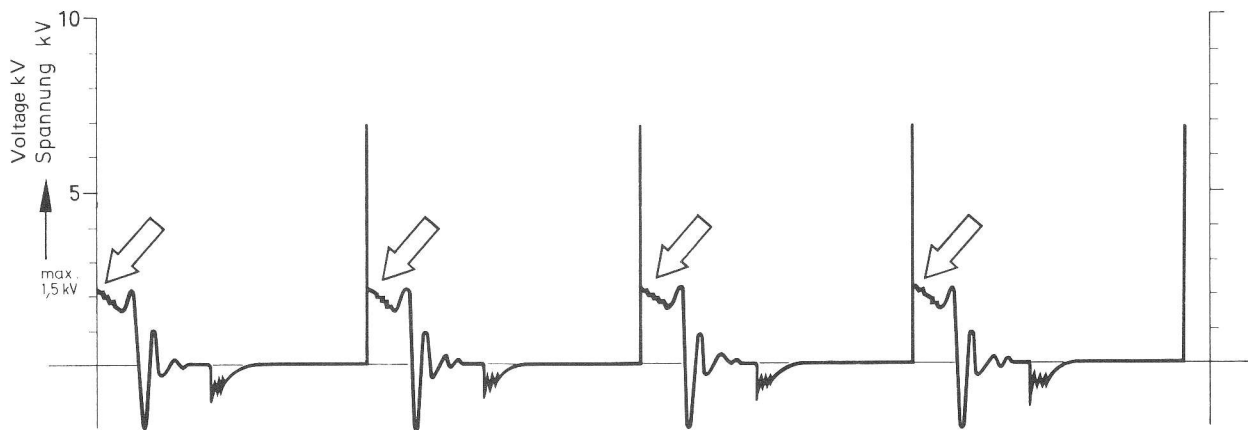


Image selection Display
Image fault Ignition line spots above 1,5 kV
Visible Idle speed at all cylinders
Cause Ohmic resistance at secondary end too high, caused by distributor rotor, distributor disc or high-voltage cable No. 4 with plug
Remedy Renew parts where ohmic resistance is too high (use ohmmeter)

Z 151 - 4826

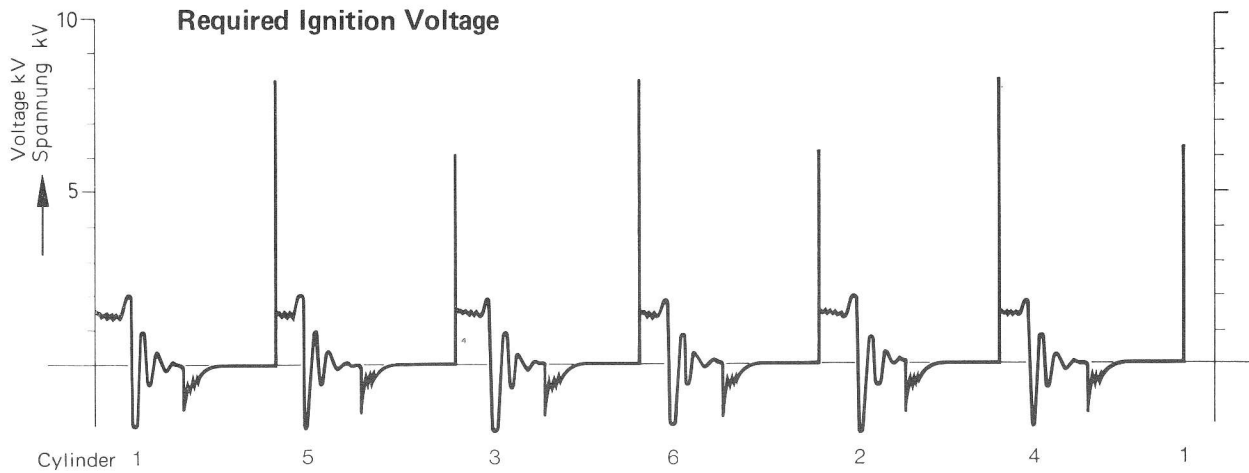


Image selection Display
Image fault Cylinders 4, 5 and 6 require higher ignition voltage than cylinders 1, 2 and 3 (observe firing order)
Visible Idle speed
Cause Uneven mixture distribution in engines with 2-carburetor systems
Remedy Regulate carburetor (basic adjustment), check intake system for leaks, disassemble and clean carburetor, check diaphragms of full load enrichment and renew, if required.

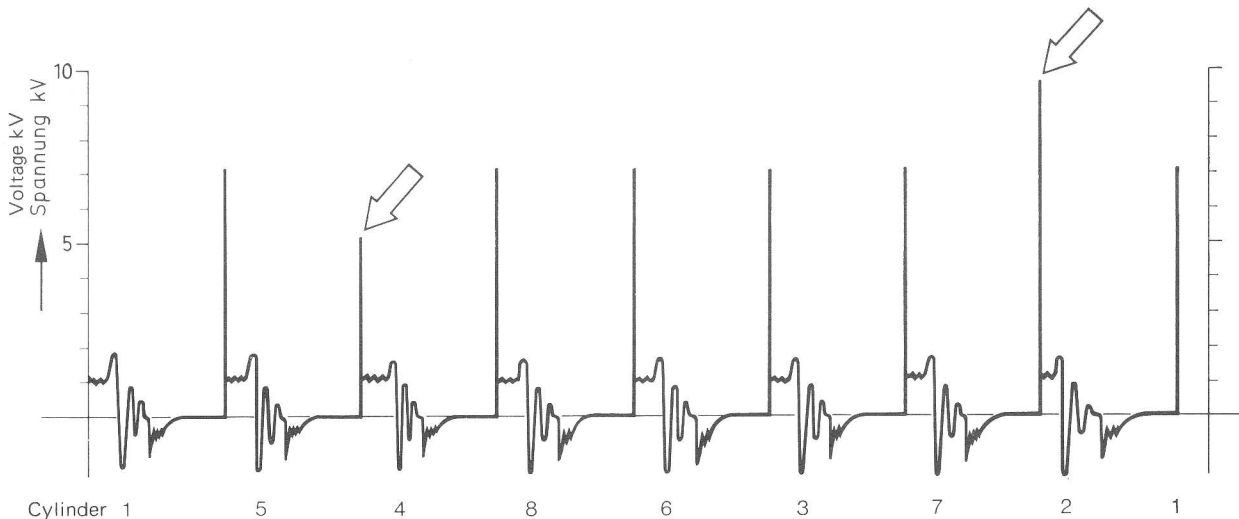


Image selection Display
Image fault Cylinder 4 bias line too low — ignition line longer
 Cylinder 2 bias line too high — ignition line shorter
Visible May occur at all speeds visible without engine load
Cause Cylinder 4 spark plug electrode gap too small, fuel-air mixture too rich, compression losses
 Cylinder 2 spark plug electrode gap too large, fuel-air mixture too lean, additional spark path at secondary end
Remedy Bias line too low: correct spark plug electrode gap, check cylinder for leaks
 Bias line too high: correct spark plug electrode gap, test ignition distributor disc, interference suppressor plug, ignition cable and spark plug for break (use ohmmeter)

Z 151 - 4827

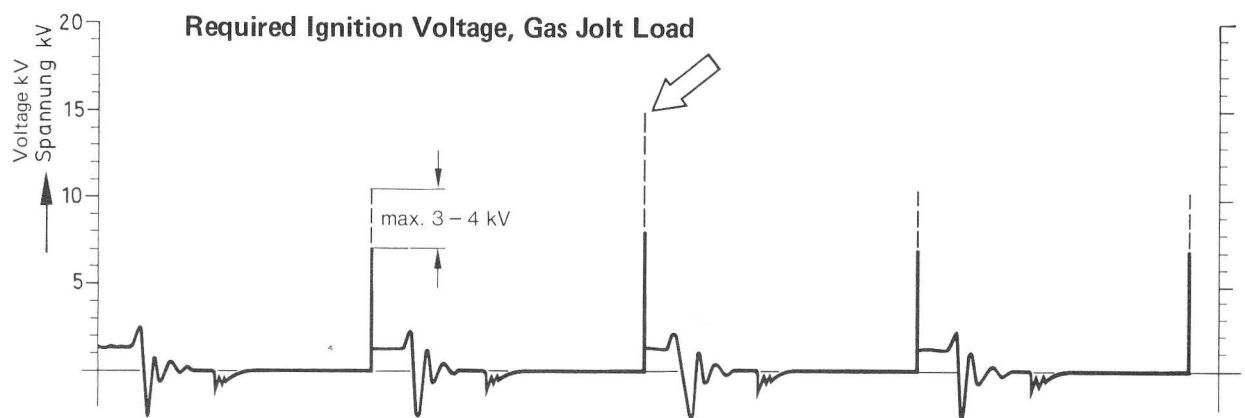


Image selection Display
Image fault Increase of required ignition voltage by more than 4 kV
Visible Accelerate engine repeatedly and suddenly to approx. 3,000/min
Cause Spark plug electrode gap too large
Remedy Correct spark plug electrode gap, replace spark plug, if required

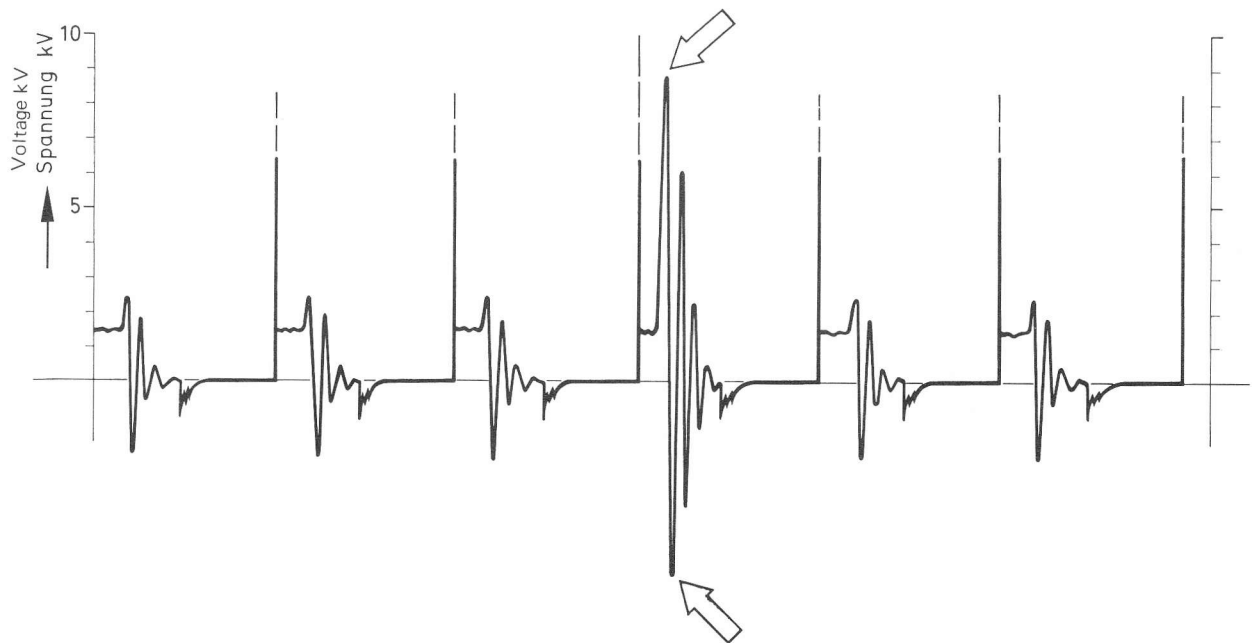


Image selection Display
Image fault Required ignition voltage increases by more than 4 kV, shortened ignition line, heavy increase of oscillations in opening sector above and under zero line
Visible Start engine after extended inoperative period with oscilloscope connected, accelerate engine repeatedly and suddenly to approx. 3,000/min
Cause Fuel-air mixture too lean
Remedy Check injection nozzle or injection valve and replace, if required, check pressure valve in injection pump for leaks

Z 151 - 4828

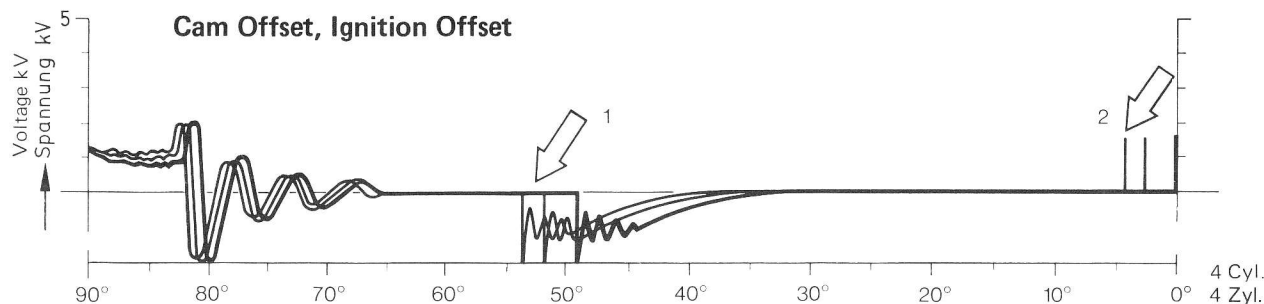


Image selection Superimposed

Image fault Too much cam offset (1) and ignition offset (2), max. 10 % of timing angle

Visible Idle speed

Cause Mechanical fault on ignition distributor or distributor drive, double contact breaker wrongly adjusted

Remedy Adjust double contact breaker, renew ignition distributor, if required

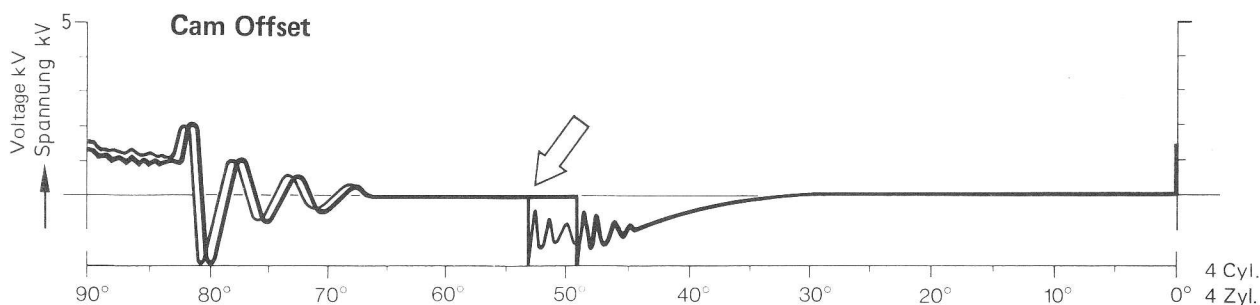


Image selection Superimposed

Image fault Cam offset too high, max. 10 % of timing angle

Visible Idle speed

Cause Descending cam of distributor shaft damaged, ground down, double contact breaker wrongly adjusted

Remedy Adjust double contact breaker, renew ignition distributor, if required

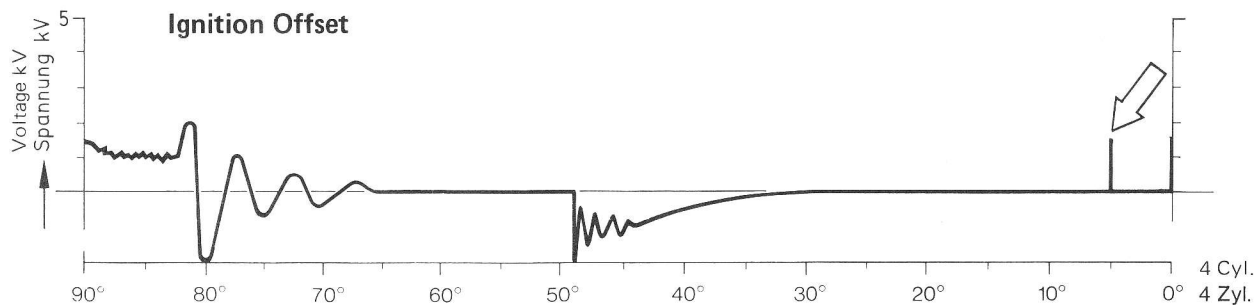


Image selection Superimposed

Image fault Ignition offset too high, max. 10 % of timing angle

Visible Idle speed

Cause Ascending cam of distributor shaft damaged, ground down, double contact breaker wrongly adjusted

Remedy Adjust double contact breaker, renew ignition distributor, if required

Z 151 - 4829

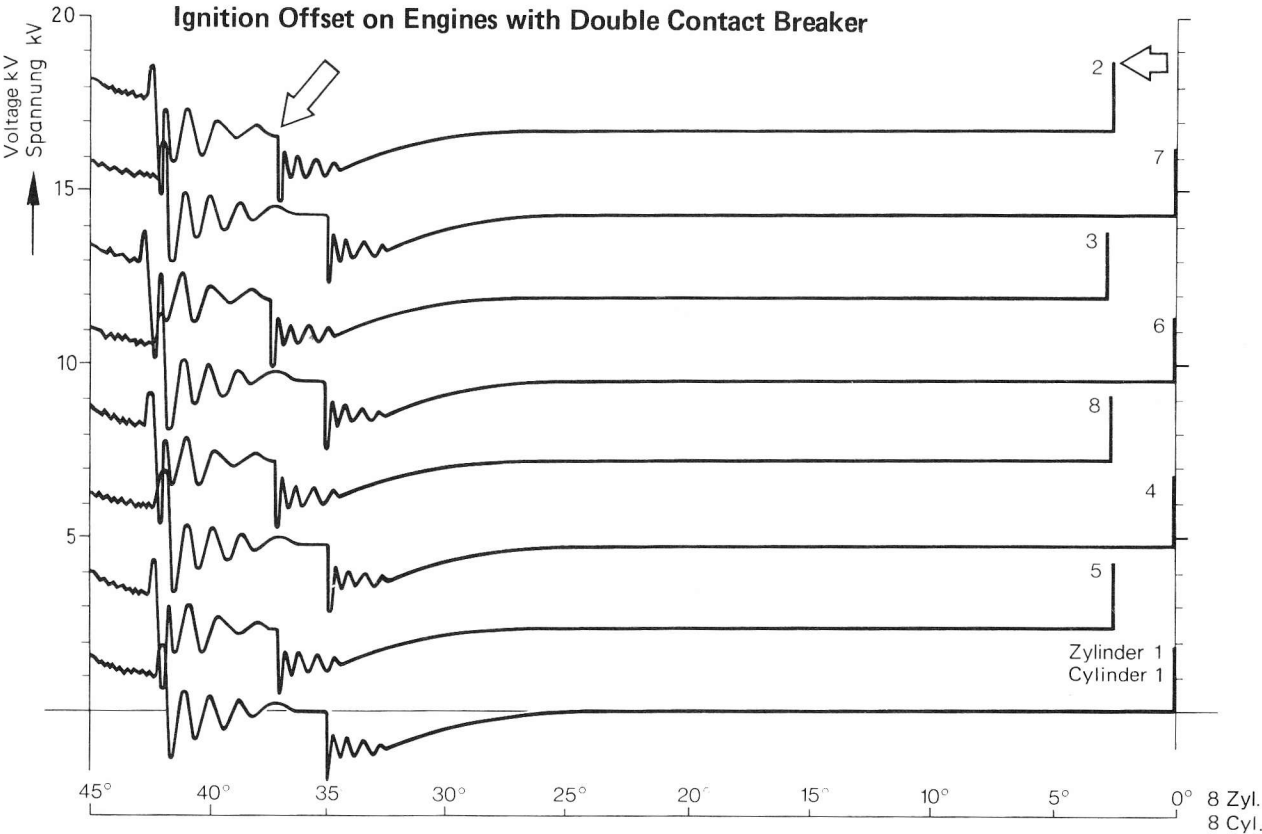


Image selection Grid
Image fault Closing sector of cylinders 5, 8, 3, 2 offset as compared with cylinders 1, 4, 6, 7
Visible Idle speed
Cause Firing point of 5th cylinder (on engine M 189 of 6th cylinder) wrongly adjusted
Remedy Adjust firing point of 5th cylinder (or 6th cylinder) by turning intermediate plate in ignition distributor
Note If timing and ignition offset are of varying size, adjust both timing angle and firing point

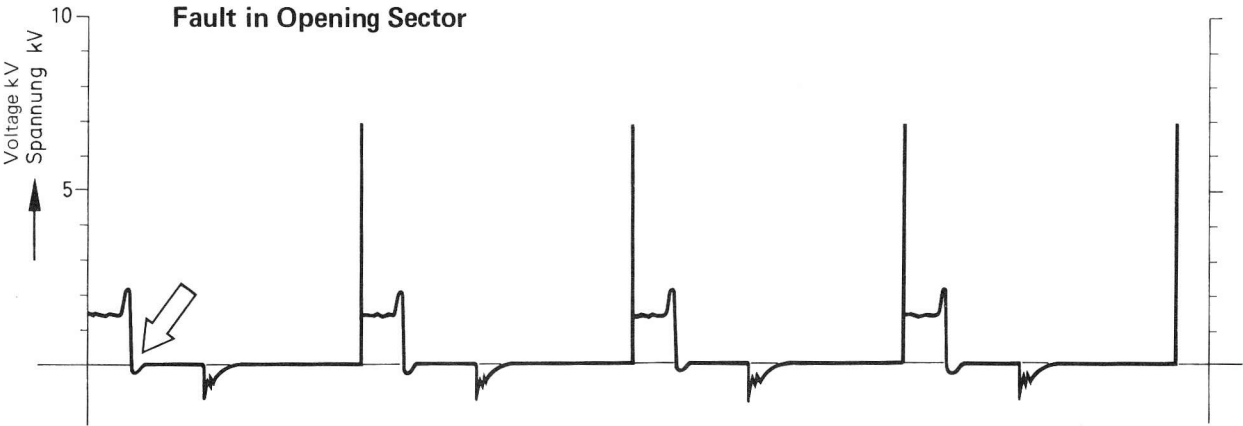
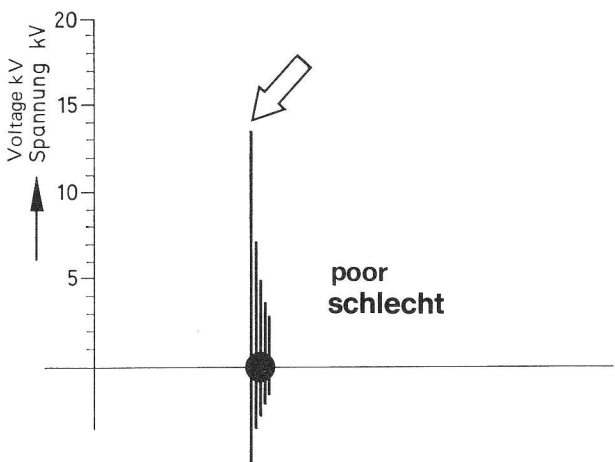
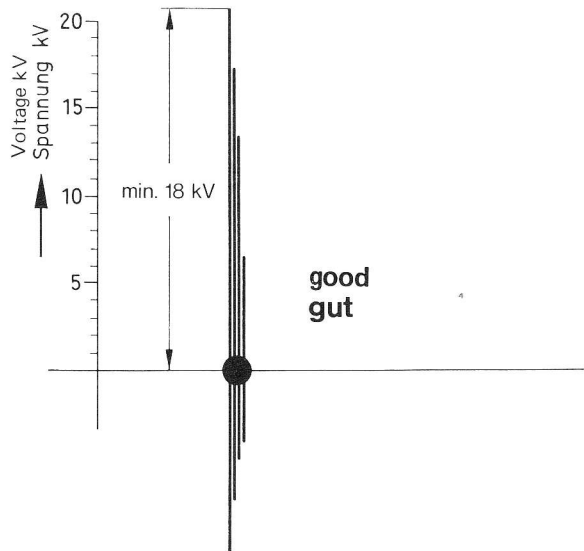


Image selection Display
Image fault No oscillation in opening sector
Visible Idle speed
Cause Defective ignition coil, connection terminal 1 on ignition distributor dirty, in rare cases defective capacitor
Remedy Separate ignition coil and capacitor test, clean ignition distributor (terminal 1 with fiber shim)

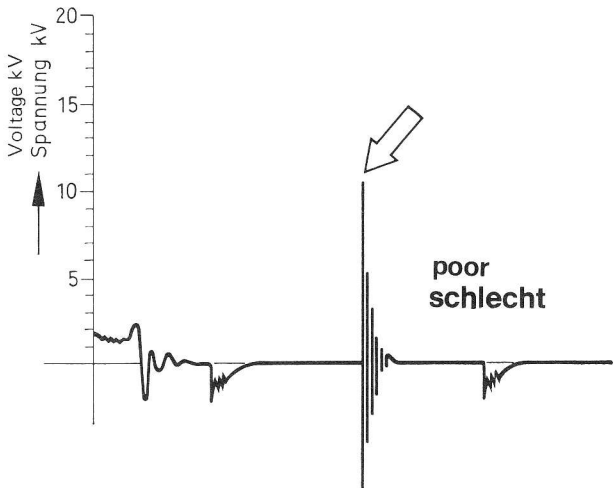
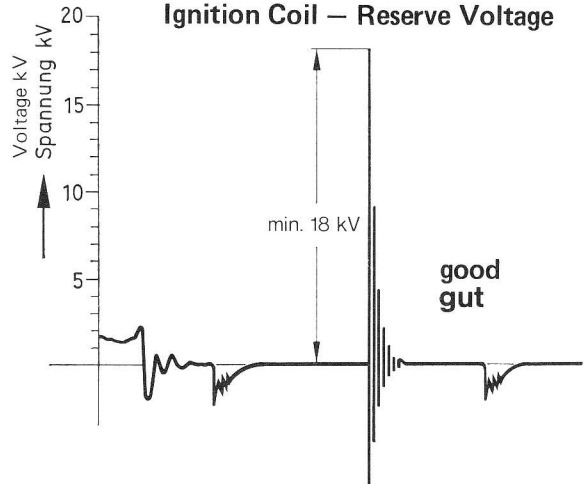
Z 151 - 4830

Ignition Coil – Starting Voltage



- Image selection** Display, superimposed
Image fault Starter ignition voltage below 18 kV
Visible Starter speed
Cause Weak battery, resistance in primary circuit, series resistance is not bridged, ignition coil or capacitor defective
Remedy Check battery, charge, check voltage drop battery – ignition coil, complete separate ignition coil and capacitor test
Note Clean high-voltage ignition cable No. 4 on ignition distributor disc

Ignition Coil – Reserve Voltage



- Image selection** Display
Image fault Ignition coil reserve voltage under 18 kV
Visible Idle speed, spark plug connector pulled off
Cause Excessive resistance in primary circuit, timing angle too small, ignition coil or capacitor defective
Remedy Check voltage drop battery – ignition coil, complete separate ignition coil and capacitor test

Z 151 - 4831

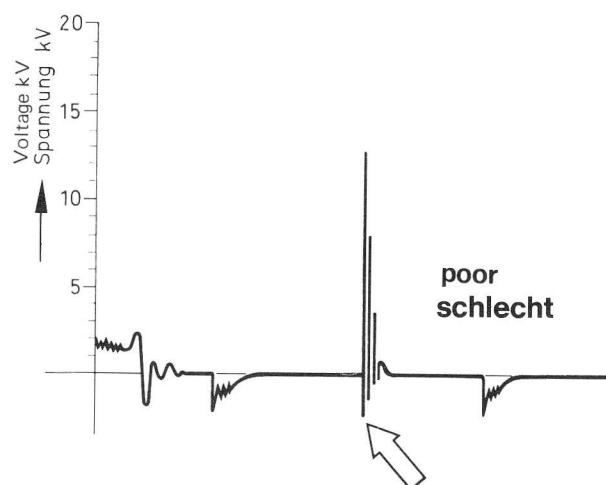
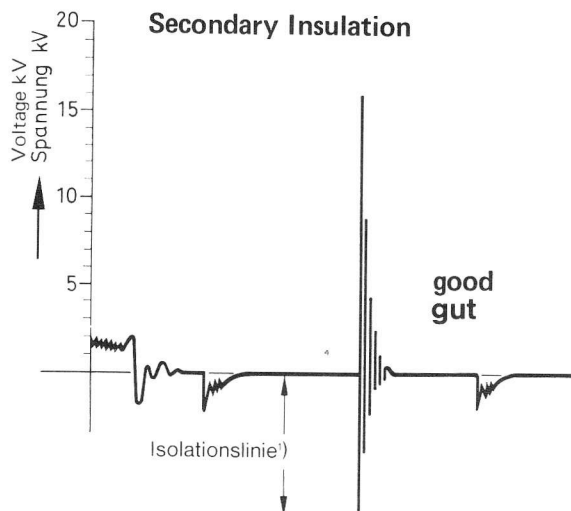


Image selection Display

Image fault Insulation line too short or completely absent

Visible Idle speed, spark plug connector pulled-off

Cause Spark flashover caused by cracks, moisture on ignition coil, ignition cable, ignition distributor disc

Remedy Clean moist and dirty parts, renew torn parts

1) Deflection under zero at least 1/3 of ignition coil reserve voltage

Ignition Coil – Separate Test

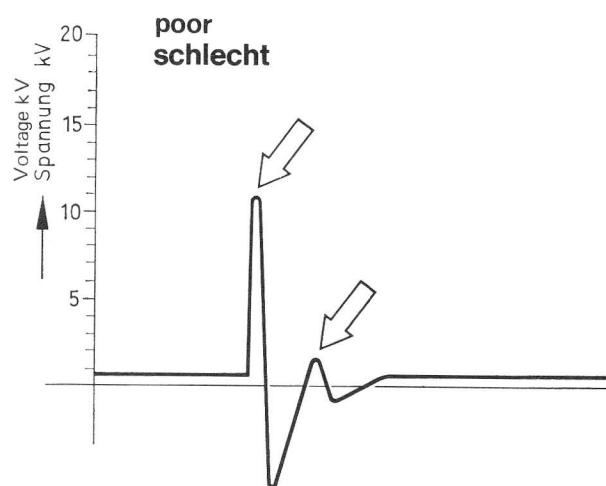
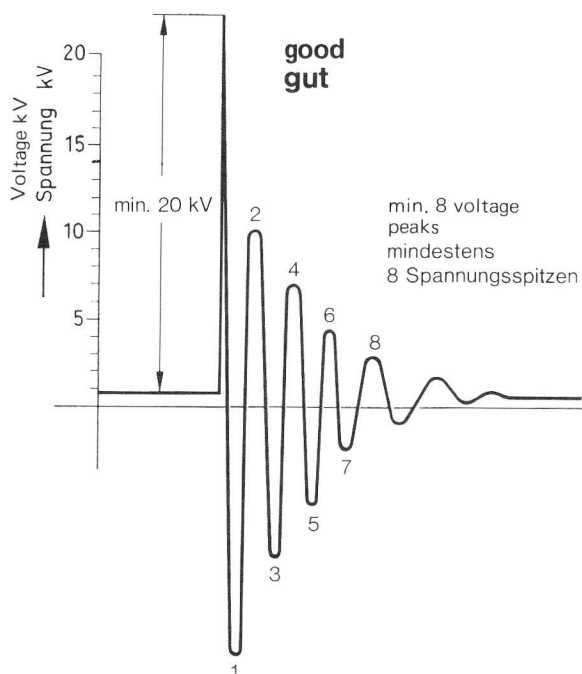


Image selection Display

Image fault Voltage under 20 kV, less than 8 voltage peaks

Cause Broken winding, winding short or insulation damage in relation to grounding contact

Remedy Renew ignition coil

Z 151 - 4832



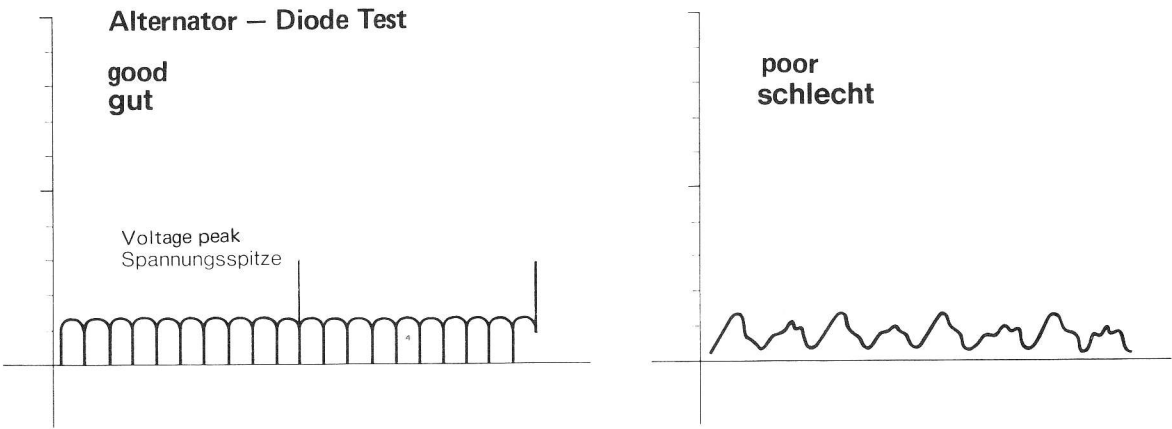


Image selection	Display, grid
Image fault	Distinct irregularity of oscillations
Visible	Connect voltmeter to battery, switch oscillograph to "primary" and actuate switch to "alternator test", switch-on low headlight beam, increase engine speed to approx. 3,000/min
Cause	Defective diode
Note	Voltage peaks caused by ignition system are without significance

Z 151 - 4833