

A. Ignition systems with series resistors

"Go" image — Display

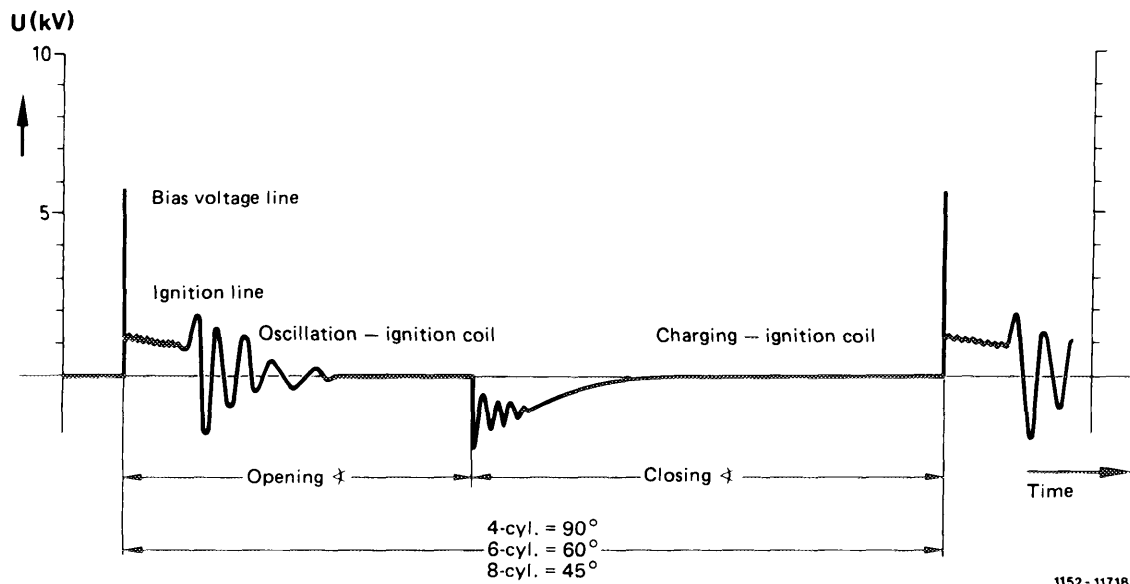


Image selection Display. Image is elongated in horizontal direction

"Go" image — Superposition

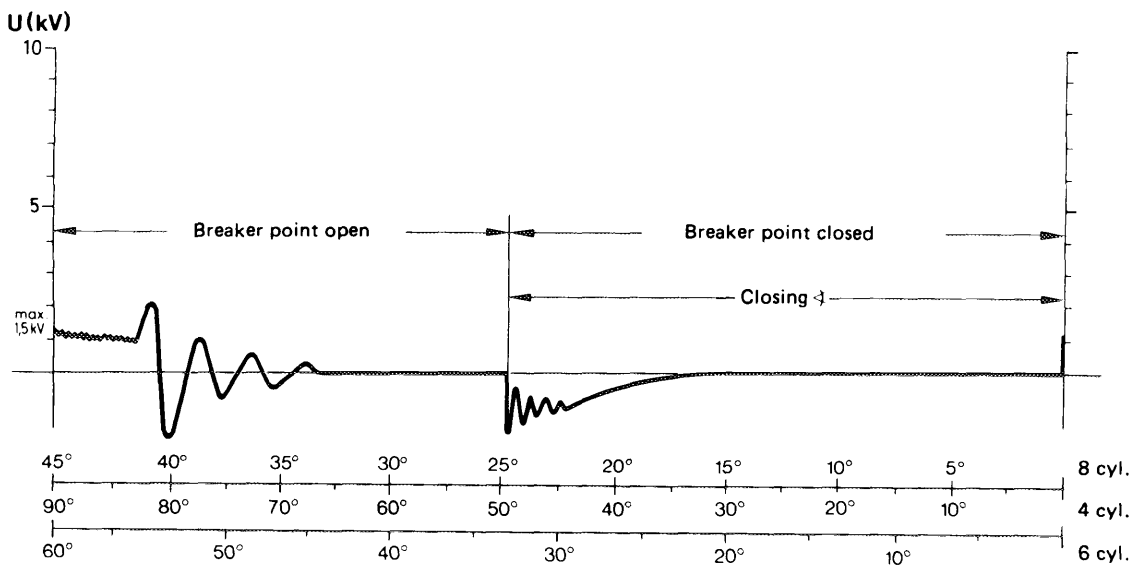
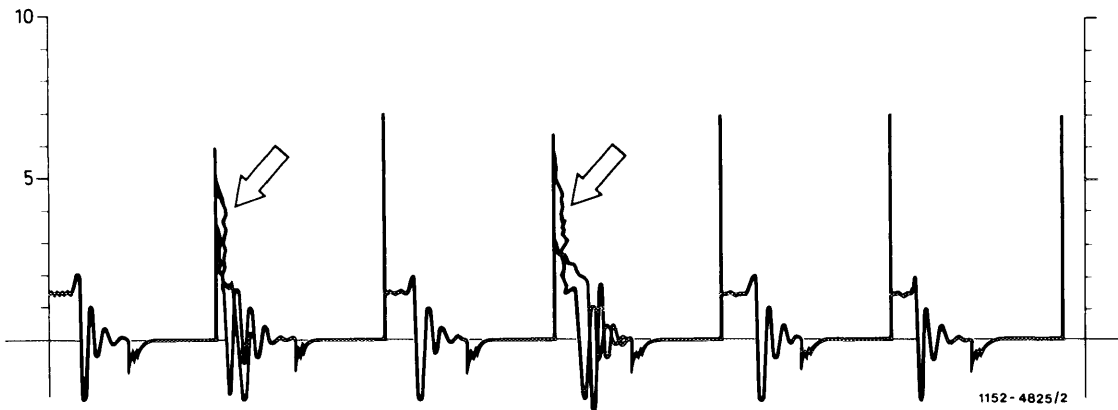


Image selection Superposition. For this purpose set begin and end of ignition procedure at left and right on calibration line

Jumping activation point of ignition line

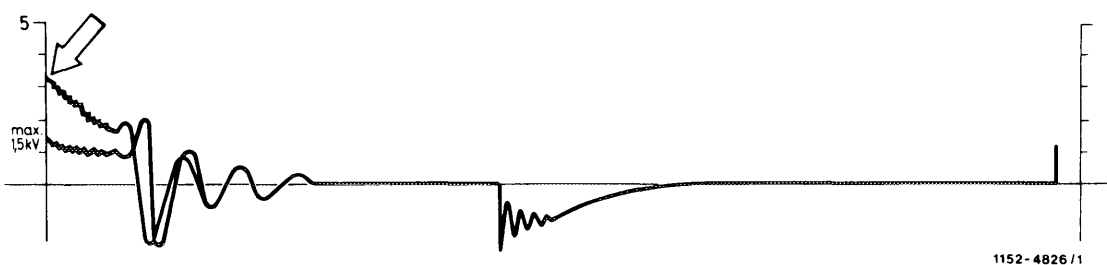
U (kV)



<i>Image selection</i>	Display
<i>Image fault</i>	Activation point of ignition line changes, jumps
<i>Visible</i>	Liable to occur at all speeds with or without engine load
<i>Cause</i>	Spark plug sooted, oiled up, lead-coated (lead or soot are conductive, ignition line is therefore jumping up and down)
<i>Remedy</i>	Clean or renew spark plug

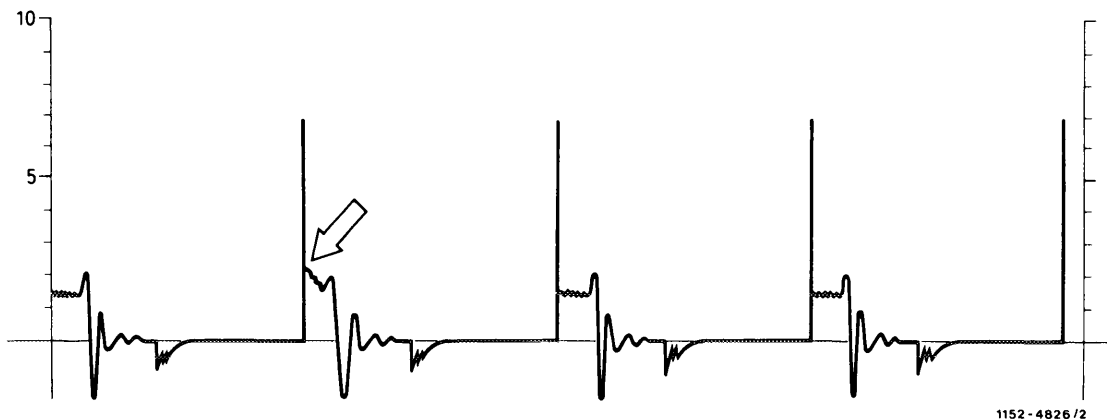
Activation point of ignition line too high, but remaining constant

U (kV)



<i>Image selection</i>	Superposition
<i>Visible</i>	Idle speed, on one or several cylinders

U (kV)



<i>Image selection</i>	Display
<i>Image fault</i>	Activation point of ignition line above 1.5 kV
<i>Visible</i>	Idle speed on one or several cylinders
<i>Cause</i>	Ohmic resistance too high at secondary end, caused by suppressor plug on spark plug or distributor cap, ignition cable, distributor rotor, spark plug
<i>Remedy</i>	Renew parts where ohmic resistance is too high (use ohmmeter)

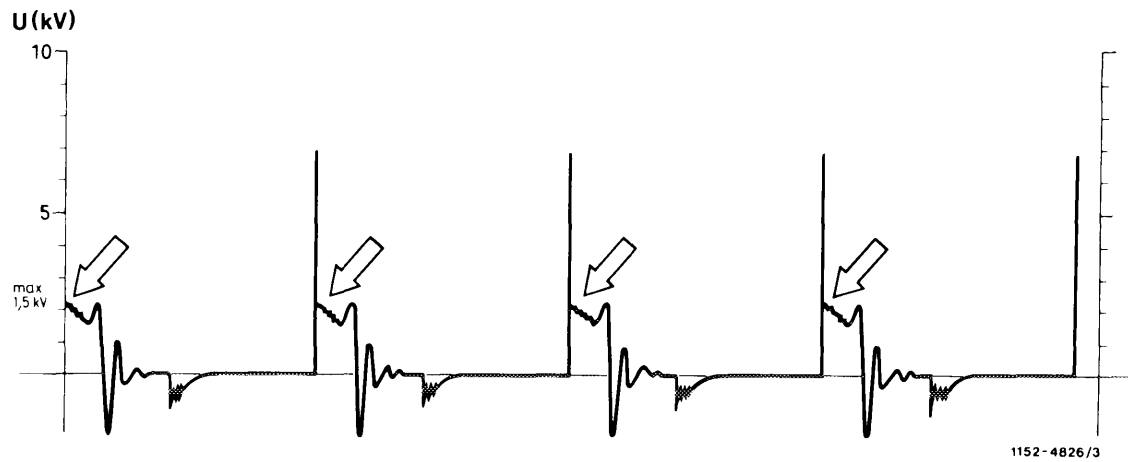


Image selection	Display
Image fault	Activation points of ignition lines above 1.5 kV
Visible	Idle speed on all cylinders
Cause	Ohmic resistance too high at secondary end caused by distributor rotor, distributor cap or high voltage cable No. 4 with plug
Remedy	Renew parts where ohmic resistance is too high (use ohmmeter)

Required ignition voltage

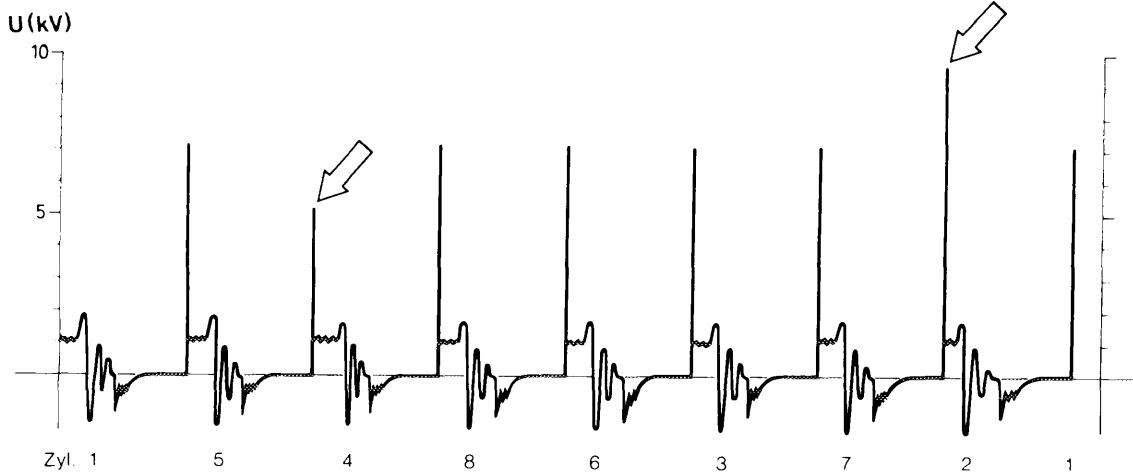
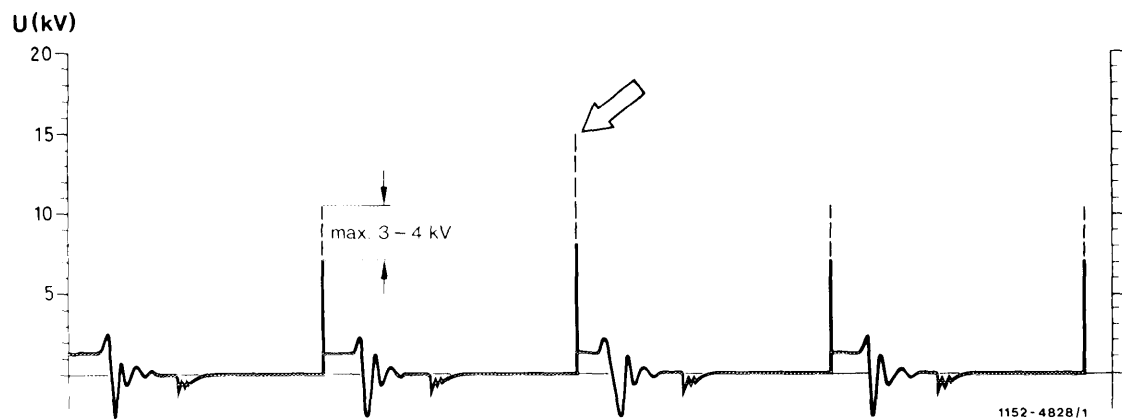
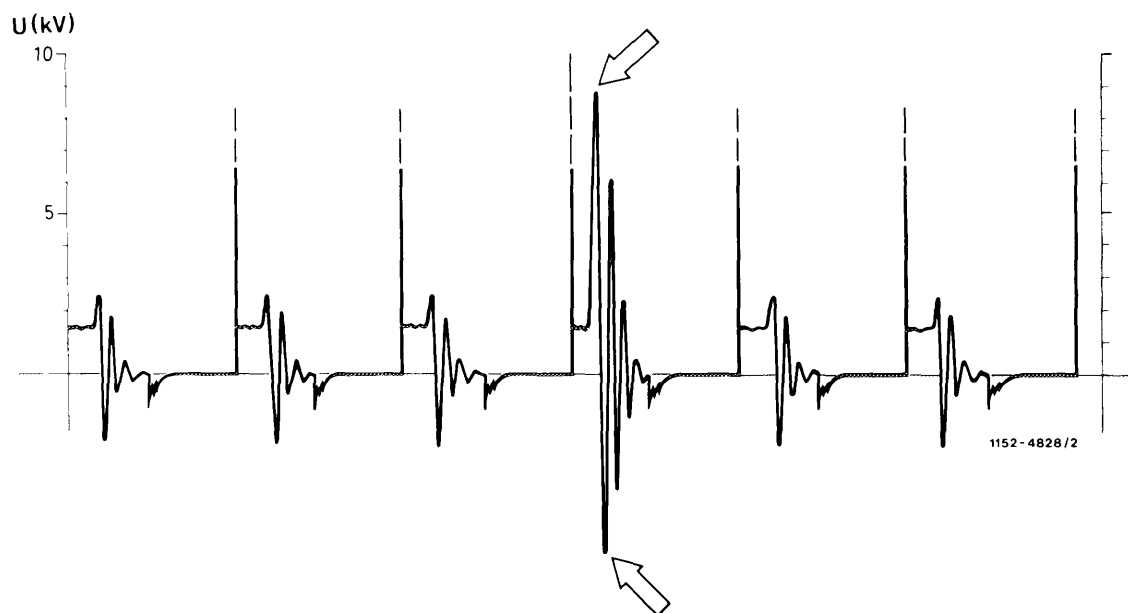


Image selection	Display
Image fault	Cylinder 4 bias voltage line too low — ignition line longer Cylinder 2 bias voltage line too high — ignition line shorter
Visible	Liable to occur at all speeds with or without engine load
Cause	Cylinder 4 spark plug — electrode gap too small, fuel-air mixture too rich, compression losses Cylinder 2 spark plug — electrode gap too large, fuel-air mixture too lean, additional sparking gap at secondary end
Remedy	Bias voltage line too low: Adjust spark plug — electrode gap, check cylinder for leaks Bias voltage line too high: Adjust spark plug — electrode gap, check distributor cap, ignition cable and spark plug for interruption (use ohmmeter)

Required ignition voltage, sudden, short acceleration



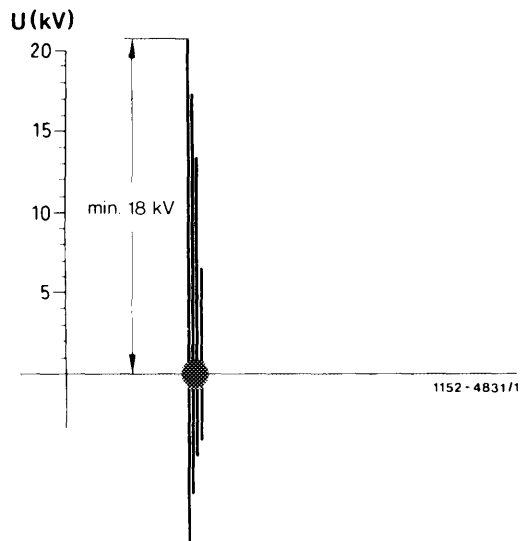
<i>Image selection</i>	Display
<i>Image fault</i>	Required ignition voltage increases by more than 4 kV
<i>Visible</i>	Accelerate engine repeatedly and suddenly to approx. 3000/min
<i>Cause</i>	Spark plug — electrode gap too large
<i>Remedy</i>	Adjust spark plug — electrode gap, renew spark plug, if applicable



<i>Image selection</i>	Display
<i>Image fault</i>	Required ignition voltage increases by more than 4 kV, shortened ignition line, excessive increase of oscillations in opening section above and below zero line
<i>Visible</i>	After an extended stationary period, start engine with oscilloscope connected, accelerate engine repeatedly and suddenly to approx. 3000/min
<i>Cause</i>	Fuel-air mixture too lean
<i>Remedy</i>	Check injection valve and renew, if applicable

Ignition coil — starting voltage

good



poor

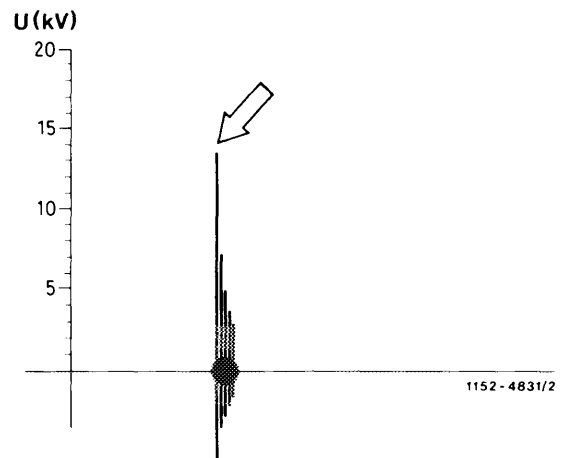


Image selection

Display, superposition

Image fault

Starting ignition voltage below 18 kV

Visible

Starter speed

Cause

Weak battery, resistance in primary circuit, primary resistance is not bridged, ignition coil defective

Remedy

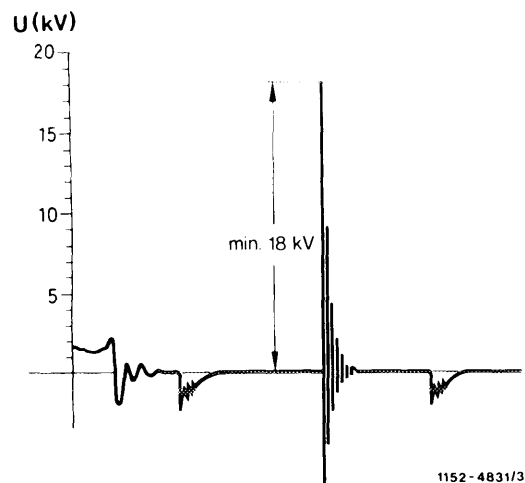
Test battery, charge, test voltage drop battery — ignition coil, perform separate ignition coil and capacitor test

Note

Pull high voltage ignition cable No. 4 from distributor cap

Ignition coil — reserve voltage

good



poor

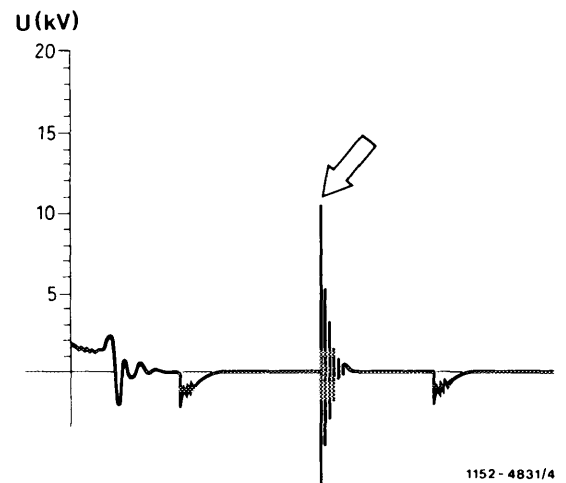


Image selection

Display

Image fault

Ignition coil — reserve voltage below 18 kV

Visible

Idle speed, spark plug connector pulled off

Cause

Resistance in primary circuit too high, dwell angle too small, ignition coil or capacitor defective

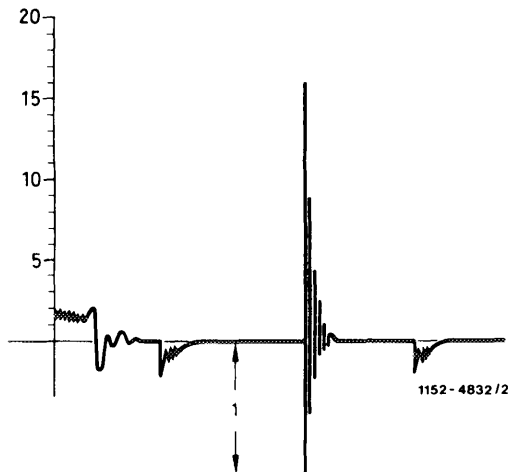
Remedy

Test voltage drop battery — ignition coil, perform separate ignition coil and capacitor test

Secondary insulation

good

U (kV)



poor

U (kV)

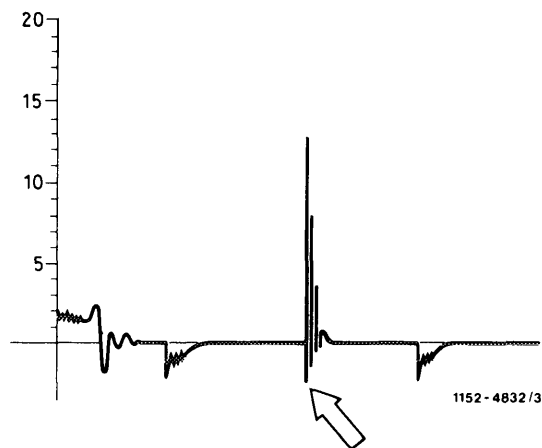


Image selection

Display

Image fault

Insulation line too short or completely missing

Visible

Idle speed, spark plug connector pulled off

Cause

Sparkover caused by cracks, moisture on ignition coil, ignition cable, distributor cap

Remedy

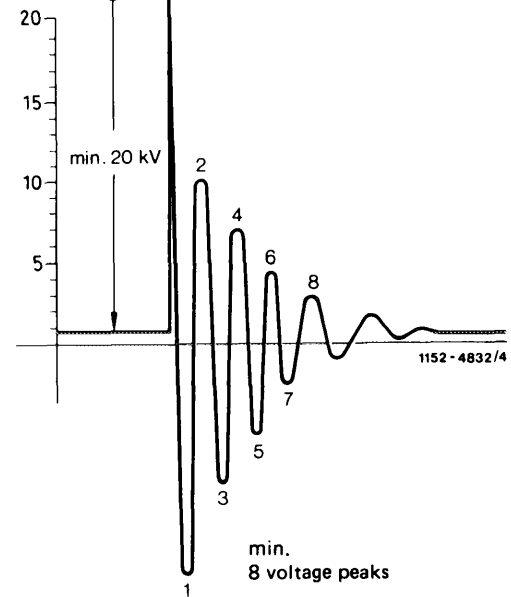
Clean moist and dirty parts, renew torn parts

1) Deflection under zero line min. 1/3 of ignition coil reserve voltage

Ignition coil — separate test

good

U (kV)



poor

U (kV)

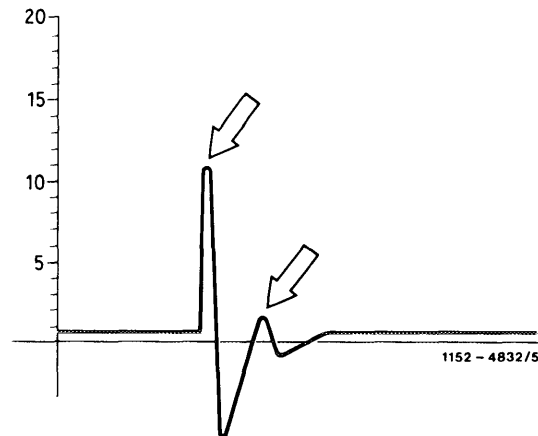


Image selection

Display

Image fault

Voltage below 20 kV, less than 8 voltage peaks

Cause

Interturn interruption, interturn short or insulation damage against ground

Remedy

Renew ignition coil

B. Ignition systems without series resistors

"Go" image — Display (engine speeds up to approx. 2000/min)

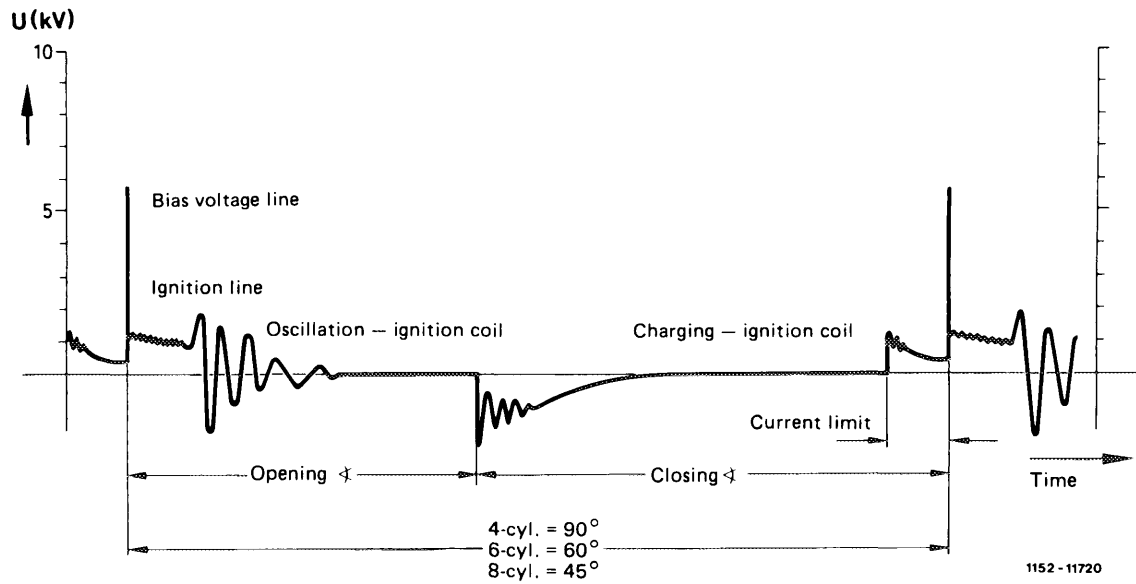


Image selection Display. Image is elongated in horizontal direction

"Go" image — Superposition (engine speeds up to approx. 2000/min)

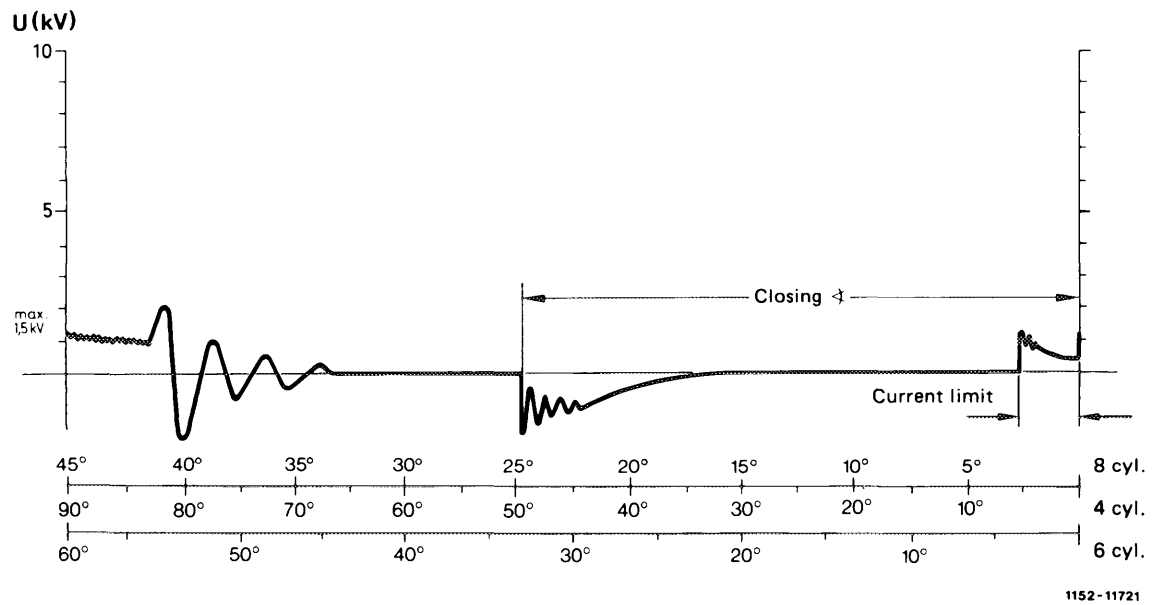


Image selection Superposition. For this purpose set begin and end of ignition procedure at left and right on calibration line

"Go" image — Display (engine speeds above approx. 2000/min)

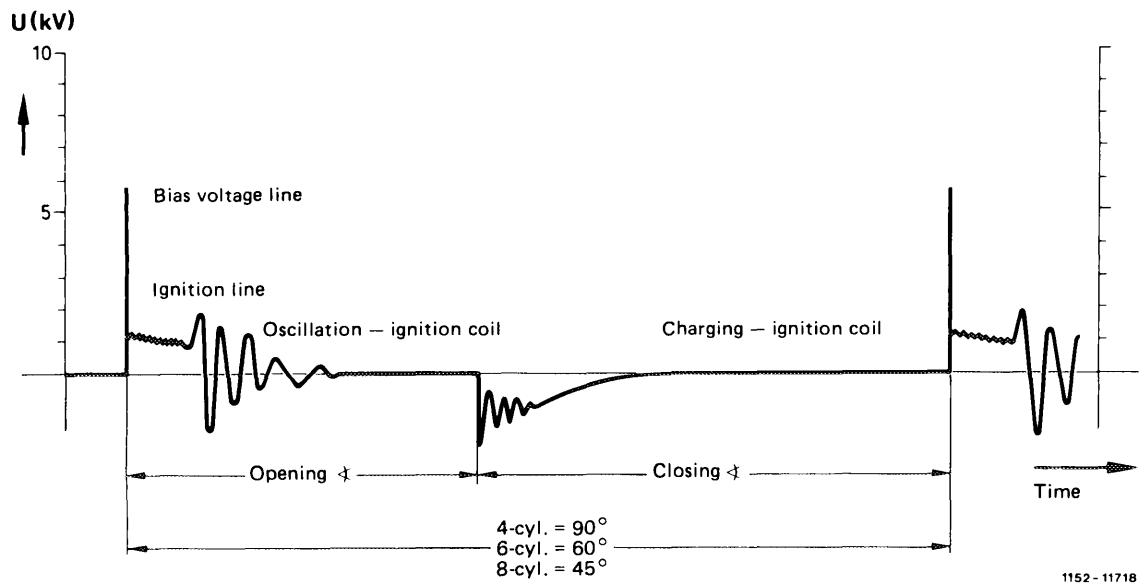


Image selection Display. Image is elongated in horizontal direction

"Go" image — Superposition (engine speeds above approx. 2000/min)

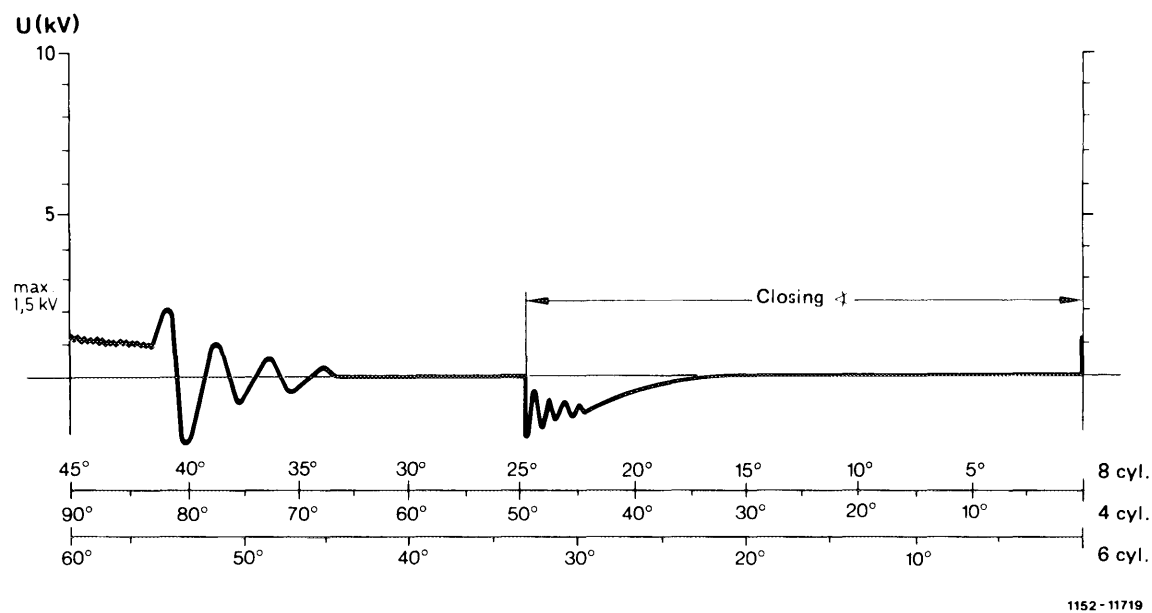


Image selection Superposition. For this purpose set begin and end of ignition procedure at left and right on calibration line

Activation point of ignition line too high, but remaining constant

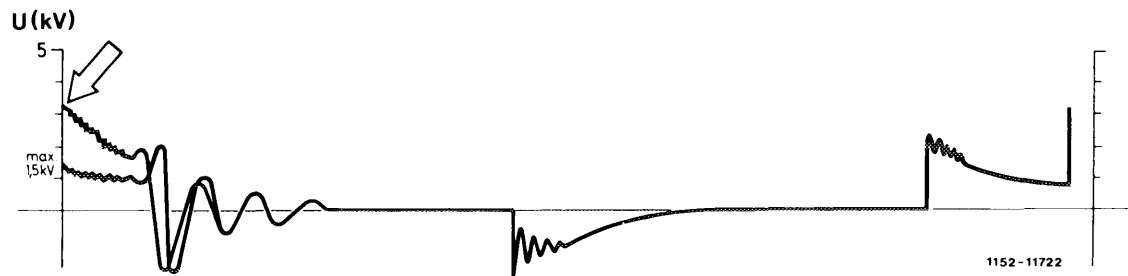


Image selection Superposition
Visible Idle speed, on one or several cylinders



Image selection Display
Image fault Activation point of ignition line above 1.5 kV
Visible Idle speed on one or several cylinders
Cause Ohmic resistance too high at secondary end, caused by spark plug connector, distributor cap, ignition cable, distributor rotor, spark plug
Remedy Renew parts on which ohmic resistance is too high (use ohmmeter)

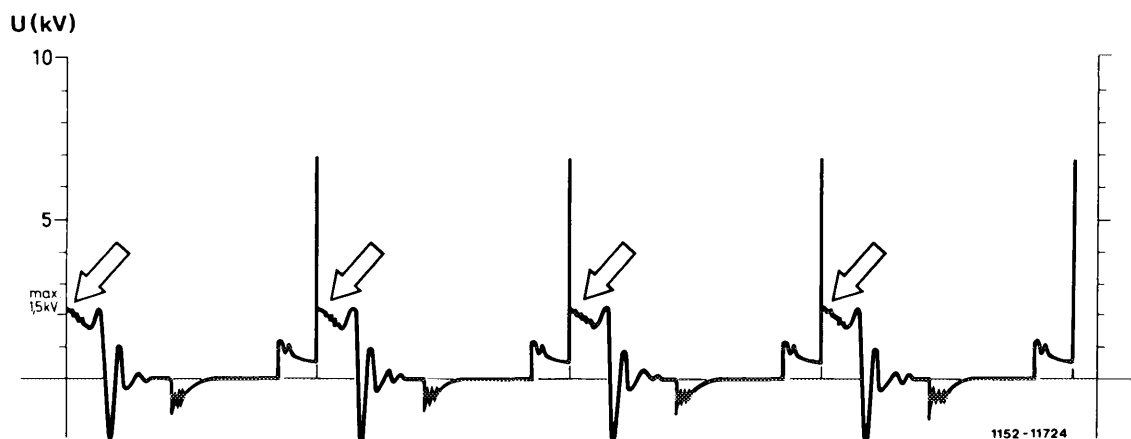
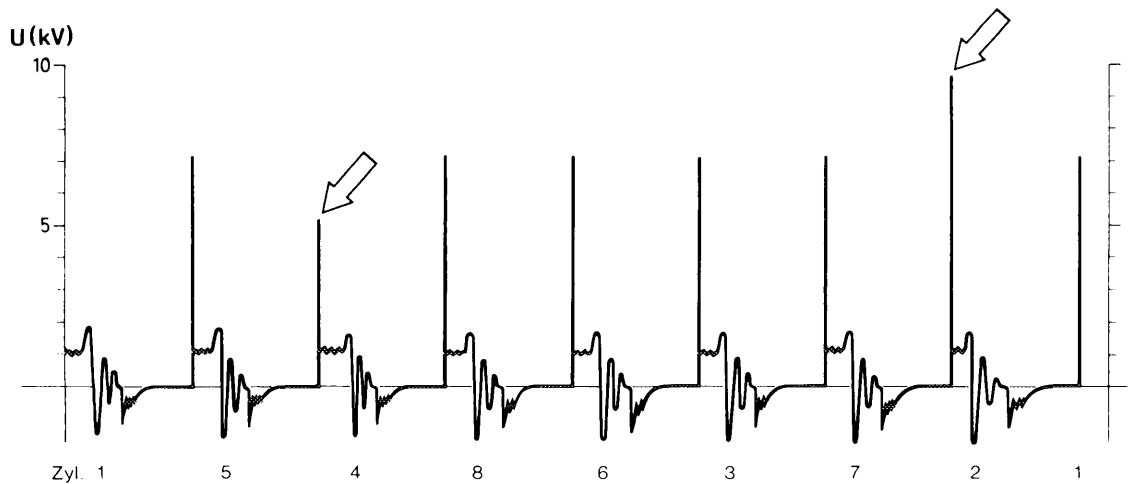


Image selection Display
Image fault Activation points of ignition lines above 1.5 kV
Visible Idle speed on all cylinders
Cause Ohmic resistance too high at secondary end, caused by distributor rotor, distributor cap or high voltage cable No. 4 with plug
Remedy Renew parts on which ohmic resistance is too high (use ohmmeter)

Required ignition voltage



1152-4827/2

Image selection	Display
Image fault	Cylinder 4 bias voltage line too low — ignition line longer Cylinder 2 bias voltage line too high — ignition line shorter
Visible	Liable to occur at all speeds with or 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 gap at secondary end
Remedy	Bias voltage line too low: adjust spark plug — electrode gap, test cylinder for leaks Bias voltage line too high: adjust spark plug — electrode gap, test distributor cap, spark plug connector, ignition cable and spark plug for interruption (use ohmmeter)

Jumping activation point of ignition line



1152-4825/2

Image selection	Display
Image fault	Activation point of ignition line changes, jumps
Visible	Liable to occur at all speeds with or without engine load
Cause	Spark plug sooted, oiled up, burnt down, insulation damage on spark plug connector
Remedy	Clean or renew spark plug, renew spark plug connector

Required ignition voltage, sudden, short acceleration

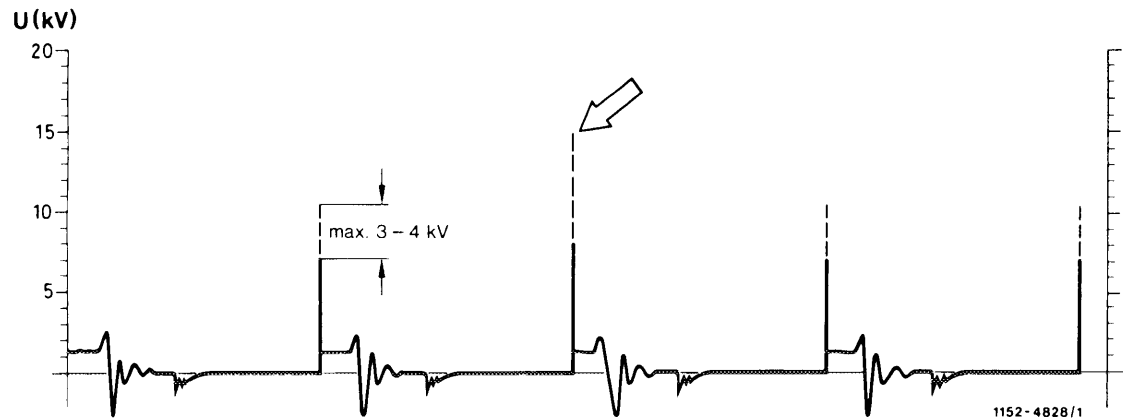


Image selection

Display

Image fault

Required ignition voltage increases by more than 4 kV

Visible

Accelerate engine repeatedly and suddenly to approx. 3000/min

Cause

Spark plug — electrode gap too large

Remedy

Adjust spark plug — electrode gap, renew spark plug, if applicable

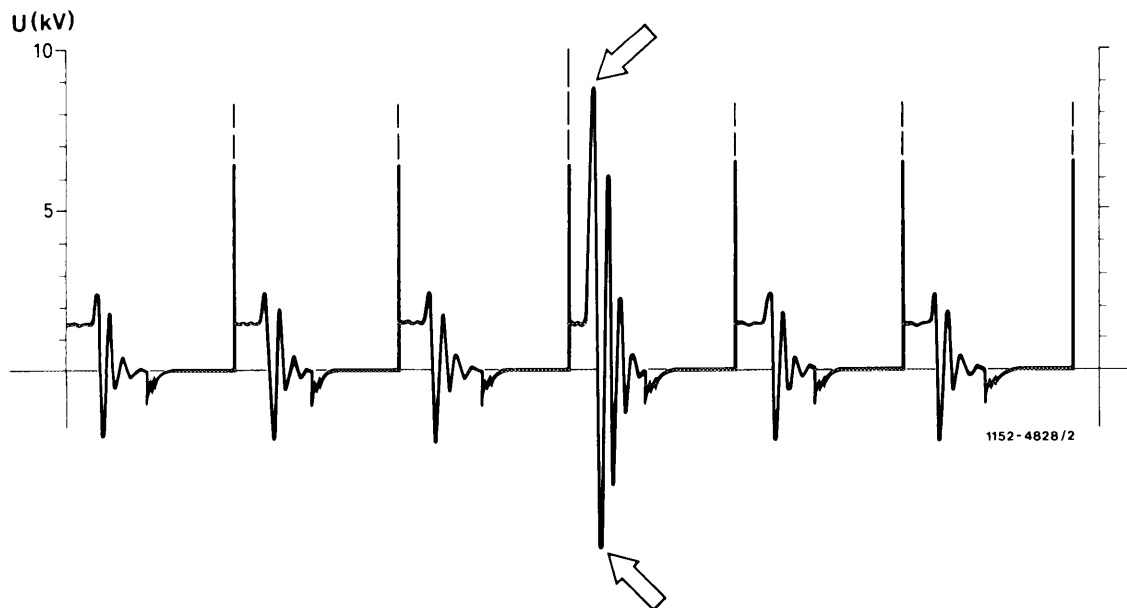


Image selection

Display

Image fault

Required ignition voltage increases by more than 4 kV, shortened ignition line, excessive increase of oscillations in opening section above and below zero line

Visible

After an extended stationary period, start engine with oscilloscope connected, accelerate engine repeatedly and suddenly to approx. 3000/min

Cause

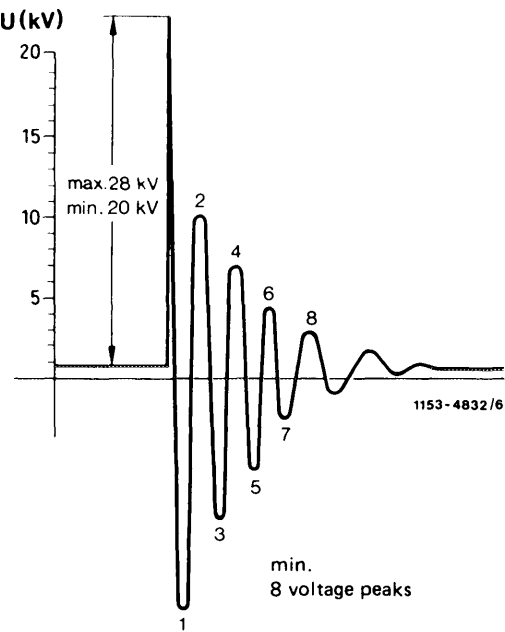
Fuel-air mixture too lean

Remedy

Check injection valve and renew, if applicable

Ignition coil — separate test

good



poor

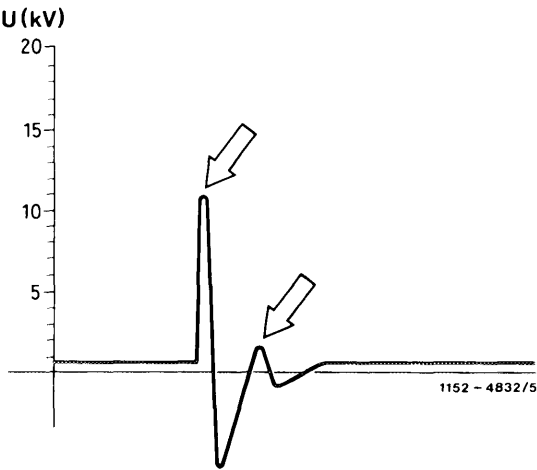


Image selection	Display
Image fault	Voltage below 20 kV, less than 8 voltage peaks
Cause	Interturn interruption, interturn short or insulation damage against ground
Remedy	Renew ignition coil
Note	Not above 28 kV, since otherwise ignition coil will be initially damaged