

Product: New Holland TCE40/TCE45/TCE50 Tractor Service Repair Manual
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CONTENT

	Page	Date		Page	Date
00 - GENERAL GUIDELINES			Fault finding	25-26-27- 28-29-30- 31-32	10-04
General instructions	1-2	09-01			
Safety regulations	3-4	09-01	Engine removal-installation	33-34-35- 36	10-04
Safety regulations	5	10-04	Compression test	37-38-39	10-04
Consumables	6	10-04	Engine disassembly-assembly ...	40-41-42- 43-44-45- 46-47-48- 49-50-51- 52-53-54- 55-56-57	10-04
10 - ENGINE			Valve clearance adjustment	58-59-60	10-04
CHAPTER 1 - Engine			Belt tension check	61	10-04
Contents	1-2	10-04	Injector jet/pressure check and reading	62-63-64- 65	10-04
General specifications	3-4-5-6-7- -8	10-04	Injection timing adjustment and check (mod. TCE40 - 45 - 50)	65-66	10-04
Cylinder head data	9	10-04	Idle speed adjustment (minimum and maximum) (mod. TCE40 - 45 - 50) ..	67	10-04
Cylinder block data	10	10-04	Injection timing adjustment and check (mod. TCE55) .	67-68-69	10-04
Rocker arm data	10	10-04	Idle speed adjustment (minimum and maximum) (mod. TCE55)	69	10-04
Piston data	11	10-04	Cooling and radiator system check	70	10-04
Piston ring data	12-13	10-04	Sensor check	71	10-04
Connecting rod data	13	10-04	Checks, measurements and repairs - cylinder head	72-73-74- 75-76-77- 78	10-04
Camshaft data	14	10-04	Checks, dimensions and repairs - cylinder blockand liners	79-80-81	10-04
Crankshaft data	14	10-04			
End float data	14	10-04			
Engine lubrication circuit data	15	10-04			
Engine cooling circuit data	15	10-04			
Tightening torques	16	10-04			
Tools	17	10-04			
Cross-sectional views of engine	18-19	10-04			
Engine lubrication circuit diagram	20-21	10-04			
Engine cooling circuit diagram	22	10-04			
Engine fuel circuit diagram	23-24	10-04			

CONTENT

	Page	Date		Page	Date
00 - GENERAL GUIDELINES			Fault finding	25-26-27- 28-29-30- 31-32	10-04
General instructions	1-2	09-01			
Safety regulations	3-4	09-01	Engine removal-installation	33-34-35- 36	10-04
Safety regulations	5	10-04	Compression test	37-38-39	10-04
Consumables	6	10-04	Engine disassembly-assembly ...	40-41-42- 43-44-45- 46-47-48- 49-50-51- 52-53-54- 55-56-57	10-04
10 - ENGINE			Valve clearance adjustment	58-59-60	10-04
CHAPTER 1 - Engine			Belt tension check	61	10-04
Contents	1-2	10-04	Injector jet/pressure check and reading	62-63-64- 65	10-04
General specifications	3-4-5-6-7- -8	10-04	Injection timing adjustment and check (mod. TCE40 - 45 - 50)	65-66	10-04
Cylinder head data	9	10-04	Idle speed adjustment (minimum and maximum) (mod. TCE40 - 45 - 50) ..	67	10-04
Cylinder block data	10	10-04	Injection timing adjustment and check (mod. TCE55) .	67-68-69	10-04
Rocker arm data	10	10-04	Idle speed adjustment (minimum and maximum) (mod. TCE55)	69	10-04
Piston data	11	10-04	Cooling and radiator system check	70	10-04
Piston ring data	12-13	10-04	Sensor check	71	10-04
Connecting rod data	13	10-04	Checks, measurements and repairs - cylinder head	72-73-74- 75-76-77- 78	10-04
Camshaft data	14	10-04	Checks, dimensions and repairs - cylinder blockand liners	79-80-81	10-04
Crankshaft data	14	10-04			
End float data	14	10-04			
Engine lubrication circuit data	15	10-04			
Engine cooling circuit data	15	10-04			
Tightening torques	16	10-04			
Tools	17	10-04			
Cross-sectional views of engine	18-19	10-04			
Engine lubrication circuit diagram	20-21	10-04			
Engine cooling circuit diagram	22	10-04			
Engine fuel circuit diagram	23-24	10-04			

	Page	Date		Page	Date
Checks, measurements and repairs - rocker arm	82-83	10-04	Disassembly-Assembly - injection pump	137-138 139-140- 141-142- 143-144- 145-146- 147-148- 149-150- 151-152- 153-154- 155-156- 157	10-04
Checks, measurements and repairs - pistons and piston rings	84-85-86- 87-88	10-04	Plunger position adjustment	158-159	10-04
Checks, measurements and repairs - connecting rod	88-89-90- 91	10-04	Turbocharger		
Checks, measurements and repairs - camshaft	92-93	10-04	General specifications	160	10-04
Checks, measurements and repairs - crankshaft	94-95-96	10-04	Cross-sectional views	161	10-04
Checks, measurements and repairs - gears	97-98	10-04	Assembly-Disassembly - turbocharger	162-163- 164-165- 166	10-04
Checks, measurements and repairs - oil pump	99-100	10-04	CHAPTER 2 - Engine (TIER 2)		
Yanmar injection pump (mod. TCE40 - 45 - 50)			Contents	1-2	01-07
Air bleeding	101	10-04	General specifications	3-4-5-6-7- -8	01-07
Disassembly-Assembly - injection pump	102-103- 104-105- 106-107- 108-109- 110-111- 112	10-04	Cylinder head data	9	01-07
Injection pump check	113-114	10-04	Cylinder block data	10	01-07
Disassembly-Assembly - regulator unit	115-116- 117-118- 119-120- 121-122- 123-124- 125	10-04	Rocker arm data	10	01-07
Regulator unit check	126-127- 128	10-04	Piston data	11	01-07
Yanmar injection pump (mod. TCE55)			Piston ring data	12-13	01-07
General specifications	129	10-04	Connecting rod data	13	01-07
Cross-sectional views	130-131- 132-133- 134	10-04	Camshaft data	14	01-07
Removal-Installation - injection pump	135-136		Crankshaft data	14	01-07
			End float data	14	01-07
			Engine lubrication circuit data	15	01-07
			Engine cooling circuit data	15	01-07
			Tightening torques	16	01-07
			Tools	17	01-07

	Page	Date		Page	Date
Checks, measurements and repairs - rocker arm	82-83	10-04	Disassembly-Assembly - injection pump	137-138 139-140- 141-142- 143-144- 145-146- 147-148- 149-150- 151-152- 153-154- 155-156- 157	10-04
Checks, measurements and repairs - pistons and piston rings	84-85-86- 87-88	10-04	Plunger position adjustment	158-159	10-04
Checks, measurements and repairs - connecting rod	88-89-90- 91	10-04	Turbocharger		
Checks, measurements and repairs - camshaft	92-93	10-04	General specifications	160	10-04
Checks, measurements and repairs - crankshaft	94-95-96	10-04	Cross-sectional views	161	10-04
Checks, measurements and repairs - gears	97-98	10-04	Assembly-Disassembly - turbocharger	162-163- 164-165- 166	10-04
Checks, measurements and repairs - oil pump	99-100	10-04	CHAPTER 2 - Engine (TIER 2)		
Yanmar injection pump (mod. TCE40 - 45 - 50)			Contents	1-2	01-07
Air bleeding	101	10-04	General specifications	3-4-5-6-7- -8	01-07
Disassembly-Assembly - injection pump	102-103- 104-105- 106-107- 108-109- 110-111- 112	10-04	Cylinder head data	9	01-07
Injection pump check	113-114	10-04	Cylinder block data	10	01-07
Disassembly-Assembly - regulator unit	115-116- 117-118- 119-120- 121-122- 123-124- 125	10-04	Rocker arm data	10	01-07
Regulator unit check	126-127- 128	10-04	Piston data	11	01-07
Yanmar injection pump (mod. TCE55)			Piston ring data	12-13	01-07
General specifications	129	10-04	Connecting rod data	13	01-07
Cross-sectional views	130-131- 132-133- 134	10-04	Camshaft data	14	01-07
Removal-Installation - injection pump	135-136		Crankshaft data	14	01-07
			End float data	14	01-07
			Engine lubrication circuit data	15	01-07
			Engine cooling circuit data	15	01-07
			Tightening torques	16	01-07
			Tools	17	01-07

	Page	Date		Page	Date
Cross-sectional views of engine	18-19	01-07	Sensor check	72	01-07
Injection pump cross-sectional views	20-21	01-07	Checks, measurements and repairs - cylinder head	73-74-75-76-77-78-79	01-07
Regulator cross-sectional views	22	01-07	Checks, dimensions and repairs - cylinder block and liners	80-81-82	01-07
Fuel pump cross-sectional views	23	01-07	Checks, measurements and repairs - rocker arm ..	83-84	01-07
Cold start device cross-sectional views	24	01-07	Checks, measurements and repairs - pistons and piston rings	85-86-87-88-89	01-07
Turbocharger cross-sectional views	25	01-07	Checks, measurements and repairs - connecting rod	89-90-91-92	01-07
Engine lubrication circuit diagram	26	01-07	Checks, measurements and repairs - camshaft ...	93-94	01-07
Engine cooling circuit diagram	27	01-07	Checks, measurements and repairs - crankshaft ..	95-96-97	01-07
Engine fuel circuit diagram	28	01-07	Checks, measurements and repairs - gears	98-99	01-07
Troubleshooting	29-30-31-32-33-34-35-36	01-07	Checks, measurements and repairs - oil pump	100-101	01-07
Engine removal-installation	37-38-39-40	01-07			
Compression test	41-42-43	01-07	Fuel injection pump		
Engine disassembly-assembly ...	44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61	01-07	Removal-Installation - injection pump	102-103	01-07
Valve clearance adjustment	62-63-64	01-07	Disassembly-Assembly - injection pump	104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124	01-07
Belt tension check	65	01-07	Plunger position adjustment	125-126	01-07
Injector jet/pressure check and reading	66-67-68-69	01-07			
Injection timing adjustment and check	69-70-71	01-07	Turbocharger		
Idle speed regulation (minimum and maximum) ..	71	01-07	Disassembly- Assembly ..	127-128-129-130-131	01-07
Cooling and radiator system check	71	01-07			

	Page	Date		Page	Date
Cross-sectional views of engine	18-19	01-07	Sensor check	72	01-07
Injection pump cross-sectional views	20-21	01-07	Checks, measurements and repairs - cylinder head	73-74-75-76-77-78-79	01-07
Regulator cross-sectional views	22	01-07	Checks, dimensions and repairs - cylinder block and liners	80-81-82	01-07
Fuel pump cross-sectional views	23	01-07	Checks, measurements and repairs - rocker arm ..	83-84	01-07
Cold start device cross-sectional views	24	01-07	Checks, measurements and repairs - pistons and piston rings	85-86-87-88-89	01-07
Turbocharger cross-sectional views	25	01-07	Checks, measurements and repairs - connecting rod	89-90-91-92	01-07
Engine lubrication circuit diagram	26	01-07	Checks, measurements and repairs - camshaft ...	93-94	01-07
Engine cooling circuit diagram	27	01-07	Checks, measurements and repairs - crankshaft ..	95-96-97	01-07
Engine fuel circuit diagram	28	01-07	Checks, measurements and repairs - gears	98-99	01-07
Troubleshooting	29-30-31-32-33-34-35-36	01-07	Checks, measurements and repairs - oil pump	100-101	01-07
Engine removal-installation	37-38-39-40	01-07			
Compression test	41-42-43	01-07	Fuel injection pump		
Engine disassembly-assembly ...	44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61	01-07	Removal-Installation - injection pump	102-103	01-07
Valve clearance adjustment	62-63-64	01-07	Disassembly-Assembly - injection pump	104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124	01-07
Belt tension check	65	01-07	Plunger position adjustment	125-126	01-07
Injector jet/pressure check and reading	66-67-68-69	01-07			
Injection timing adjustment and check	69-70-71	01-07	Turbocharger		
Idle speed regulation (minimum and maximum) ..	71	01-07	Disassembly- Assembly ..	127-128-129-130-131	01-07
Cooling and radiator system check	71	01-07			

	Page	Date		Page	Date
18 - CLUTCH			Data	2	09-01
General specifications	1	09-01	Tools	2	09-01
Tightening torques	1	09-01	Tightening torques	3	09-01
Tools	2	09-01	Cross-sectional views ...	4-5-6	09-01
Cross-sectional views ...	3	09-01	Description & Operation ..	7	09-01
Troubleshooting	4-5	09-01	Troubleshooting	8	09-01
Removal-Installation - clutch	6-7-8-9- 10-11-12- 13-14-15- 16-17-18	09-01	Removal-Installation - front axle	9-10	09-01
Clutch adjustments	19	09-01	Removal-Installation - front axle differential and bevel drive support	11-12	09-01
PTO clutch lever adjustment	20	09-01	Overhaul - front axle bevel drive	13-14	09-01
21 - TRANSMISSIONS			Adjustments - bevel drive	14-15-16- 17-18	09-01
CHAPTER 1 - Mechanical transmission (12 + 12) and (16 + 16)			Disassembly-Assembly - front differential lock device	19-20	09-01
Data	1-2	09-01	Disassembly-Assembly - wheel hub	21-22	09-01
Tightening torques	2-3	09-01	Removal-Installation - front reduction unit	23-24	09-01
Cross-sectional views ...	4-5	09-01	Disassembly-Assembly - front reduction unit	25-26-27- 28-29	09-01
Description & Operation ..	6	09-01	Removal-Installation - axle steering cylinder	30-31-32	09-01
Troubleshooting	7-8	09-01	27 - REAR MECHANICAL TRANSMISSION		
Removal-Installation - rear transmission - gearbox casing	9-10	09-01	Data	1	09-01
Disassembly-Assembly - transmission-gearbox casing	11-12-13- 14-15-16- 17-18-19	09-01	Tightening torques	2-3	09-01
Transmission-gearbox casing adjustment	20-21	09-01	Tools	4	09-01
Disassembly-Assembly - clutch casing	22-23-24- 25-26-27	09-01	Cross-sectional views ...	5-6	09-01
25 - FRONT AXLE MECHANICAL TRANSMISSION			Description & Operation ..	7	09-01
CHAPTER 1 - Front axle mechanical transmission			Troubleshooting	7-8	09-01
			Disassembly-Assembly - transmission-gearbox casing	9-10	09-01

	Page	Date		Page	Date
18 - CLUTCH			Data	2	09-01
General specifications	1	09-01	Tools	2	09-01
Tightening torques	1	09-01	Tightening torques	3	09-01
Tools	2	09-01	Cross-sectional views ...	4-5-6	09-01
Cross-sectional views ...	3	09-01	Description & Operation ..	7	09-01
Troubleshooting	4-5	09-01	Troubleshooting	8	09-01
Removal-Installation - clutch	6-7-8-9- 10-11-12- 13-14-15- 16-17-18	09-01	Removal-Installation - front axle	9-10	09-01
Clutch adjustments	19	09-01	Removal-Installation - front axle differential and bevel drive support	11-12	09-01
PTO clutch lever adjustment	20	09-01	Overhaul - front axle bevel drive	13-14	09-01
21 - TRANSMISSIONS			Adjustments - bevel drive	14-15-16- 17-18	09-01
CHAPTER 1 - Mechanical transmission (12 + 12) and (16 + 16)			Disassembly-Assembly - front differential lock device	19-20	09-01
Data	1-2	09-01	Disassembly-Assembly - wheel hub	21-22	09-01
Tightening torques	2-3	09-01	Removal-Installation - front reduction unit	23-24	09-01
Cross-sectional views ...	4-5	09-01	Disassembly-Assembly - front reduction unit	25-26-27- 28-29	09-01
Description & Operation ..	6	09-01	Removal-Installation - axle steering cylinder	30-31-32	09-01
Troubleshooting	7-8	09-01	27 - REAR MECHANICAL TRANSMISSION		
Removal-Installation - rear transmission - gearbox casing	9-10	09-01	Data	1	09-01
Disassembly-Assembly - transmission-gearbox casing	11-12-13- 14-15-16- 17-18-19	09-01	Tightening torques	2-3	09-01
Transmission-gearbox casing adjustment	20-21	09-01	Tools	4	09-01
Disassembly-Assembly - clutch casing	22-23-24- 25-26-27	09-01	Cross-sectional views ...	5-6	09-01
25 - FRONT AXLE MECHANICAL TRANSMISSION			Description & Operation ..	7	09-01
CHAPTER 1 - Front axle mechanical transmission			Troubleshooting	7-8	09-01
			Disassembly-Assembly - transmission-gearbox casing	9-10	09-01

	Page	Date		Page	Date
Removal-Installation - right or left-hand final drive casing assembly	11-12-13-14-15-16	09-01	Removal-Installation - hydraulic lift control valve .	16	09-01
Disassembly-Assembly - drive wheel shaft.	17-18-19	09-01	Disassembly-Assembly - lift control valve	17-18-19-20-21-22-23	09-01
Bevel drive adjustments ..	20-21-22-23-24	09-01	Hydraulic lift control valve checks	24-25-26-27	09-01
31 - MECHANICAL POWER TAKE-OFF					
CHAPTER 1 - Mechanical power take-off					
Data	1	09-01	Adjusting the hydraulic lift .	28-29-30-31-32-33-34	09-01
Tightening torques	2	09-01	Hydraulic lift working pressure check	35	09-01
Cross-sectional views ...	3	09-01	CHAPTER 2 - Open centre system auxiliary control valves		
Description & Operation ..	4-5-6	09-01	Data	1	09-01
Troubleshooting	6-7	09-01	Tools	1	09-01
Disassembly-Assembly - mechanical power take-off	8-9-10	09-01	Cross-sectional views ...	2	09-01
33 - BRAKES					
Data	1	09-01	Description & Operation ..	3-4-5-6	09-01
Tightening torques	2	09-01	41 - STEERING		
Cross-sectional views ...	3	09-01	CHAPTER 1 - Mechanical power take-off		
Description & Operation ..	4	09-01	Data	2	09-01
Troubleshooting	5-6	09-01	Tools	2	09-01
Removal-Installation - right or left-hand brake	7-8	09-01	Cross-sectional and exploded views	3-4	09-01
Adjustments	9-10-11	09-01	Description & Operation ..	5-6-7-8-9-10	09-01
35 - HYDRAULIC SYSTEMS					
CHAPTER 1 - Rear mechanical hydraulic lift					
Data	1	09-01	Working pressure check ..	11	09-01
Tools	1	09-01	50 - CAB AIR-CONDITIONING SYSTEM		
Cross-sectional and perspective views	2-3-4-5	09-01	Safety regulations	2	06-03
Description & Operation ..	6-7-8-9-10-11-12-13-14-15	09-01	Operating instructions	3	06-03
			Tools	4	06-03
			General specifications	4	06-03
			Operating principles	5	06-03

	Page	Date		Page	Date
Removal-Installation - right or left-hand final drive casing assembly	11-12-13-14-15-16	09-01	Removal-Installation - hydraulic lift control valve .	16	09-01
Disassembly-Assembly - drive wheel shaft.	17-18-19	09-01	Disassembly-Assembly - lift control valve	17-18-19-20-21-22-23	09-01
Bevel drive adjustments ..	20-21-22-23-24	09-01	Hydraulic lift control valve checks	24-25-26-27	09-01
31 - MECHANICAL POWER TAKE-OFF					
CHAPTER 1 - Mechanical power take-off					
Data	1	09-01	Adjusting the hydraulic lift .	28-29-30-31-32-33-34	09-01
Tightening torques	2	09-01	Hydraulic lift working pressure check	35	09-01
Cross-sectional views ...	3	09-01	CHAPTER 2 - Open centre system auxiliary control valves		
Description & Operation ..	4-5-6	09-01	Data	1	09-01
Troubleshooting	6-7	09-01	Tools	1	09-01
Disassembly-Assembly - mechanical power take-off	8-9-10	09-01	Cross-sectional views ...	2	09-01
33 - BRAKES					
Data	1	09-01	Description & Operation ..	3-4-5-6	09-01
Tightening torques	2	09-01	41 - STEERING		
Cross-sectional views ...	3	09-01	CHAPTER 1 - Mechanical power take-off		
Description & Operation ..	4	09-01	Data	2	09-01
Troubleshooting	5-6	09-01	Tools	2	09-01
Removal-Installation - right or left-hand brake	7-8	09-01	Cross-sectional and exploded views	3-4	09-01
Adjustments	9-10-11	09-01	Description & Operation ..	5-6-7-8-9-10	09-01
35 - HYDRAULIC SYSTEMS					
CHAPTER 1 - Rear mechanical hydraulic lift					
Data	1	09-01	Working pressure check ..	11	09-01
Tools	1	09-01	50 - CAB AIR-CONDITIONING SYSTEM		
Cross-sectional and perspective views	2-3-4-5	09-01	Safety regulations	2	06-03
Description & Operation ..	6-7-8-9-10-11-12-13-14-15	09-01	Operating instructions	3	06-03
			Tools	4	06-03
			General specifications	4	06-03
			Operating principles	5	06-03

	Page	Date		Page	Date
Conditioning system components	6-7-8-9-10	06-03	CHAPTER 4 - Charging system		
			Technical data	1	09-01
Cab controls	11-12-13-14-15	06-03	Description & Operation ..	2-3	09-01
Testing operation and cooling	16-17	06-03	System testing and troubleshooting	4-5-6	09-01
Air conditioning system maintenance	18-19	06-03	Removal-Installation - alternator	7	09-01
Troubleshooting	20-21-22-23	06-03	Charging system from frame no. HGMT07545 for models with a safety frame and for all models fitted out with a cab		
Refrigerant recovery - recycling and evacuation - charging stations	24	06-03	Technical data	9	06-03
Checking for and eliminating any gas leaks ..	25-26	06-03	Description & Operation ..	10-11	06-03
Compressor drive belt tension adjustment	27	06-03	System testing and troubleshooting	12-13-14-15	06-03
Cab heating/air-conditioning system. Removal - Installation	28-29-30-31-32	06-03	Removal-Installation - alternator	16	06-03
			CHAPTER 5 - Battery		
55 - ELECTRICAL SYSTEM			Technical data	1	09-01
CHAPTER 1 - Instruments			Description & Operation ..	1	09-01
Analogue instrumentation ..	1-2-3-4	09-01	Removal-Installation - battery	2	09-01
Transmitters, sensors and switches	5-6-7-8-9	09-01	Battery checking and maintenance	3	09-01
Maintenance	10	09-01	Battery charging	4-5-6	09-01
CHAPTER 2 - Components			Battery troubleshooting ...	6	09-01
Description of components	1-2-3-4-5	09-01	CHAPTER 6 - Electrical circuits (mod. TCE40 - 45 - 50)		
Maintenance	6-7	09-01	Contents	1-2	10-04
CHAPTER 3 - Starting System			Electrical circuits components	3-4	09-01
Technical data	1	09-01	General functional diagram	5	09-01
Description & Operation ..	2	09-01	Location of tractor-dashboard components ..	7-8-9	09-01
Troubleshooting	3-4	09-01	Location of fuses and relays	10-11-12	09-01
System testing	5-6	09-01	Symbols and codes	13-14	09-01
Removal-Installation - starter motor	7	09-01			

	Page	Date		Page	Date
Conditioning system components	6-7-8-9-10	06-03	CHAPTER 4 - Charging system		
			Technical data	1	09-01
Cab controls	11-12-13-14-15	06-03	Description & Operation ..	2-3	09-01
Testing operation and cooling	16-17	06-03	System testing and troubleshooting	4-5-6	09-01
Air conditioning system maintenance	18-19	06-03	Removal-Installation - alternator	7	09-01
Troubleshooting	20-21-22-23	06-03	Charging system from frame no. HGMT07545 for models with a safety frame and for all models fitted out with a cab		
Refrigerant recovery - recycling and evacuation - charging stations	24	06-03	Technical data	9	06-03
Checking for and eliminating any gas leaks ..	25-26	06-03	Description & Operation ..	10-11	06-03
Compressor drive belt tension adjustment	27	06-03	System testing and troubleshooting	12-13-14-15	06-03
Cab heating/air-conditioning system. Removal - Installation	28-29-30-31-32	06-03	Removal-Installation - alternator	16	06-03
			CHAPTER 5 - Battery		
55 - ELECTRICAL SYSTEM			Technical data	1	09-01
CHAPTER 1 - Instruments			Description & Operation ..	1	09-01
Analogue instrumentation ..	1-2-3-4	09-01	Removal-Installation - battery	2	09-01
Transmitters, sensors and switches	5-6-7-8-9	09-01	Battery checking and maintenance	3	09-01
Maintenance	10	09-01	Battery charging	4-5-6	09-01
CHAPTER 2 - Components			Battery troubleshooting ...	6	09-01
Description of components	1-2-3-4-5	09-01	CHAPTER 6 - Electrical circuits (mod. TCE40 - 45 - 50)		
Maintenance	6-7	09-01	Contents	1-2	10-04
CHAPTER 3 - Starting System			Electrical circuits components	3-4	09-01
Technical data	1	09-01	General functional diagram	5	09-01
Description & Operation ..	2	09-01	Location of tractor-dashboard components ..	7-8-9	09-01
Troubleshooting	3-4	09-01	Location of fuses and relays	10-11-12	09-01
System testing	5-6	09-01	Symbols and codes	13-14	09-01
Removal-Installation - starter motor	7	09-01			

	Page	Date		Page	Date
Main wiring and electrical circuits	15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55	09-01	Location of fuses and relays	8-9-10	10-04
			Symbols and codes	12-13	10-04
			Main wiring and electrical circuits	14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55	10-04
CHAPTER 7 - Cab electrical components					
Contents	1	06-03			
Cab controls	2-3-4	06-03			
Fuses and relays	5-6	06-03			
Air-conditioner controls ..	7	06-03			
Components outside the cab	8-9-10	06-03			
Electrical circuits components	11	06-03			
Location of components ..	13-14	06-03			
Symbols and codes	15-16	06-03			
Air-conditioner - radio - window-washer circuit ...	18-19-20-21-22-23-24-25	06-03			
Work lights - rotating beacon - internal lighting - rear window wiper circuit .	26-27-28-29-30-31-32	06-03			
CHAPTER 8 - Electrical circuits (mod. TCE55)					
Contents	1	10-04			
Electrical circuits components	2-3	10-04			
Location of components ..	5-6	10-04			
Location of main connections	7-11	10-04			
			Contents	1	01-07
			Electrical circuits components	2-3	01-07
			Location of components ..	5-6	01-07
			Location of fuses and relays	7-8-9-10	01-07
			Symbols and colour codes	11-12	01-07
			Main wiring and electrical circuits	13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64	10-04

	Page	Date		Page	Date
Main wiring and electrical circuits	15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55	09-01	Location of fuses and relays	8-9-10	10-04
			Symbols and codes	12-13	10-04
			Main wiring and electrical circuits	14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55	10-04
CHAPTER 7 - Cab electrical components					
Contents	1	06-03			
Cab controls	2-3-4	06-03			
Fuses and relays	5-6	06-03			
Air-conditioner controls ..	7	06-03			
Components outside the cab	8-9-10	06-03			
Electrical circuits components	11	06-03			
Location of components ..	13-14	06-03			
Symbols and codes	15-16	06-03			
Air-conditioner - radio - window-washer circuit ...	18-19-20-21-22-23-24-25	06-03			
Work lights - rotating beacon - internal lighting - rear window wiper circuit .	26-27-28-29-30-31-32	06-03			
CHAPTER 8 - Electrical circuits (mod. TCE55)					
Contents	1	10-04			
Electrical circuits components	2-3	10-04			
Location of components ..	5-6	10-04			
Location of main connections	7-11	10-04			
			Contents	1	01-07
			Electrical circuits components	2-3	01-07
			Location of components ..	5-6	01-07
			Location of fuses and relays	7-8-9-10	01-07
			Symbols and colour codes	11-12	01-07
			Main wiring and electrical circuits	13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64	10-04

	Page	Date		Page	Date
90 - PLATFORM, CAB, BODYWORK			Cab assembly with platform. Removal - Installation	6-7-8-9- 10-11-12- 13-14-15- 16-17	06-03
Bonnet. Removal - Installation	2	06-03			
Right/left-hand side panels. Removal - Installation	3	06-03	Window replacement	18-19-20- 21-22-23	06-03
Instrument panel lower guard. Removal - Installation	4-5	06-03			

	Page	Date		Page	Date
90 - PLATFORM, CAB, BODYWORK			Cab assembly with platform. Removal - Installation	6-7-8-9- 10-11-12- 13-14-15- 16-17	06-03
Bonnet. Removal - Installation	2	06-03			
Right/left-hand side panels. Removal - Installation	3	06-03	Window replacement	18-19-20- 21-22-23	06-03
Instrument panel lower guard. Removal - Installation	4-5	06-03			

SECTION 10 - ENGINE

Chapter 2 - Engine (TIER 2)

CONTENT

Section	Description	Page
10 000	General specifications	3
	Main data	9
	Torque settings	16
	Tools	17
	Sections	18
	Lubrication, cooling and fuel system diagrams	26
	Engine troubleshooting	29
10 001 10	Engine	37
	- Removal-Installation	37
10 001 30	- Compression test	41
10 001 54	- Disassembly-Assembly	44
	Valve clearance adjustment (TCE40-45-50)	62
	Valve clearance adjustment (TCE55)	63
	Belt tension check	65
	Injectors and injection jet pressure check and reading	66
	Injection timing adjustment and check	69
	Idle speed adjustment (minimum and maximum)	71
	Checking the cooling system and radiator for leaks	71
	Sensors check	72
	Checks, dimensions and repairs - cylinder head	73
	Checks, dimensions and repairs - block and cylinder linings	80
	Checks, dimensions and repairs - rocker arm	83
	Checks, dimensions and repairs - pistons and snap rings	85
	Checks, dimensions and repairs - connecting rod	89
	Checks, dimensions and repairs - camshaft	93

SECTION 10 - ENGINE

Chapter 2 - Engine (TIER 2)

CONTENT

Section	Description	Page
10 000	General specifications	3
	Main data	9
	Torque settings	16
	Tools	17
	Sections	18
	Lubrication, cooling and fuel system diagrams	26
	Engine troubleshooting	29
10 001 10	Engine	37
	- Removal-Installation	37
10 001 30	- Compression test	41
10 001 54	- Disassembly-Assembly	44
	Valve clearance adjustment (TCE40-45-50)	62
	Valve clearance adjustment (TCE55)	63
	Belt tension check	65
	Injectors and injection jet pressure check and reading	66
	Injection timing adjustment and check	69
	Idle speed adjustment (minimum and maximum)	71
	Checking the cooling system and radiator for leaks	71
	Sensors check	72
	Checks, dimensions and repairs - cylinder head	73
	Checks, dimensions and repairs - block and cylinder linings	80
	Checks, dimensions and repairs - rocker arm	83
	Checks, dimensions and repairs - pistons and snap rings	85
	Checks, dimensions and repairs - connecting rod	89
	Checks, dimensions and repairs - camshaft	93

Checks, dimensions and repairs - crankshaft	95
Checks, dimensions and repairs - gears	98
Checks, dimensions and repairs - oil pump	100
Injection pump	102
- Removal - Refitting.	102
- Disassembly - Assembly	104
Plunger position adjustment	125
Turbocharger	127
- Disassembly - Assembly	127

Checks, dimensions and repairs - crankshaft	95
Checks, dimensions and repairs - gears	98
Checks, dimensions and repairs - oil pump	100
Injection pump	102
- Removal - Refitting.	102
- Disassembly - Assembly	104
Plunger position adjustment	125
Turbocharger	127
- Disassembly - Assembly	127

GENERAL SPECIFICATIONS	TCE40
Engine	
- Initial/Layout	3TNV88/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	3
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	88
Stroke (mm)	90
Total displacement (cm ³)	1642
Firing order	1 - 3 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	35.4/26
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	110
Maximum torque speed (rpm)	1680
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	4
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	4.7
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.0
Cooling fan	6-blade fan, Ø 335 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE40
Engine	
- Initial/Layout	3TNV88/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	3
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	88
Stroke (mm)	90
Total displacement (cm ³)	1642
Firing order	1 - 3 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	35.4/26
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	110
Maximum torque speed (rpm)	1680
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	4
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	4.7
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.0
Cooling fan	6-blade fan, Ø 335 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE45
Engine	
- Initial/Layout	4TNV84/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	4
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	84
Stroke (mm)	90
Total displacement (cm ³)	1995
Firing order	1 - 3 - 4 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	43.4/31.9
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	133
Maximum torque speed (rpm)	1690
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE45
Engine	
- Initial/Layout	4TNV84/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	4
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	84
Stroke (mm)	90
Total displacement (cm ³)	1995
Firing order	1 - 3 - 4 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	43.4/31.9
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	133
Maximum torque speed (rpm)	1690
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE50
Engine	
- Initial/Layout	4TNV88/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	4
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	88
Stroke (mm)	90
Total displacement (cm ³)	2189
Firing order	1 - 3 - 4 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	47.5/35
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	145
Maximum torque speed (rpm)	1690
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE50
Engine	
- Initial/Layout	4TNV88/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders	4
Fuel system	Natural
Cylinder liners	In cylinder block
Bore (mm)	88
Stroke (mm)	90
Total displacement (cm ³)	2189
Firing order	1 - 3 - 4 - 2
Compression ratio	19.1:1
ISO power output (CV/kW)	47.5/35
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3000 to 3050
Maximum torque (Nm)	145
Maximum torque speed (rpm)	1690
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE55
Engine	
- Initial/Layout	4TNV84T/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders in line	4
Fuel system	Turbo
Cylinder liners	In cylinder block
Bore (mm)	84
Stroke (mm)	90
Total displacement (cm ³)	1995
Firing order	1 - 3 - 4 - 2
Compression ratio	18.9:1
ISO power output (CV/kW)	54.2/39.9
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3185 to 3235
Maximum torque (Nm)	164
Maximum torque speed (rpm)	1680
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

GENERAL SPECIFICATIONS	TCE55
Engine	
- Initial/Layout	4TNV84T/Klan
- Manufacturer	Yanmar
Cycle	Diesel, 4-stroke
Direct	Injection
Number of cylinders in line	4
Fuel system	Turbo
Cylinder liners	In cylinder block
Bore (mm)	84
Stroke (mm)	90
Total displacement (cm ³)	1995
Firing order	1 - 3 - 4 - 2
Compression ratio	18.9:1
ISO power output (CV/kW)	54.2/39.9
Maximum power speed (rpm)	2800
Maximum no-load speed (rpm)	3185 to 3235
Maximum torque (Nm)	164
Maximum torque speed (rpm)	1680
Slow idle speed (rpm)	1000
Direction of rotation	Anticlockwise (as seen from flywheel)
Number of main bearings	5
Recommended diesel fuel	ISO 8217 DMA, BS 2869 A1 or A2 (cetane No.: 45 min)
Lubrication system	Forced lubrication with trochoid pump
Lubrication oil tank capacity (l)	7.4
Recommended lubrication oil	AMBRA SUPER GOLD
Cooling System	Coolant/Radiator
Coolant tank capacity (l)	2.7
Cooling fan	6-blade fan, Ø 370 mm
Regulator	Mechanical centrifuge-type (all speeds)
Ignition system	Electric

(continued)

(cont)

GENERAL SPECIFICATIONS	TCE40	TCE45-50-55
Valve Timing		
Type	Overhead valves operated by rocker arms	
Valve clearance, engine cold:		
- intake	0.15 to 0.25 mm	
- exhaust	0.15 to 0.25 mm	
Fuel system		
Type (TCE40-45-50)	Aspirated	
Type (TCE55)	Turbo	
Air filtering	5" dry filter, with two removable elements for maintenance	
Fuel pump	Yanmar	
Fuel filtering	Paper filter on injection pump delivery	
Actuation	via cam	
Injection Pump	Yanmar	
All-speed governor, incorporated in pump	Yanmar	
Automatic advance regulator, incorporated in pump	Yanmar	
Cold start device	Thermostarter	
For further fuel system technical data:		
- Fixed advance	25° (TCE40-45-50) 25° (TCE55)	
- Injection order	1 - 3 - 2	1 - 3 - 4 - 2
Fuel injectors	Yanmar	
- Calibration pressure (bar)	216 to 226	

(continued)

(cont)

GENERAL SPECIFICATIONS	TCE40	TCE45-50-55
Valve Timing		
Type	Overhead valves operated by rocker arms	
Valve clearance, engine cold:		
- intake	0.15 to 0.25 mm	
- exhaust	0.15 to 0.25 mm	
Fuel system		
Type (TCE40-45-50)	Aspirated	
Type (TCE55)	Turbo	
Air filtering	5" dry filter, with two removable elements for maintenance	
Fuel pump	Yanmar	
Fuel filtering	Paper filter on injection pump delivery	
Actuation	via cam	
Injection Pump	Yanmar	
All-speed governor, incorporated in pump	Yanmar	
Automatic advance regulator, incorporated in pump	Yanmar	
Cold start device	Thermostarter	
For further fuel system technical data:		
- Fixed advance	25° (TCE40-45-50) 25° (TCE55)	
- Injection order	1 - 3 - 2	1 - 3 - 4 - 2
Fuel injectors	Yanmar	
- Calibration pressure (bar)	216 to 226	

(continued)

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GENERAL SPECIFICATIONS	TCE40	TCE45-50-55
Lubrication		
Type	Forced, by pump	
Oil cleaning	Mesh filter (on pump inlet)	
	cartridge filter (on engine delivery)	
Oil pressure with engine at maximum power	3 to 4 bar	
Recommended oil	AMBRA SUPER GOLD	
Cooling		
Type	Water, pressurised circulation by centrifugal pump driven by timing gears	
Coolant tank capacity (l)	2.0	2.7
Cooling fan	Fan with blades, \varnothing 373 mm	
Fan diameter and No. of blades (mm)	335 x 6	370 x 6
Recommended fluid	See Sect. 00, Chapter 1, page 6	
Injection Pump		
Model	YPD-4MP2	
Plunger diameter	9 mm	
Cam height	8.1 mm	
Regulator	Mechanical	
Fuel pump	Trochoid pump with forced lubrication	
Lubrication	From the engine lubrication system	
Injection regulator	Hydraulic system	
Turbocharger (mod. TCE55)		
Model	RHB31	
Type	Standard centrifugal	
Lubrication	External	
Continuous peak speed (rpm)	250.000	
Exhaust gas maximum temperature	750°	

(cont)

GENERAL SPECIFICATIONS	TCE40	TCE45-50-55
Lubrication		
Type	Forced, by pump	
Oil cleaning	Mesh filter (on pump inlet)	
	cartridge filter (on engine delivery)	
Oil pressure with engine at maximum power	3 to 4 bar	
Recommended oil	AMBRA SUPER GOLD	
Cooling		
Type	Water, pressurised circulation by centrifugal pump driven by timing gears	
Coolant tank capacity (l)	2.0	2.7
Cooling fan	Fan with blades, \varnothing 373 mm	
Fan diameter and No. of blades (mm)	335 x 6	370 x 6
Recommended fluid	See Sect. 00, Chapter 1, page 6	
Injection Pump		
Model	YPD-4MP2	
Plunger diameter	9 mm	
Cam height	8.1 mm	
Regulator	Mechanical	
Fuel pump	Trochoid pump with forced lubrication	
Lubrication	From the engine lubrication system	
Injection regulator	Hydraulic system	
Turbocharger (mod. TCE55)		
Model	RHB31	
Type	Standard centrifugal	
Lubrication	External	
Continuous peak speed (rpm)	250.000	
Exhaust gas maximum temperature	750°	

CYLINDER HEAD DATA	Nominal value	Wear limit value
Cylinder head combustion surface distortion (mm)	≤ 0.05	0.15
Valve seat angle		
- Inlet	120°	-
- Exhaust	90°	-
Inlet valve		
- Valve stem external diameter (mm)	7.955 to 7.975	7.9
- Valve guide internal diameter (mm)	8.010 to 8.025	8.1
- Assembly clearance between valve stem and guide (mm)	0.035 to 0.070	0.18
Exhaust Valve		
- Valve stem external diameter (mm)	7.955 to 7.970	7.9
- Valve guide internal diameter (mm)	8.015 to 8.030	8.1
- Assembly clearance between valve stem and guide (mm)	0.045 to 0.075	0.18
Valve guide protrusion (TCE40-45-50) (mm)	14.7 to 15	-
Valve guide stand-out (TCE55) (mm)	8.2 to 8.5	-
Valve seat sink		
- Intake valve (TCE 40-45-50) (mm)	0.35 to 0.55	0.8
- Exhaust valve (TCE 40-45-50) (mm)	0.3 to 0.5	0.8
- Intake valve (TCE 55) (mm)	0.36 to 0.56	0.8
- Exhaust valve (TCE 55) (mm)	0.35 to 0.55	0.8
Valve head thickness		
- Inlet valve (mm)	1.34	0.5
- Exhaust valve (mm)	1.45	0.5
Valve spring		
- Free length (mm)	42	-
- Angle	-	1.1
Inlet and exhaust valve clearance (mm)	0.15 to 0.25	-

CYLINDER HEAD DATA	Nominal value	Wear limit value
Cylinder head combustion surface distortion (mm)	≤ 0.05	0.15
Valve seat angle		
- Inlet	120°	-
- Exhaust	90°	-
Inlet valve		
- Valve stem external diameter (mm)	7.955 to 7.975	7.9
- Valve guide internal diameter (mm)	8.010 to 8.025	8.1
- Assembly clearance between valve stem and guide (mm)	0.035 to 0.070	0.18
Exhaust Valve		
- Valve stem external diameter (mm)	7.955 to 7.970	7.9
- Valve guide internal diameter (mm)	8.015 to 8.030	8.1
- Assembly clearance between valve stem and guide (mm)	0.045 to 0.075	0.18
Valve guide protrusion (TCE40-45-50) (mm)	14.7 to 15	-
Valve guide stand-out (TCE55) (mm)	8.2 to 8.5	-
Valve seat sink		
- Intake valve (TCE 40-45-50) (mm)	0.35 to 0.55	0.8
- Exhaust valve (TCE 40-45-50) (mm)	0.3 to 0.5	0.8
- Intake valve (TCE 55) (mm)	0.36 to 0.56	0.8
- Exhaust valve (TCE 55) (mm)	0.35 to 0.55	0.8
Valve head thickness		
- Inlet valve (mm)	1.34	0.5
- Exhaust valve (mm)	1.45	0.5
Valve spring		
- Free length (mm)	42	-
- Angle	-	1.1
Inlet and exhaust valve clearance (mm)	0.15 to 0.25	-

CYLINDER HEAD DATA (*)	Nominal value (mm)	Wear limit value (mm)
Bore		
- Models TCE45 and TCE55	84.000 to 84.030	84.20
- Models TCE40 and TCE50	88.000 to 88.030	88.20
Cylinder roundness		
- Models TCE45 and TCE55	0.00 to 0.01	0.03
- Models TCE40 and TCE50	0.00 to 0.01	0.03
Cylindricity		
- Models TCE45 and TCE55	0.00 to 0.01	0.03
- Models TCE40 and TCE50	0.00 to 0.01	0.03

(*) For all models.

ROCKER ARM DATA	Nominal value	Wear limit value
Inlet and exhaust valves rocker		
- Rocker pin external diameter	15.97 to 15.98	15.94
- Rocker bushing internal diameter	16.000 to 16.020	16.07
- Clearance between pin and bush	0.016 to 0.054	0.13
Rocker arm rod bending	≤ 0.03	-

CYLINDER HEAD DATA (*)	Nominal value (mm)	Wear limit value (mm)
Bore		
- Models TCE45 and TCE55	84.000 to 84.030	84.20
- Models TCE40 and TCE50	88.000 to 88.030	88.20
Cylinder roundness		
- Models TCE45 and TCE55	0.00 to 0.01	0.03
- Models TCE40 and TCE50	0.00 to 0.01	0.03
Cylindricity		
- Models TCE45 and TCE55	0.00 to 0.01	0.03
- Models TCE40 and TCE50	0.00 to 0.01	0.03

(*) For all models.

ROCKER ARM DATA	Nominal value	Wear limit value
Inlet and exhaust valves rocker		
- Rocker pin external diameter	15.97 to 15.98	15.94
- Rocker bushing internal diameter	16.000 to 16.020	16.07
- Clearance between pin and bush	0.016 to 0.054	0.13
Rocker arm rod bending	≤ 0.03	-

PISTONS DATA	Nominal value (mm)	Wear limit value (mm)
Piston external diameter		
- Models TCE45 and TCE55	83.945 to 83.975	83.90
- Models TCE40 and TCE50	87.945 to 87.975	87.90
Minimum clearance between piston and cylinder		
- Models TCE45 and TCE55	0.040 to 0.070	-
- Models TCE40 and TCE50	0.040 to 0.070	-
Piston and pin		
- Pin external diameter		
- Models TCE40, TCE45, TCE50 and TCE55	25.995 to 26.000	25.965
- Pin hole diameter		
- Models TCE40, TCE45, TCE50 and TCE55	26.000 to 26.009	26.039
	26.025 to 26.038	26.068
- Assembly clearance between pin and hole		
- Models TCE40, TCE45, TCE50 and TCE55	0.000 to 0.014	0.074

PISTONS DATA	Nominal value (mm)	Wear limit value (mm)
Piston external diameter		
- Models TCE45 and TCE55	83.945 to 83.975	83.90
- Models TCE40 and TCE50	87.945 to 87.975	87.90
Minimum clearance between piston and cylinder		
- Models TCE45 and TCE55	0.040 to 0.070	-
- Models TCE40 and TCE50	0.040 to 0.070	-
Piston and pin		
- Pin external diameter		
- Models TCE40, TCE45, TCE50 and TCE55	25.995 to 26.000	25.965
- Pin hole diameter		
- Models TCE40, TCE45, TCE50 and TCE55	26.000 to 26.009	26.039
	26.025 to 26.038	26.068
- Assembly clearance between pin and hole		
- Models TCE40, TCE45, TCE50 and TCE55	0.000 to 0.014	0.074

PISTON RINGS DATA	Nominal value (mm)	Wear limit value (mm)
Upper piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	2.065 to 2.080	-
- Models TCE40 and TCE50	2.060 to 2.075	-
- Piston ring width		
- Models TCE45 and TCE55	1.970 to 1.990	1.950
- Models TCE40 and TCE50	1.970 to 1.990	1.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.075 to 0.110	-
- Models TCE40 and TCE50	0.070 to 0.105	-
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490
2° piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	2.035 to 2.050	2.150
- Models TCE40 and TCE50	2.025 to 2.040	2.140
- Piston ring width		
- Models TCE45 and TCE55	1.970 to 1.990	1.950
- Models TCE40 and TCE50	1.970 to 1.990	1.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.045 to 0.080	0.200
- Models TCE40 and TCE50	0.035 to 0.070	0.190
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490

(continued)

PISTON RINGS DATA	Nominal value (mm)	Wear limit value (mm)
Upper piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	2.065 to 2.080	-
- Models TCE40 and TCE50	2.060 to 2.075	-
- Piston ring width		
- Models TCE45 and TCE55	1.970 to 1.990	1.950
- Models TCE40 and TCE50	1.970 to 1.990	1.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.075 to 0.110	-
- Models TCE40 and TCE50	0.070 to 0.105	-
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490
2° piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	2.035 to 2.050	2.150
- Models TCE40 and TCE50	2.025 to 2.040	2.140
- Piston ring width		
- Models TCE45 and TCE55	1.970 to 1.990	1.950
- Models TCE40 and TCE50	1.970 to 1.990	1.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.045 to 0.080	0.200
- Models TCE40 and TCE50	0.035 to 0.070	0.190
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490

(continued)

(cont)

PISTON RINGS DATA	Nominal value (mm)	Wear limit value (mm)
Oil scraper piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	4.015 to 4.030	4.130
- Models TCE40 and TCE50	4.015 to 4.030	4.130
- Piston ring width		
- Models TCE45 and TCE55	3.970 to 3.990	3.950
- Models TCE40 and TCE50	3.970 to 3.990	3.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.025 to 0.060	0.180
- Models TCE40 and TCE50	0.025 to 0.060	0.180
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490

CONNECTING ROD DATA	Nominal value (mm)	Wear limit value (mm)
Connecting rod journal side		
- Connecting rod journal bushing internal diameter	47.952 to 47.962	-
- Connecting rod journal bearing thickness	1.492 to 1.500	-
- Connecting rod journal external diameter	47.952 to 47.962	47.902
- Assembly clearance between journal and bearing	0.038 to 0.074	0.150
Pin side		
- Pin bushing internal diameter	26.025 to 26.038	26.068
- Pin external diameter	25.995 to 26.000	25.967
- Assembly clearance between pin and bush	0.025 to 0.043	0.101
Torsion and parallelism	< 0.03 per 100 mm	0.08

(cont)

PISTON RINGS DATA	Nominal value (mm)	Wear limit value (mm)
Oil scraper piston ring		
- Piston ring groove width		
- Models TCE45 and TCE55	4.015 to 4.030	4.130
- Models TCE40 and TCE50	4.015 to 4.030	4.130
- Piston ring width		
- Models TCE45 and TCE55	3.970 to 3.990	3.950
- Models TCE40 and TCE50	3.970 to 3.990	3.950
- Minimum side clearance		
- Models TCE45 and TCE55	0.025 to 0.060	0.180
- Models TCE40 and TCE50	0.025 to 0.060	0.180
- End gap		
- Models TCE45 and TCE55	0.200 to 0.400	0.490
- Models TCE40 and TCE50	0.200 to 0.400	0.490

CONNECTING ROD DATA	Nominal value (mm)	Wear limit value (mm)
Connecting rod journal side		
- Connecting rod journal bushing internal diameter	47.952 to 47.962	-
- Connecting rod journal bearing thickness	1.492 to 1.500	-
- Connecting rod journal external diameter	47.952 to 47.962	47.902
- Assembly clearance between journal and bearing	0.038 to 0.074	0.150
Pin side		
- Pin bushing internal diameter	26.025 to 26.038	26.068
- Pin external diameter	25.995 to 26.000	25.967
- Assembly clearance between pin and bush	0.025 to 0.043	0.101
Torsion and parallelism	< 0.03 per 100 mm	0.08

CAMSHAFT DATA	Nominal value (mm)	Wear limit value (mm)
Gear side		
- Main journal/camshaft external diameter	44.925 to 44.950	44.890
- Assembly clearance between pin and seat	0.040 to 0.130	0.240
Intermediate		
- Main journal/camshaft external diameter	44.910 to 44.935	44.875
- Assembly clearance between pin and seat	0.065 to 0.115	0.225
Flywheel side		
- Main journal/camshaft external diameter	44.925 to 44.950	44.890
- Assembly clearance between pin and seat	0.050 to 0.100	0.210
Bend	≤ 0.02	0.05

CRANKSHAFT DATA	Nominal value (mm)	Wear limit value (mm)
Main journal		
- Engine main journal external diameter	53.952 to 53.962	53.902
- Main bearing thickness	1.995 to 1.990	-
- Main journal/bushing assembly clearance	0.038 to 0.068	0.15
Bend	≤ 0.02	-

AXIAL CLEARANCE DATA (*)	Nominal value (mm)
Crankshaft axial clearance	0.090 to 0.271
Camshaft axial clearance	0.05 to 0.25
Connecting rod axial clearance	0.2 to 0.4
Intermediate gear axial clearance	0.1 to 0.3
Crankshaft gear, camshaft, intermediate and injection pump axial clearance	0.07 to 0.15
Lubrication oil pump axial clearance	0.11 to 0.19

(*) For all models.

CAMSHAFT DATA	Nominal value (mm)	Wear limit value (mm)
Gear side		
- Main journal/camshaft external diameter	44.925 to 44.950	44.890
- Assembly clearance between pin and seat	0.040 to 0.130	0.240
Intermediate		
- Main journal/camshaft external diameter	44.910 to 44.935	44.875
- Assembly clearance between pin and seat	0.065 to 0.115	0.225
Flywheel side		
- Main journal/camshaft external diameter	44.925 to 44.950	44.890
- Assembly clearance between pin and seat	0.050 to 0.100	0.210
Bend	≤ 0.02	0.05

CRANKSHAFT DATA	Nominal value (mm)	Wear limit value (mm)
Main journal		
- Engine main journal external diameter	53.952 to 53.962	53.902
- Main bearing thickness	1.995 to 1.990	-
- Main journal/bushing assembly clearance	0.038 to 0.068	0.15
Bend	≤ 0.02	-

AXIAL CLEARANCE DATA (*)	Nominal value (mm)
Crankshaft axial clearance	0.090 to 0.271
Camshaft axial clearance	0.05 to 0.25
Connecting rod axial clearance	0.2 to 0.4
Intermediate gear axial clearance	0.1 to 0.3
Crankshaft gear, camshaft, intermediate and injection pump axial clearance	0.07 to 0.15
Lubrication oil pump axial clearance	0.11 to 0.19

(*) For all models.

ENGINE LUBRICATION CIRCUIT DATA	Nominal value
Lubrication oil pump delivery volume	
- High speed litres/min	25.0 (at 3600 rpm)
- Low speed litres/min	8.0 (at 800 rpm)
Pressure check valve opening pressure bar	3.0 to 4.0
Lubrication oil pressure switch working pressure bar	0.4 to 0.6

ENGINE COOLANT CIRCUIT DATA	Nominal value
Coolant pump delivery volume (at 3220 to 3280 rpm) litres/min	70
Thermostat valve opening temperature	
- Opening temperature °C	69.5 to 72.5
- Cam lift mm	≥ 8.0 (≥ 85 °C)
Thermo switch activation temperature	
- ON °C	107 to 113

ENGINE LUBRICATION CIRCUIT DATA	Nominal value
Lubrication oil pump delivery volume	
- High speed litres/min	25.0 (at 3600 rpm)
- Low speed litres/min	8.0 (at 800 rpm)
Pressure check valve opening pressure bar	3.0 to 4.0
Lubrication oil pressure switch working pressure bar	0.4 to 0.6

ENGINE COOLANT CIRCUIT DATA	Nominal value
Coolant pump delivery volume (at 3220 to 3280 rpm) litres/min	70
Thermostat valve opening temperature	
- Opening temperature °C	69.5 to 72.5
- Cam lift mm	≥ 8.0 (≥ 85 °C)
Thermo switch activation temperature	
- ON °C	107 to 113

TORQUE WRENCH SETTINGS

PARTS TO BE TIGHTENED	Thread	Tightening torque	
		Nm	kgm
Cylinder head bolts ⁽¹⁾	M10 X 1.25	85.3 to 91.2	8.7 to 9.3
Connecting rod cap retaining bolts ⁽¹⁾	M9 x 1.0	44.1 to 54.0	4.5 to 5.5
Flywheel retaining bolts ⁽¹⁾	M10 X 1.25	83.4 to 88.3	8.5 to 9.0
Main bearing cap retaining bolts ⁽¹⁾	M12 x 1.5	96.1 to 100.1	9.8 to 10.2
Crankshaft V pulley retaining bolts ⁽¹⁾	M 14 x 1.5	112.8 to 122.6	11.5 to 12.5
Injector nuts ⁽²⁾	M6 x 1.0	6.9 to 8.8	0.7 to 0.9
Automatic advance retaining nuts ⁽²⁾	M12 x 1.75	58.9 to 68.7	6.0 to 7.0
Regulator centrifuge weights support nut ⁽²⁾	M12 x 1.25	44.1 to 49.1	4.5 to 5.0
Fuel high pressure pipe sleeve retaining nut ⁽²⁾	M12 x 1.5	29.4 to 34.3	3.0 to 3.5
Hex bolt (4T) and nut ⁽²⁾ ⁽³⁾	M6 x 1	9.8 to 11.8	1.0 to 1.2
	M 8 x 1.25	22.6 to 28.4	2.3 to 2.9
	M10 x 1.5	44.1 to 54.0	4.5 to 5.5
	M12 x 1.75	78.5 to 98.1	8.0 to 10.0
PT caps ⁽²⁾	1/8"	9.8	1.0
	1/4"	19.6	2.0
	3/8"	29.4	3.0
	1/2"	58.9	6.0
Pipe union bolts ⁽²⁾	M8	12.8 to 16.7	1.3 to 1.7
	M12	24.5 to 34.3	2.5 to 3.5
	M14	39.2 to 49.1	4.0 to 5.0
	M16	49.1 to 54.0	5.0 to 5.5

⁽¹⁾ Parts smeared with lubrication oil.

⁽²⁾ Parts not smeared with lubrication oil.

⁽³⁾ a. When fitting aluminium parts, tighten the bolts to 80% of the torque indicated in the table.
b. 4T bolts and locknuts must be tightened to 60% of the torque indicated in the table.

TORQUE WRENCH SETTINGS

PARTS TO BE TIGHTENED	Thread	Tightening torque	
		Nm	kgm
Cylinder head bolts ⁽¹⁾	M10 X 1.25	85.3 to 91.2	8.7 to 9.3
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	M 8 x 1.25	22.6 to 28.4	2.3 to 2.9
	M10 x 1.5	44.1 to 54.0	4.5 to 5.5
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Pipe union bolts ⁽²⁾	M8	12.8 to 16.7	1.3 to 1.7
	M12	24.5 to 34.3	2.5 to 3.5
	M14	39.2 to 49.1	4.0 to 5.0
	M16	49.1 to 54.0	5.0 to 5.5

⁽¹⁾ Parts smeared with lubrication oil.

⁽²⁾ Parts not smeared with lubrication oil.

⁽³⁾ a. When fitting aluminium parts, tighten the bolts to 80% of the torque indicated in the table.
b. 4T bolts and locknuts must be tightened to 60% of the torque indicated in the table.

SPECIAL TOOLS

Warning - The operations described in this section can only be carried out with **ESSENTIAL** tools indicated by an **(X)**.

To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools, which are to be made according to the drawings included in this chapter.

List of specific tools required for the various operations described in this Sect.

X 380000301 Revolving engine service stand.

X 380000216 Engine lifting hook.

X 380000220 Clamp for fitting pistons in cylinders.

X 380000303 Compression test kit (use with **380000179**).

X 380000221 Piston ring pliers.

X 380000178 Rotating stand connection bracket (**380000301**).

X 380000179 Dummy injector (use with **380000303**).

X 380000180 Drift for fitting camshaft bushings.

X 380000181 Drift for extracting valve guides.

X 380000182 Drift for fitting valve guides.

X 380000183 Engine valve guide reamer.

X 380000184 Engine valve spring disassembly-assembly compressor.

SPECIAL TOOLS

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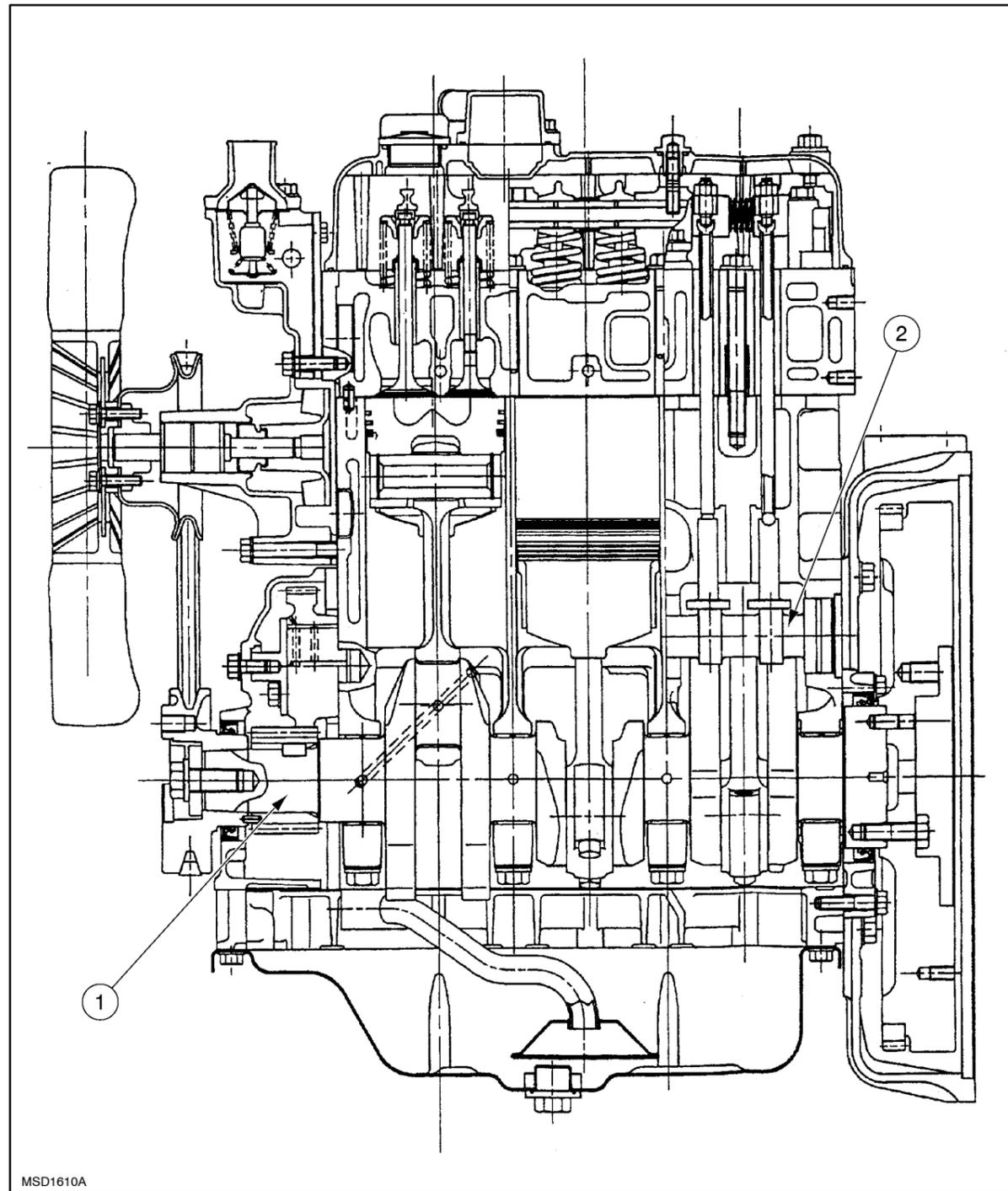
X 380000181 Drift for extracting valve guides.

X 380000182 Drift for fitting valve guides.

X 380000183 Engine valve guide reamer.

X 380000184 Engine valve spring disassembly-assembly compressor.

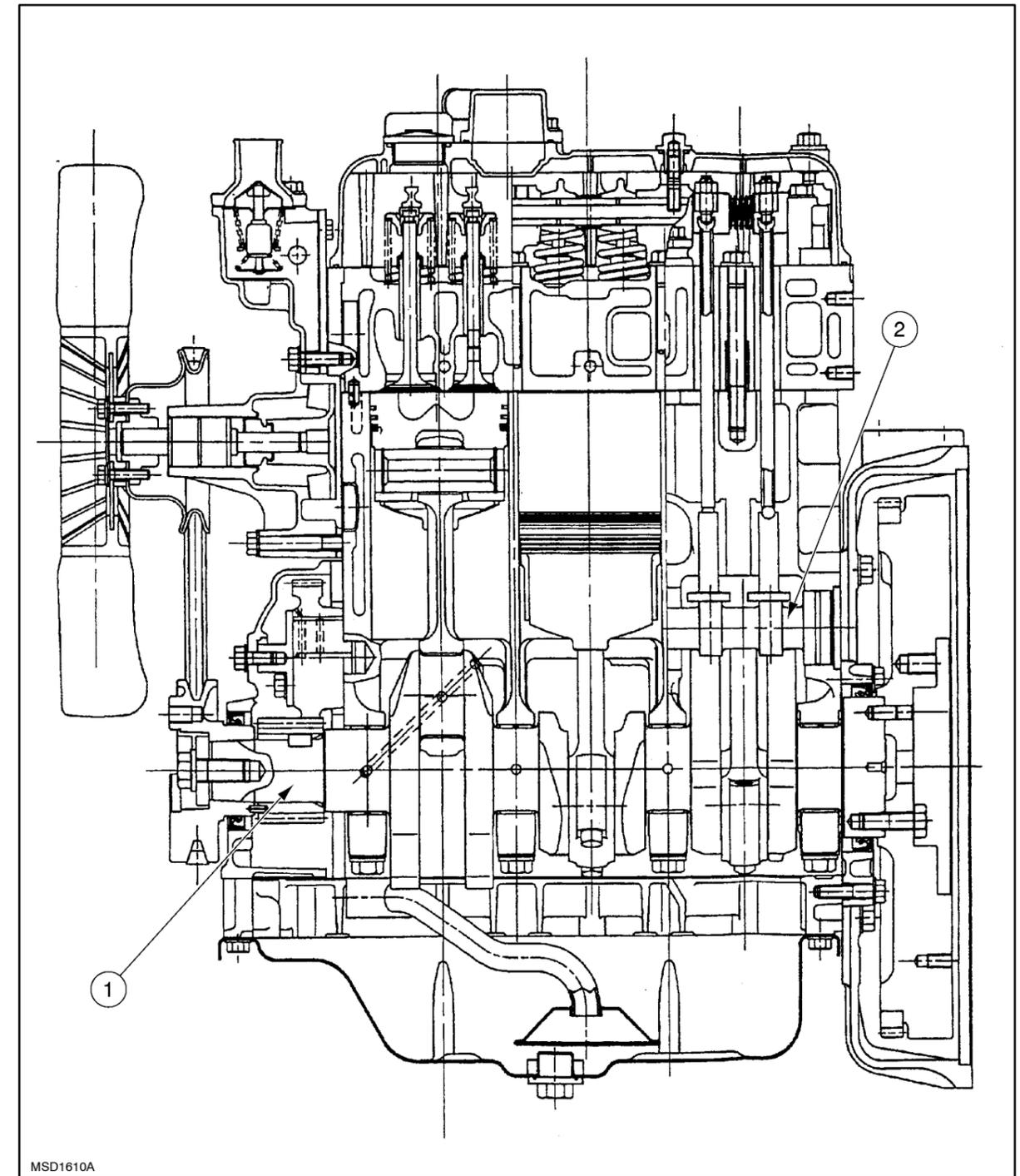
SECTIONS



Longitudinal section of engine (mod. TCE40).

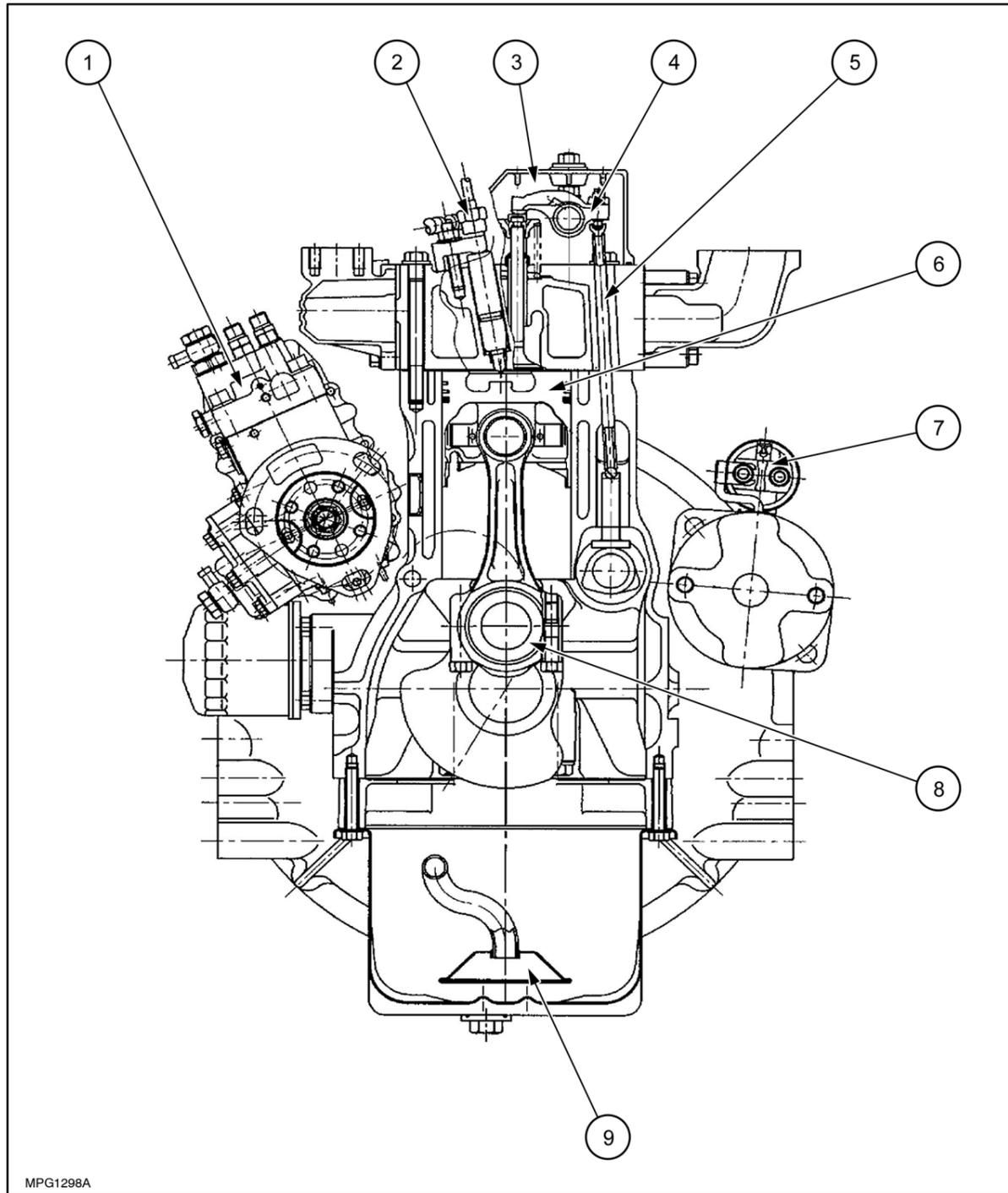
1. Crankshaft
2. Camshaft

SECTIONS



Longitudinal section of engine (mod. TCE40).

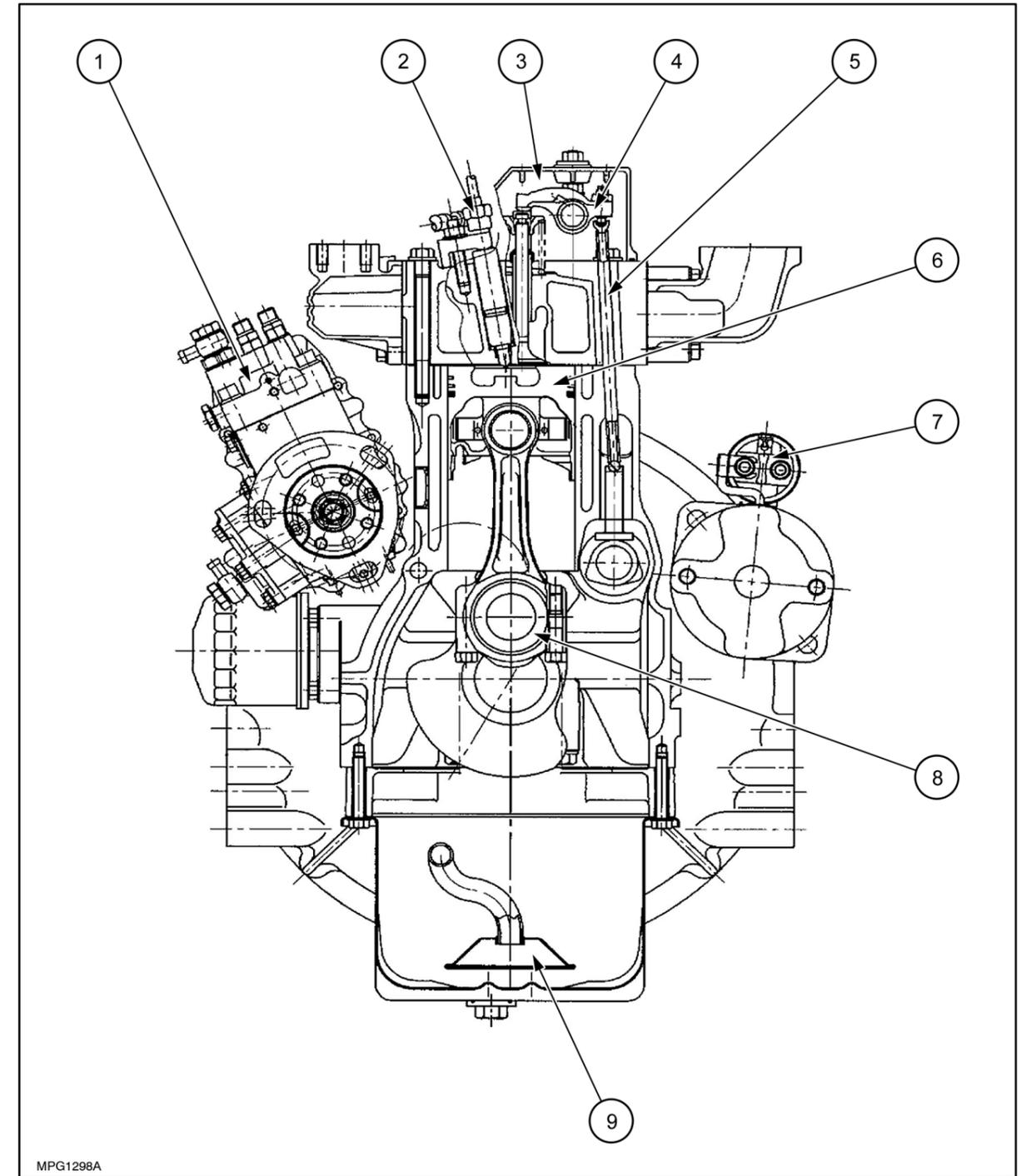
1. Crankshaft
2. Camshaft



Cross-section of engine (mod. TCE40).

2

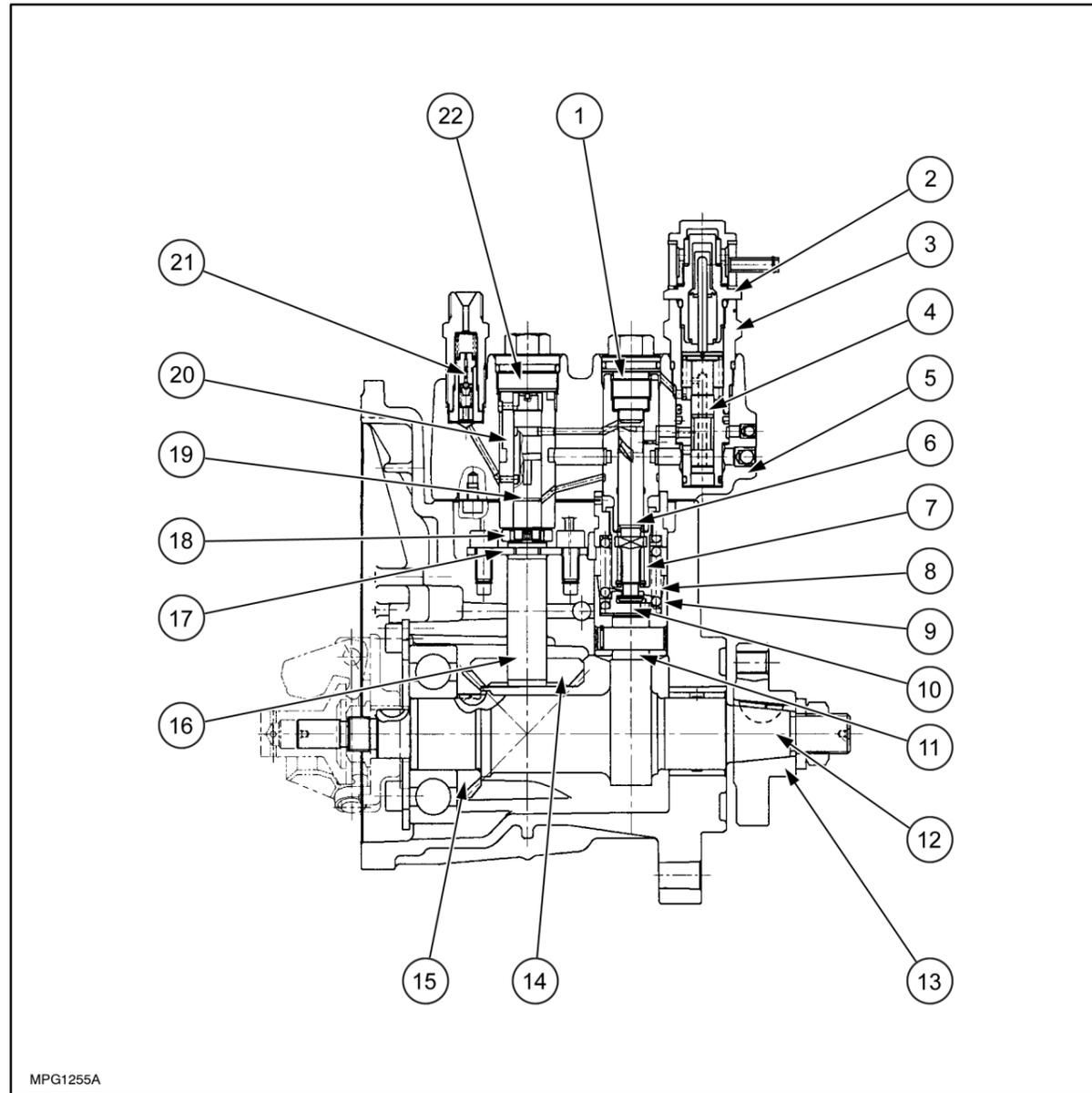
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|------------------------|-------------------------------|
| 1. Fuel injection pump | 6. Piston |
| 2. Injection nozzle | 7. Starter motor |
| 3. Tappet cover | 8. Connecting rod |
| 4. Rocker arm | 9. Lubrication oil inlet pipe |
| 5. Cylinder head | |



Cross-section of engine (mod. TCE40).

2

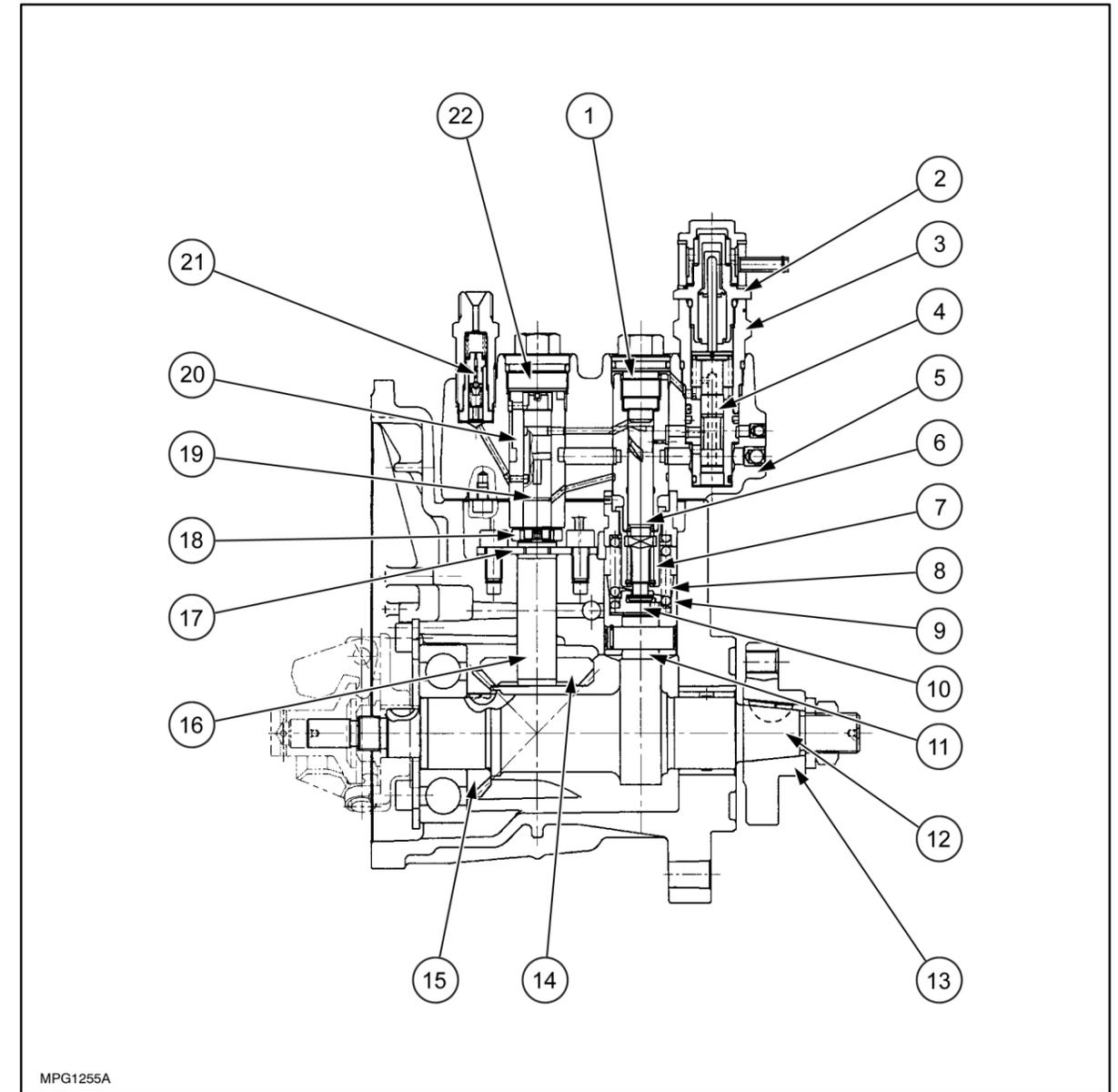
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|------------------------|-------------------------------|
| 1. Fuel injection pump | 6. Piston |
| 2. Injection nozzle | 7. Starter motor |
| 3. Tappet cover | 8. Connecting rod |
| 4. Rocker arm | 9. Lubrication oil inlet pipe |
| 5. Cylinder head | |



3

Injection pump sectional view.

- | | |
|----------------------------|--|
| 1. Plunger plug | 13. Flange |
| 2. Thermo-element | 14. Control valve propeller shaft gear |
| 3. Heating element carrier | 15. Camshaft gear |
| 4. Plunger | 16. Control valve propeller shaft |
| 5. Upper pump body | 17. Stop plate |
| 6. Plunger | 18. Joint |
| 7. Control sleeve | 19. Control valve |
| 8. Spring | 20. Control valve cylinder |
| 9. Roller tappet | 21. Delivery valve |
| 10. Spring guide | 22. Control valve cap |
| 11. Roller | |
| 12. Camshaft | |



3

Injection pump sectional view.

- | | |
|----------------------------|--|
| 1. Plunger plug | 13. Flange |
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| 12. Camshaft | |