Sisu engine - General

C . Main characteristics

Model	8450
Engine type	SISU 74 ETA
Number of cylinders	6
Bore	108
Stroke	134
Capacity	7.4
Compression ratio	17.5/1
Compression pressure (kPa)	2000 / 3500
Allowable compression deviation between cylinders (kPa)	350
Output at 2,200 rpm ch (kw) ISO	215 (158)
Maximum torque (Nm)	925
at speed (rpm)	1500
Idle speed	800
Nominal speed	2200
Maximum speed at no load	2350
Pre- / Post-heating	yes
Wet cylinder sleeves	yes
Weight (kg)	520
Injection pump	
Trademark and type	Bosch VP44
Rotation	Clockwise
Static timing angle (degrees)	26°
Engine position	TDC
Engine check angle (degrees)	pin
Injection order	1-5-3-6-2-4
Lift pump	Electric
Injectors	
Trademark	Stanadyne
Code	M33877
Nozzle holder	
Nozzle	5 ports
New and servicing setting (bar)	278
Miscellaneous	
Suction system	Intercooler air/air turbocompressor (no wastegate)
Minimum boost pressure at 2,200 rpm at full load (bar)	1.2
Number of valves per cylinder	2
Valve spring	simple
Valve seat insert (Inlet / Exhaust)	yes / yes
Inlet / Exhaust valve angle	35° / 45°
Inlet / Exhaust valve tip clearance (mm)	0.35 / 0.35
Oil cooler	yes
Number of temperature switches	2
Opening temperature (start/full)	83°C
Fan	Vistronic
Piston cooling nozzle	yes
Oil filter	1
Fuel filter (microns)	prefilter (30) + filter (5)

A . Checking the valve timing adjustment

Checking the valve timing adjustment

NOTE: The engine oil must be drained before opening the timing housing. Use a new seal for the cover of the timing housing.

1. Remove the fan, the belt (1), the alternator (2) and the air conditioning compressor if the tractor has air conditioning.
2. Remove the crankshaft pulley (3) and the damper (4).
3. Unscrew the crankshaft nut (5) by two turns, without actually removing it (service tool ref. 902455800).

   NOTE: The nut will serve as a retainer when removing the hub.
4. Fit the extracting tool (service tool ref. 910453300) onto the crankshaft hub and extract the hub (Fig. 2).
5. Take off the extracting tool, remove the crankshaft nut and remove the hub.
6. On 84CTA engines, remove the water pump screws and mark them.
7. Remove the screws from the timing cover and the belt tensioner (19 screws for 74CTA engines, 22 screws for 84CTA engines).

   NOTE: Mark the long screws and the short screws, and their locations.
8. Turn the crankshaft pinion in the direction that the engine turns, until the mark of the crankshaft pinion is lined up with that of the intermediary pinion.

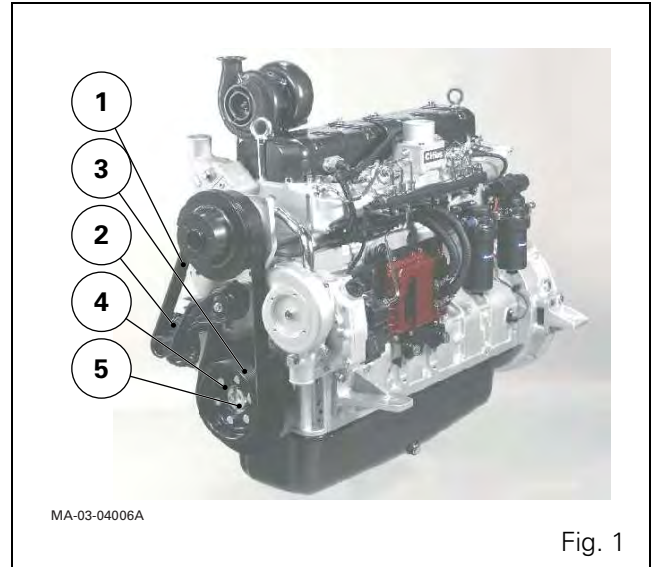   *IMPORTANT: Do not force if it blocks during rotation.*

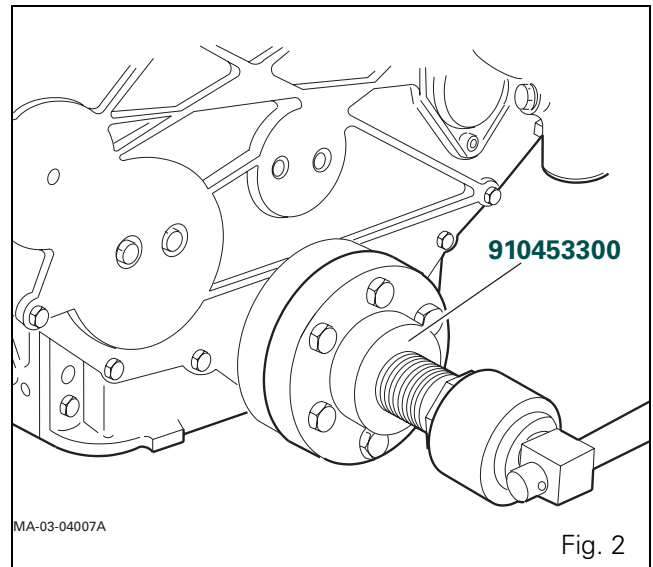MA-03-04006A

Fig. 1

910453300

MA-03-04007A

Fig. 2

Selecting movement and direction

The Dyna VT transmission possesses a user interface and a specific display screen. The power shuttle lever (Fig. 21) controls direction of travel, and speed increase and decrease.

Set the left-hand lever to the desired direction of movement, the corresponding symbol comes on the relevant screen. When the tractor is in movement, each change of direction is achieved with the left-hand lever (Fig. 21).

(1) Neutral position

(2) Forward position

(3) Reverse position

To set the tractor in motion (forward or reverse), adapt the transmission ratio with the right-hand lever, or the plus and minus buttons of the reverse shuttle lever, depending on the desired speed. During tractor movement, if the clutch pedal is activated, the transmission ratio is decreased until speed is zero.

MA-05-04285A

Fig. 21

The armrest lever (Fig. 22), with no neutral or Park-Lock, also controls speed increase and decrease depending on the direction of movement.
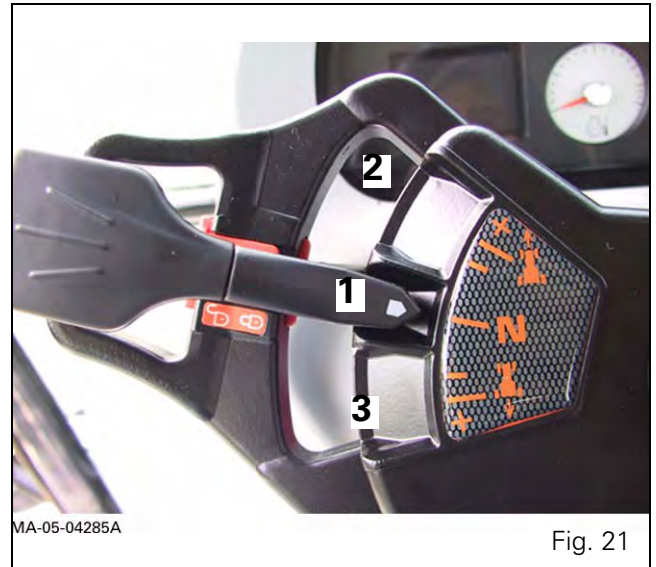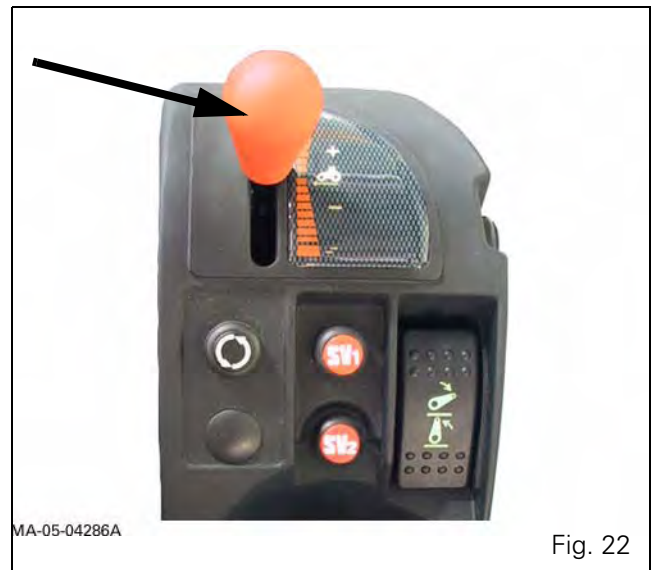

MA-05-04286A

Fig. 22

Final drive units

## E . Reassembling a rear axle drive unit

Important: Before reassembling, all components, mating faces and grooves must be clean. Any rust, mud or water must be removed.

If necessary:

39. Fit home the external ring of the taper roller bearing (28).

40. Fit the snap ring (29) into the groove.

41. On the opposite side, fit home the external ring of the taper roller bearing.


MA-06-04166A

Fig. 18

42. Heat the internal ring of the taper roller bearing (28) to approximately 80°C and install it in the drive unit housing (15).

43. Smear the outside of the new spi seal (30) with sealing product X 903.051.711, clean the inside with a mixture of white spirit and water (1:1) and fit it home.

MA-06-04167A

Fig. 19
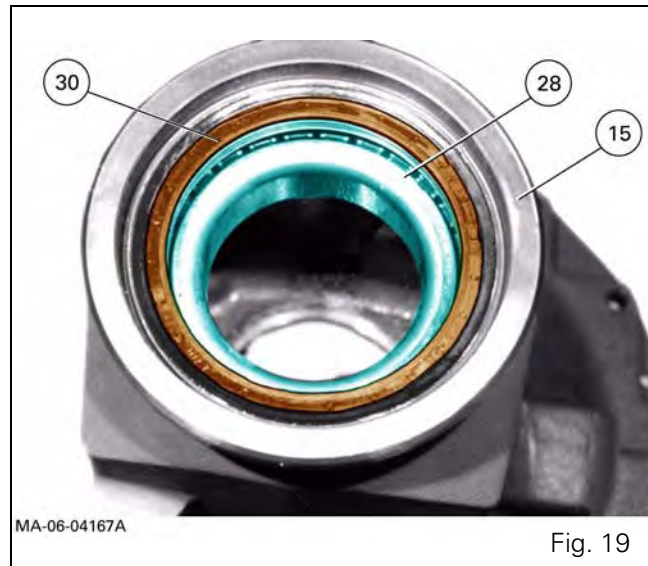
44. Before the internal ring cools, fit home the shaft (31) using locally made handles (see Fig. 20).

MA-06-04168A

Fig. 20
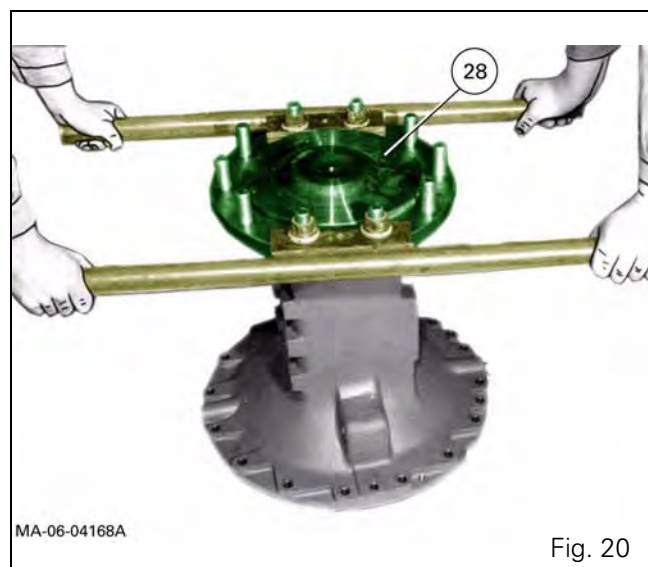
Blown-up view of steering housing
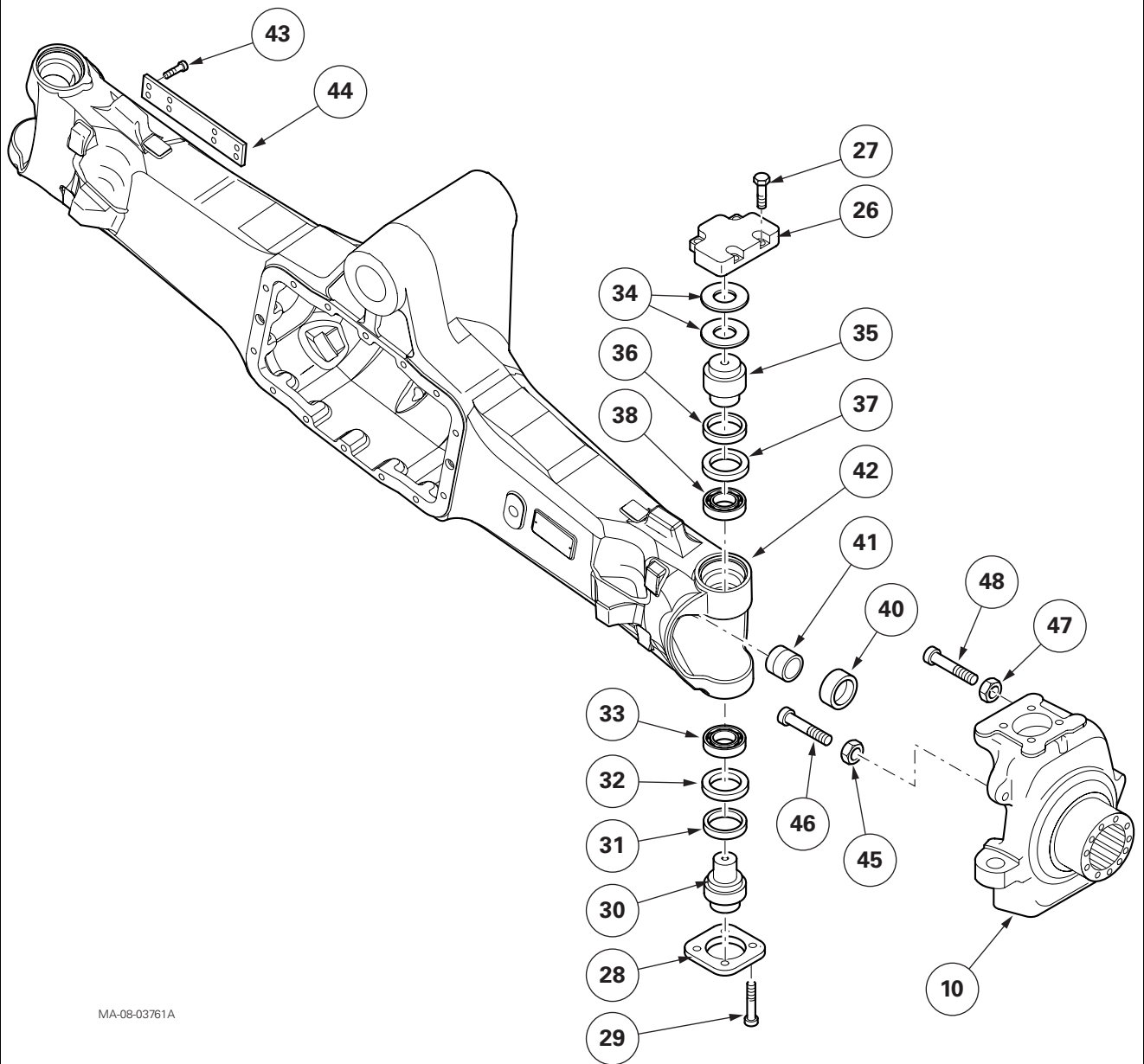
MA-08-03761A

Fig 3

C . Disassembling the 4WD clutch

The following operations must first be carried out:

1. Drain the transmission oil (approx. 65 litres).
2. Remove the universal joint shaft.
3. Remove brake pipes and hydraulic pipes which obstruct access.
4. Remove the transmission unit.

   NOTE: For easier reading, the work is carried out on a scale model.

5. Remove the suction pipe (Fig. 4).
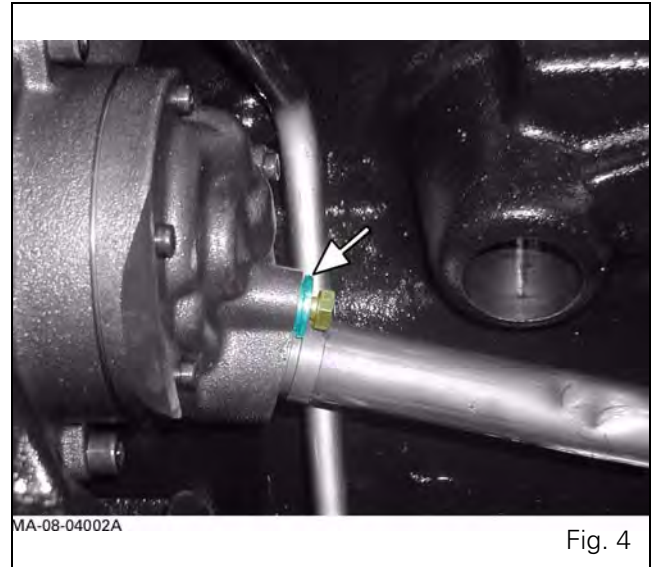6. Remove M8 screws and take out the retaining washer.

MA-08-04002A

Fig. 4
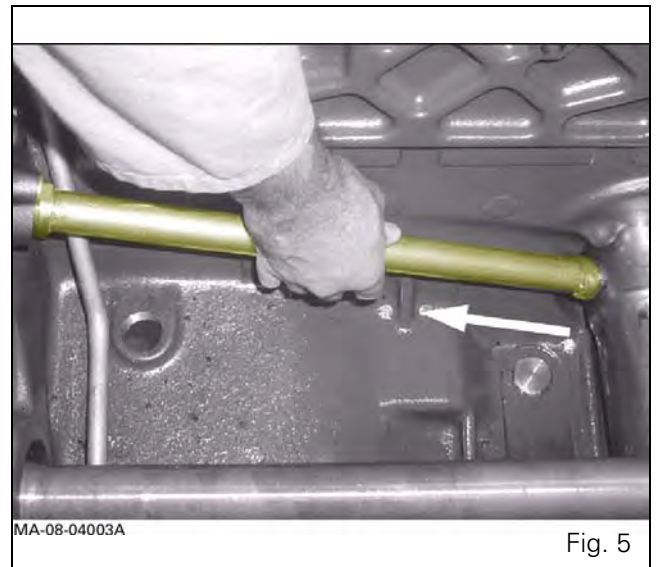
7. Extract the suction pipe from the filter housing.

MA-08-04003A

Fig. 5

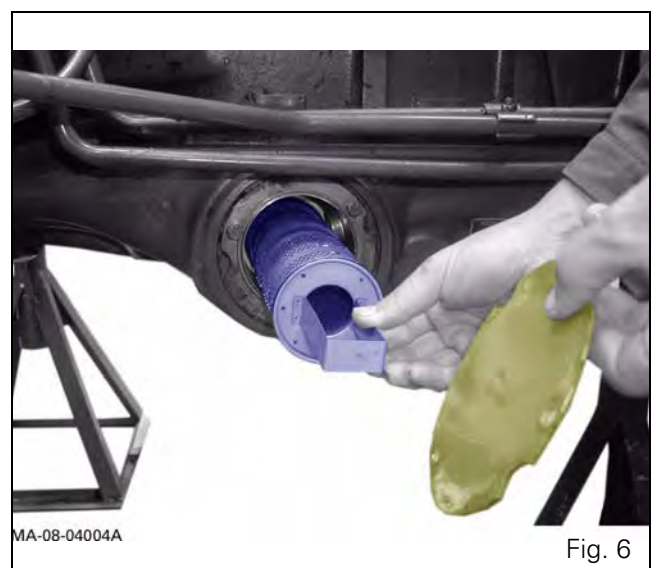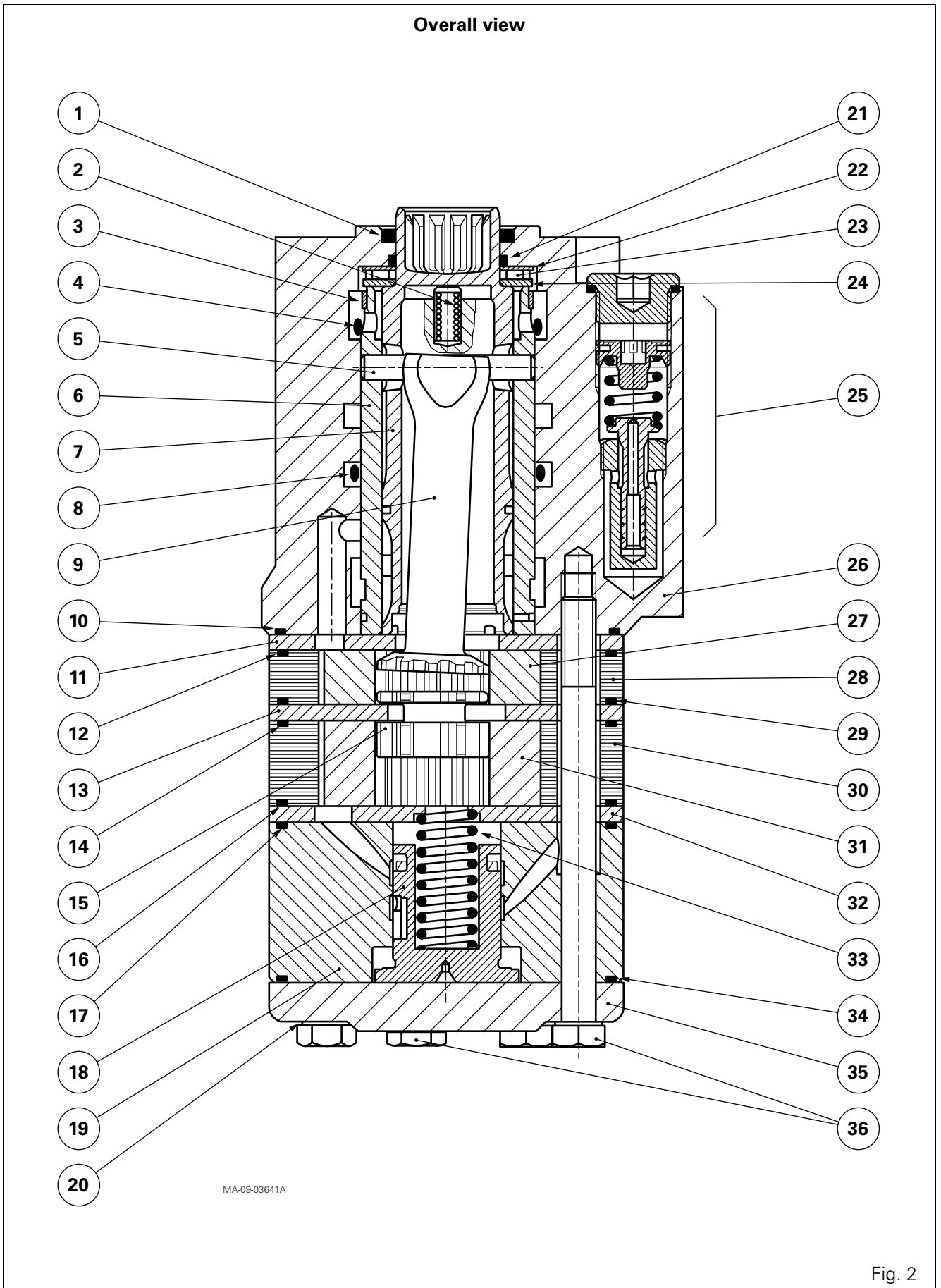8. Take off the closing plate.
9. Take out the suction filter.

MA-08-04004A

Fig. 6

Overall view

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MA-09-03641A

Fig. 2

Disassembling and reassembling the pumps

122. Fit the suction filter (74).

MA-09-04159A
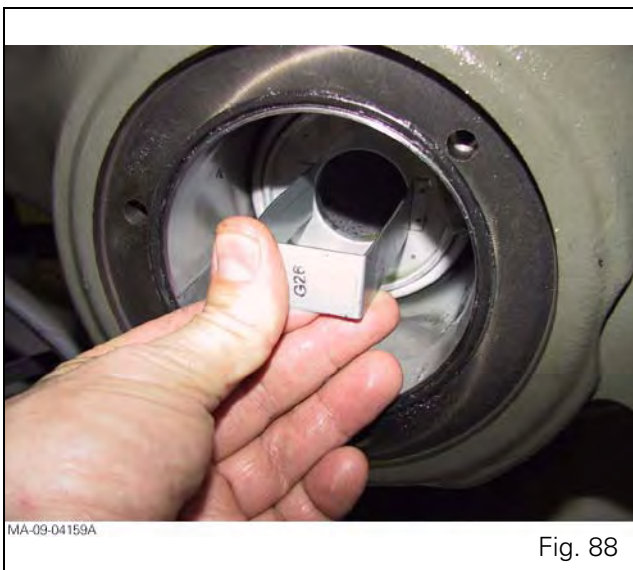
Fig. 88

123. Fit the cover (76) using the 3 screws (75).

MA-09-04160A

Fig. 89

124. Tighten the screws (75) to a torque of:

25 Nm
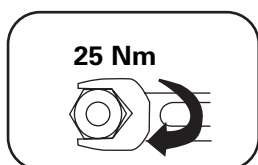
125. Refit the transmission unit. See "Reassembling the Dyna VT module" section.

MA-09-04161A

Fig. 90

55, Pump speed deviation

Description

The EEM2 controller has inconsistent speed information between crank speed (detected by Hall sensor from the crank shaft) and pump speed (detected inside the Injection pump). The probable causes for the problem is the PCU, because if there is an error with a Hall sensor, there would be a different error code.

Reaction in the EEM

The error code is stored and the indicator light is activated. The EEM2 controller will activate emergency shutdown.

Solution

The probable cause of the problem is a faulty PCU.

• Test PCU operation with another EEM2 controller.

NOTE: If the EEM2 controller from another tractor is used, error code 175 will be activated, because of pump serial number mismatch.

If error code 55 disappears, the EEM2 controller has been damaged. Replace the controller and connect the current injection pump (serial number) to the new EEM2 controller with the EEM2 Service Tool. If error code 55 does not disappear when using another EEM2 controller, the Bosch VP PCU is damaged. Contact the BOSCH service agency.

• Switch the ignition off (5sec.) and back on and start the engine. If the error is still active, the problem is caused by a faulty PCU (Pump Control unit). Contact the BOSCH service agency.

56, Pump supply voltage too low (< 6.8V)

Description

The supply voltage is too low for the defined time. The engine cannot start.

Reaction in the EEM

The error code is stored and the indicator light is activated.

Solution

The probable cause of the problem is the voltage drop down during starting.

• Check that battery voltage is not too low (> 11.5V).
• Check alternator operation.

If the error remains active after ignition is switched on:

• check all contacts and fuses and wiring from the battery to the EEM2 controller and to the rotary pump for bad contact at a connector or for a short circuit.
• Check the supply voltage of the BOSCH VP injection pump (Fig. 8).

57, Pump supply voltage too high (>17.0V)

Description

Supply voltage is too high for defined time.

Reaction in the EEM

The error code is stored and the indicator light is activated. The EEM2 controller will switch off the supply voltage from the PCU and will stop the engine if the error remains active after 20 seconds.

Solution

• The error code is stored and the indicator light is activated. Check the correct operation of the alternator and charge voltage.
• Check the supply voltage of the BOSCH VP injection pump (Fig. 8).

DCC2 (DynaVT) - Calibrations, constants and adjustments

EC BIN: DCC2 digital input data for electronic injection

```
          DIAGNOSTIC
DATA          DC    BIN
DC   ANA      DC    ERR
DC   LED      DC    GAUGE
TC   BIN      TC    ANA
TC   EV       TC    ERR
EC   BIN      EC    ANA
```

MA-11-01205A

Fig. 31

```
Switch A                0
Switch B                0
Switch +                0
Switch -                0
Hours                 128
```

MA-11-01206A

Fig. 32

Screen Code	Diagnostic function
Switch A	A memorised speed activation switch
Switch B	B memorised speed activation switch
+ Switch	+ switch for memorised speeds adjustment
- Switch	- switch for memorised speeds adjustment
Hours	Total engine hours stored by engine electronic calculator

EC ANA: DCC2 analog input data for electronic injection

```
          DIAGNOSTIC
DATA          DC    BIN
DC   ANA      DC    ERR
DC   LED      DC    GAUGE
TC   BIN      TC    ANA
TC   EV       TC    ERR
EC   BIN      EC    ANA
```

MA-11-01203A

Fig. 33

```
Droop Curv              5
Torque Curv             1
Engine Temp           120
Fuel Cons              20
Air Inlet              79
Oil Pressur            78
Engine Load            73
Torque Ref            590
```

MA-11-01204A

Fig. 34

Screen Code	Diagnostic function
Droop Curv	Regulation slope: always 5%
Torque Curv	Torque curve
Engine Temp	Engine temperature
Fuel Cons	Fuel consumption
Air Inlet	Vacuum gauge
Oil Pressur	Engine oil pressure
Engine Load	Engine load
Torque Ref	Reference torque

B . Saving to a file

Calculator data (program, parameters and calibration) can be saved in a single file that can be forwarded to technical support as requested.
This file can be opened only by the factory engineers.

- Double click in the left-hand column of the line of the calculator whose content you wish to save.
  The line turns blue and at the bottom of the left-hand column, Wintest specifies which Autotronic 5 has been selected.
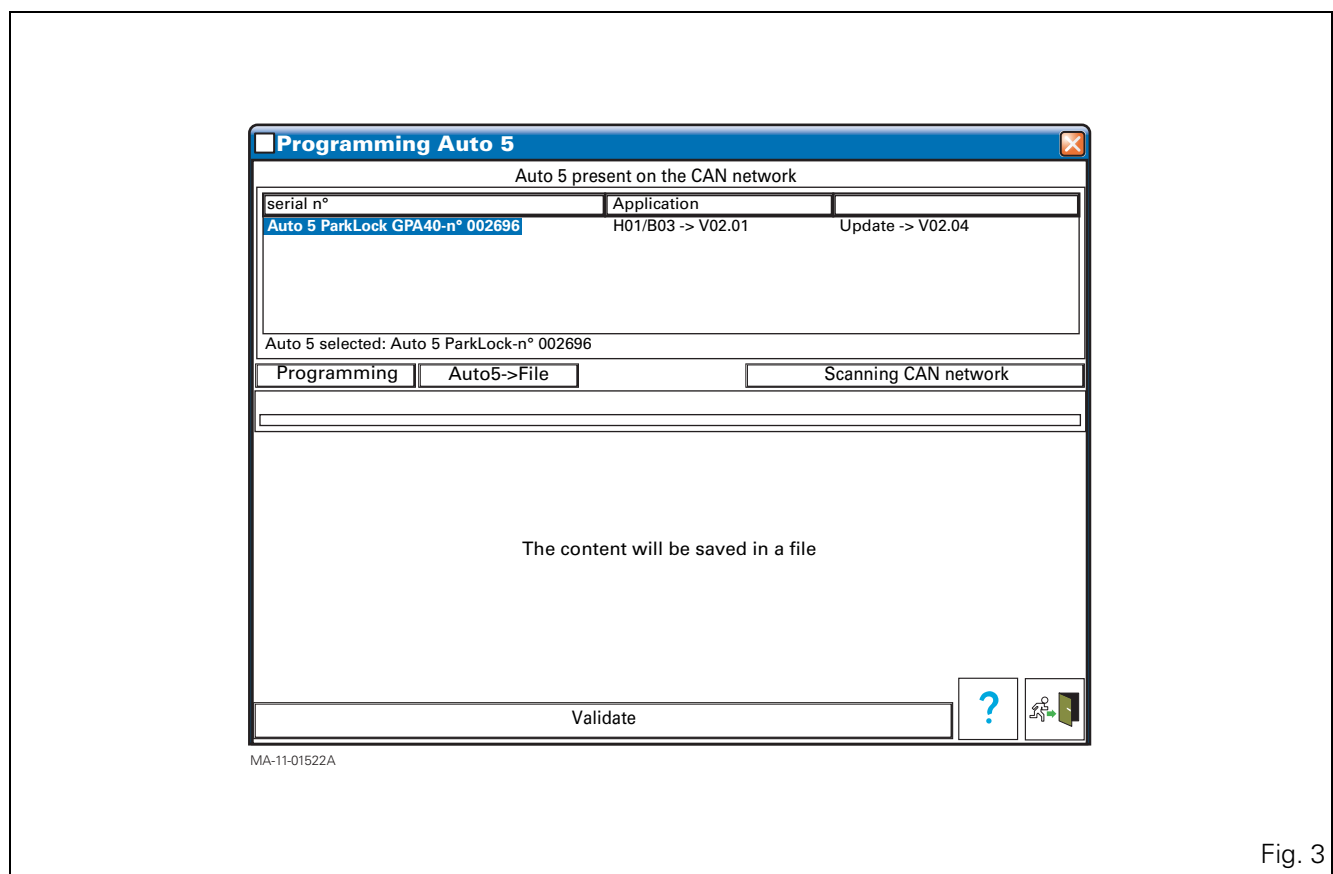- Next, click on the "Auto5 -> File" icon:

Programming Auto 5		✕
Auto 5 present on the CAN network		

serial n°	Application	
Auto 5 ParkLock GPA40-n° 002696	H01/B03 -> V02.01	Update -> V02.04

Auto 5 selected: Auto 5 ParkLock-n° 002696

Programming	Auto5->File	Scanning CAN network

The content will be saved in a file

Validate	?	🚪

MA-11-01522A

Fig. 3

- Next, click on "Validate".

Points menu

POINTS menu displayed only in the right-hand window
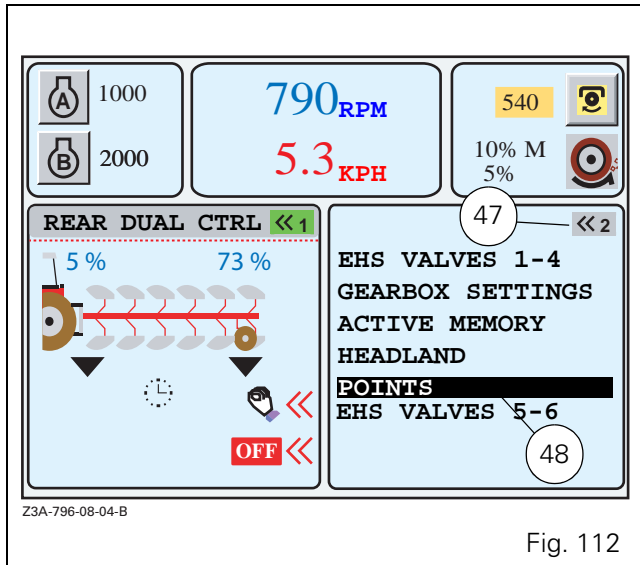(Fig. 112):

Fig. 112

- To start one of the applications, press the key «₁
  or «₂ twice. The first press selects the window and
  the second displays the list. The active application is
  represented by a green button at the top right of the
  window (47 Fig. 112).
- To call up the various menus, select the application
  using the encoder. The selected application is
  displayed in a black frame (48 Fig. 112). Validate by
  pressing the encoder. The window (Fig. 113) is
  displayed.

Fig. 113

The DUAL CONTROL menus are used to initiate a
straight furrow start or end phase. When the field is
pointed, however (see diagram Fig. 114), the POINTS
menu must be used.

This menu can only be used with a single DUAL
CONTROL at a time.

*Note: To define the DUAL CONTROL and POINTS
menu settings, see page 68 DUAL CONTROL applica-
tion.*

Fig. 114

A . Programming

Programming of the Datatronic 3 is necessary:

- when the former Datatronic 3 unit has been replaced by a new one (the present program is updated when the new unit is delivered),
- when a new program becomes available to improve the product
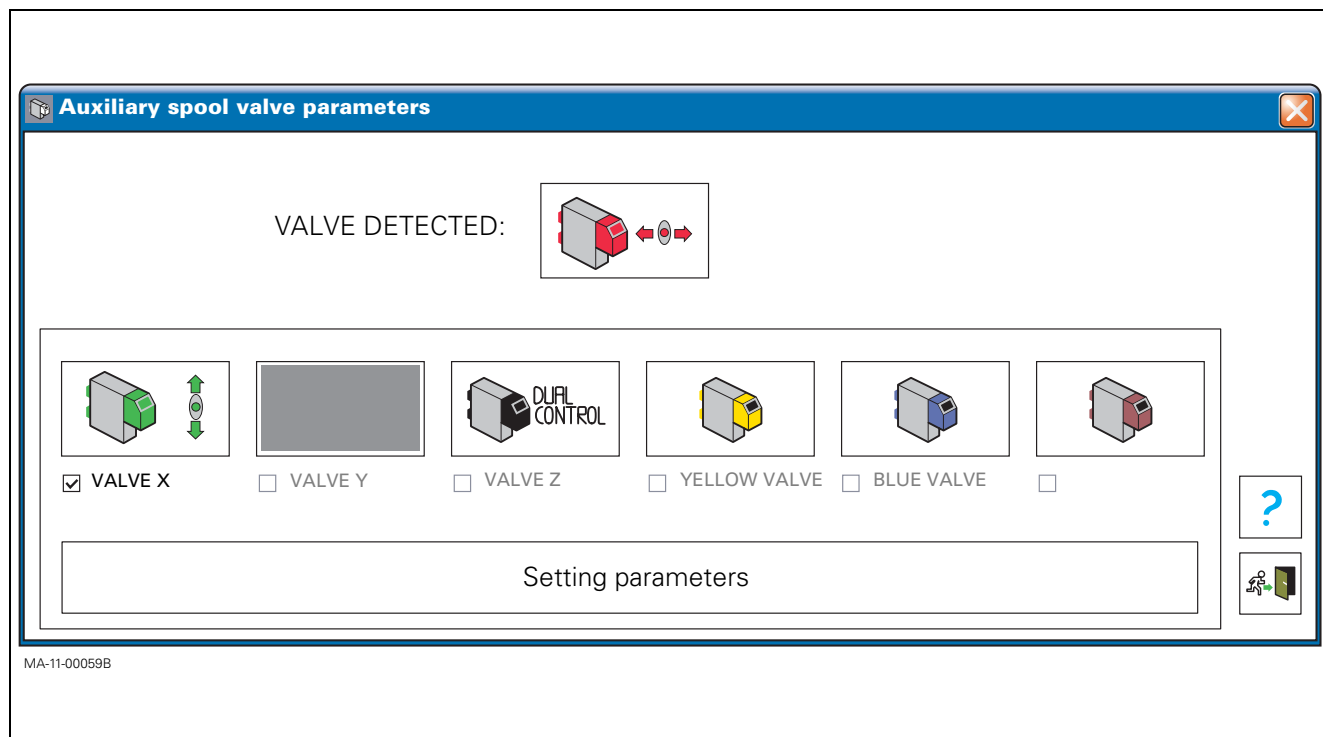
Soft version from 1.2 to 1.5 prior to programming

- Switch on the ignition key to carry out this operation. The engine must be stopped.
- Start Wintest and detection; the following screen will appear:


MA-11-06240A
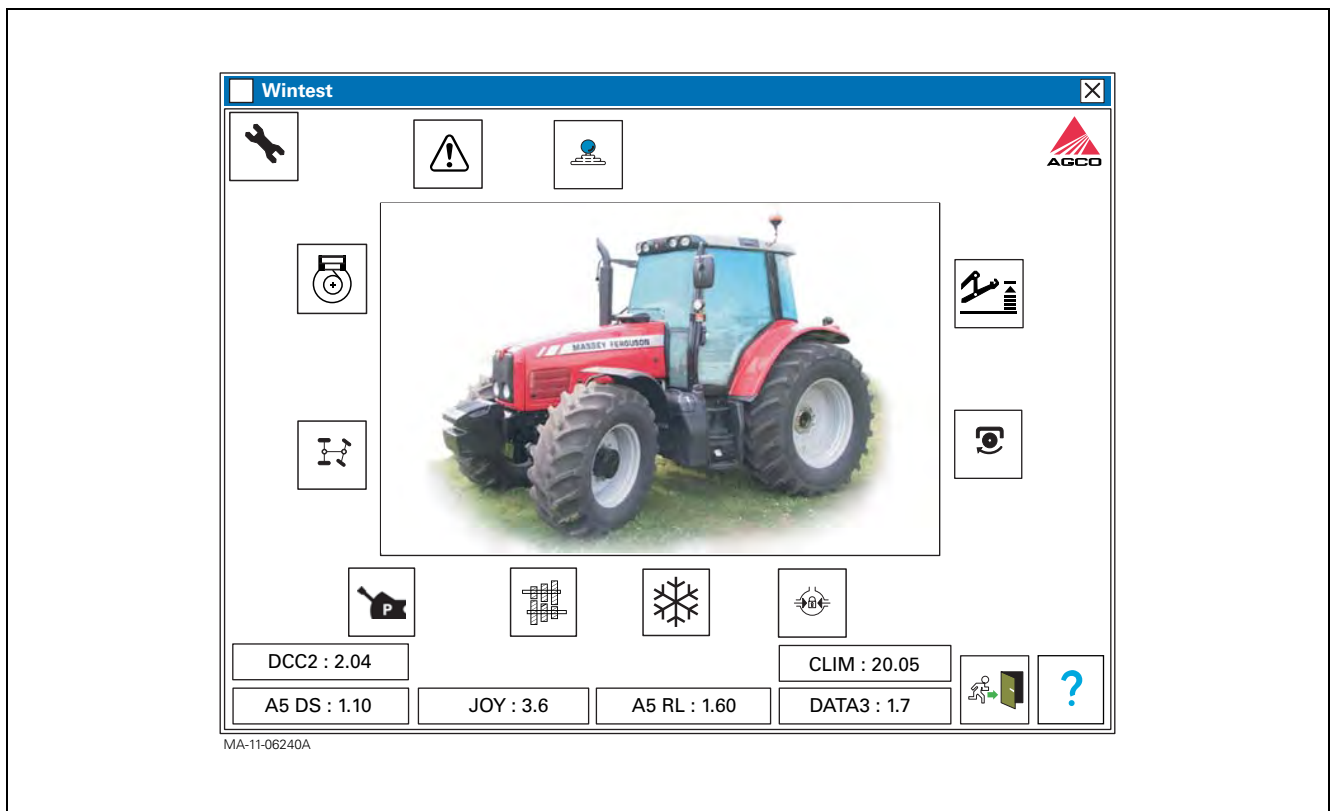
SMS - JOYSTICK / FingerTIP - Setting parameters

The following screen is displayed:

MA-11-00059B

Wintest indicates the detected valve (red, Y axis)
The types of valves are always relative to a colour.
*NOTE:* *If no valve is detected, no icons are displayed in the windows.*

White valve
New service valve not configured

Green valve
Valve configured along the X axis of the Joystick or for the FingerTIP (can be used for the Dual Control)

Red valve
Valve configured along the Y axis of the Joystick or for the FingerTIP

Black valve
Valve configured for the 3rd lever or for the FingerTIP (can be used for the Dual Control)

Yellow valve
Valve configured for the 4th lever or for the FingerTIP

Blue valve
Valve configured for the 5th lever or for the 1st lever on tractors with FingerTIP

Brown valve
Valve configured for the 6th lever or for the 2nd lever on tractors with FingerTIP

A . Operating principle

The air conditioning system is controlled entirely by the electronic control unit in order to obtain the same level of comfort for the driver regardless of external weather conditions.

Temperature sensors inside and outside the cab and on the evaporator allow the system to regulate the temperature at a level close to that selected by the user. A solar ray sensor informs the calculator of the effect of the sun on cab temperature.

The calculator is also informed of the temperature of the engine water used for heating and of its flow rate through the engine speed. Along with other information, for example error codes, this information is transmitted through the CAN network.

The calculator acts on the clutch of the air conditioning compressor, the fan motor, the heating valve and the air recycling shutter.
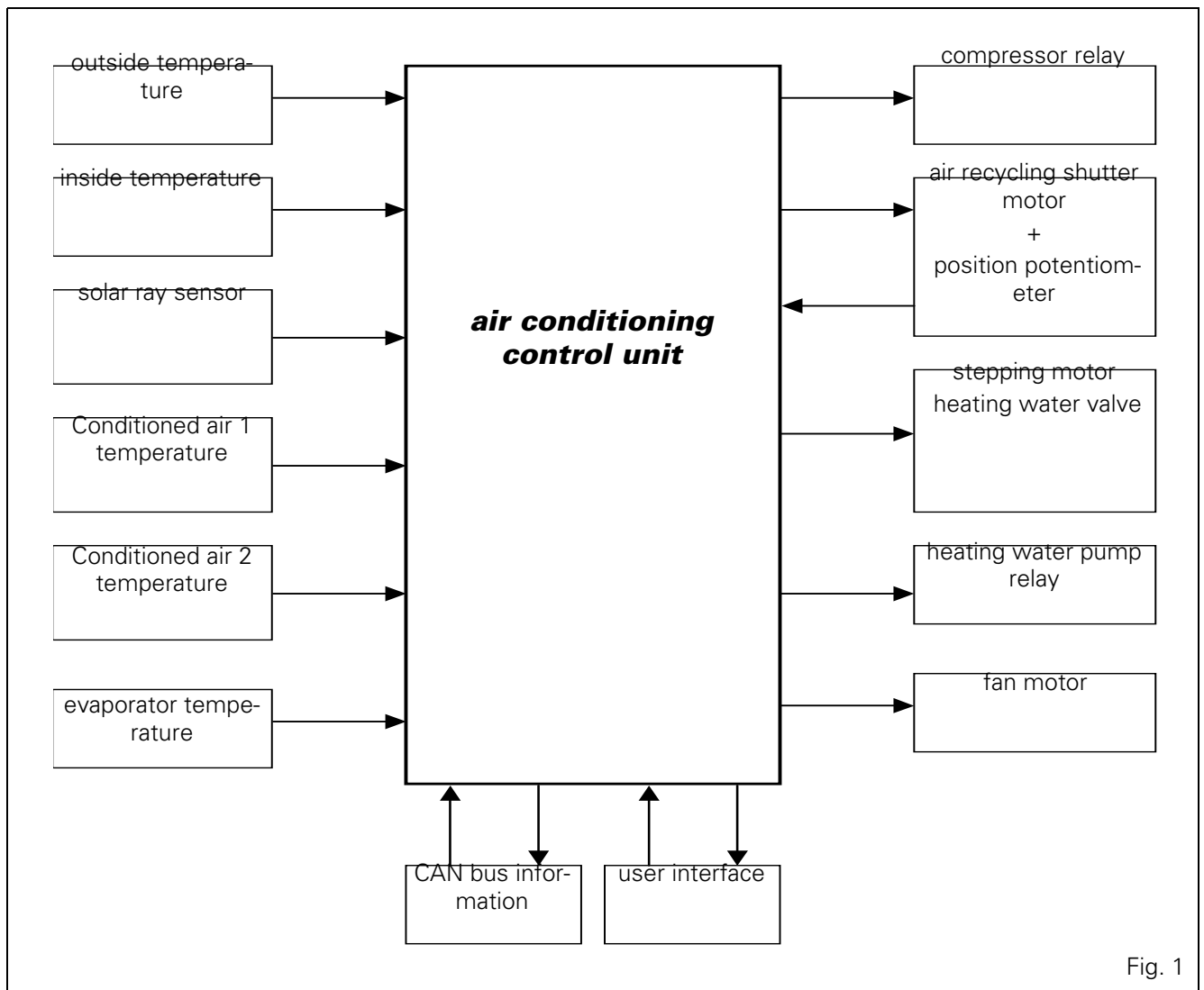
outside temperature		compressor relay
inside temperature		air recycling shutter motor + position potentiometer
solar ray sensor	**air conditioning control unit**	stepping motor heating water valve
Conditioned air 1 temperature		heating water pump relay
Conditioned air 2 temperature		fan motor
evaporator temperature		
	CAN bus information	user interface

Fig. 1

-