AL 440
AL 540

Articulated Loader





GEHL®

Form No.
918275
Revison B
Mar. 2011

Service Manual

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CHAPTER 1 — SAFETY

This manual and decals on the machine warn of safety hazards and should be read and observed closely.

Before operating the machine, first read and study the safety information in this manual, and the safety information in the Operator's Manual. Additionally, anyone who operates or works on the machine must be familiar with these safety precautions.



This safety alert symbol means ATTENTION! ALWAYS BE ALERT! YOUR SAFETY IS INVOLVED! This symbol is used throughout this manual and on the decals on the machine.

DANGER

"DANGER" indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

"WARNING" indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

"CAUTION" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury or property damage. It is also used to alert users of unsafe practices.

It is essential that operators are thoroughly trained in the safe operation of the machine and handling loads. Operators must not be physically or mentally impaired. Do not allow minors or unqualified personnel to operate the machine, or to be near the machine unless they are properly supervised. It is recommended that the operator be capable of obtaining a valid motor vehicle operator's license.

Use of this machine is subject to certain hazards that cannot be eliminated by mechanical means, but only by exercising intelligence, care and common sense. Such hazards include: hillside operation, overloading, load instability, poor maintenance, and using the machine for a purpose for which it was not intended or designed.

Gehl Company always takes operator's safety into consideration during the design process. Guards and shields are provided, which protect the operator and bystanders from moving parts and other hazards. Operators must be alert, however, because some areas cannot be guarded or shielded without preventing or interfering with proper operation.

WARNING

The machine must be equipped with a Falling-Object Protective Structure (FOPS) when the machine is intended for applications where there is a risk of falling objects.

Different applications may require optional safety equipment. Be sure you know the work site hazards and equip the machine and the operator as necessary. The information in this manual does not replace any applicable safety rules and laws. Before operating the machine, learn the rules and laws for your area. Make sure the machine is equipped as required according to these rules/laws.

Some photographs in this manual may show doors, guards and shields open or removed for the purposes of illustration only. Be sure that all doors, guards and shields are in the proper operating positions before starting the engine to operate the machine.

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CHAPTER 2 — SPECIFICATIONS

Fluid Capacities/Lubricants

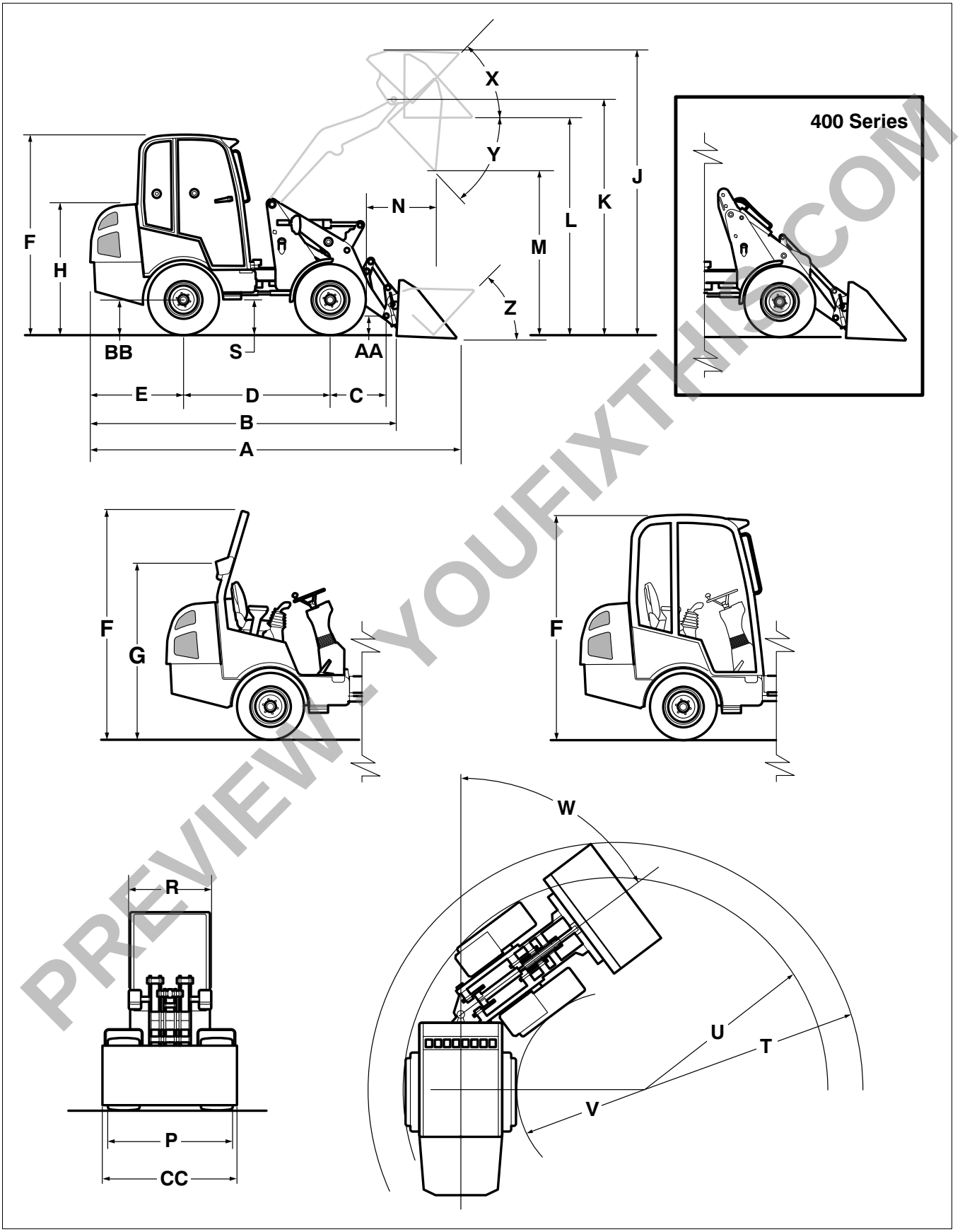
Application	AL 400 Series	AL 500 Series
Diesel Engine Oil		
Specification	API CD or Higher (United States) ACEA E-3, E-4, E-5 (European Union)	
Season/Temp. Range	SAE 10W-30: -20°C (-4°F) to 30°C (86°F) SAE 15W-40: -15°C (5°F) to 40°C (104°F) SAE 20W-50: -10°C (14°F) to 50°C (122°F)	
Capacity	7.4 L (2.0 gal.)	
Diesel Fuel	LSD or ULSD (low sulfur or ultra-low sulfur), below 500 PPM. Up to 5% (B5) mixture of BioDiesel allowed.	
Specification	1-D or 2-D, ASTM D975-94 (United States) EN 590:96 (European Union) ISO 8217 DMX (International) BS 2869-A1 or A2 (United Kingdom)	
Season/Temp. Range	Dependent on Outside Temperatures	
Capacity	67 L (17.7 gal.)	
Hydraulic Oil System/Tank		
Hydraulic Oil		
Specification	UTTO Fluid (Mobil 424 or equivalent)	
Season/Temp. Range	Year-Round	
Capacity	40 L (10.6 gal.)	
Biodegradable Oil		
Specification	Panolin BioFluid LS	
Season/Temp. Range	Year-Round	
Capacity	42 L (11 gal.)	
Axle Oil		
Hubs (each)	0.4 L (0.4 qt.) UTTO Fluid (Mobil 424 or equivalent)	
Front Center	2.5 L (2.6 qt.) UTTO Fluid (Mobil 424 or equivalent)	
Rear Center	3.2 L (3.4 qt.) UTTO Fluid (Mobil 424 or equivalent)	
Grease		
Specification	KF2K-25 Lithium	
Season/Temp. Range	Year-Round	
Capacity	As Required	
Engine Coolant System/Radiator		
Specification	Long-life coolant ASTM D4985, D6210 (United States) SAE J814D, J1941, J1034 or J2036 (International)	
Season/Temp. Range	Year-Round	
Capacity	6.4 L (6.8 qts.)	
Windshield Washer		
Specification	Windshield Washer Fluid	
Season/Temp. Range	Year-Round	
Capacity	1.3 L (1.4 qts.)	
Air Conditioning Refrigerant	—	737 g. (26 oz.) R134a

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Specifications

Dimensions

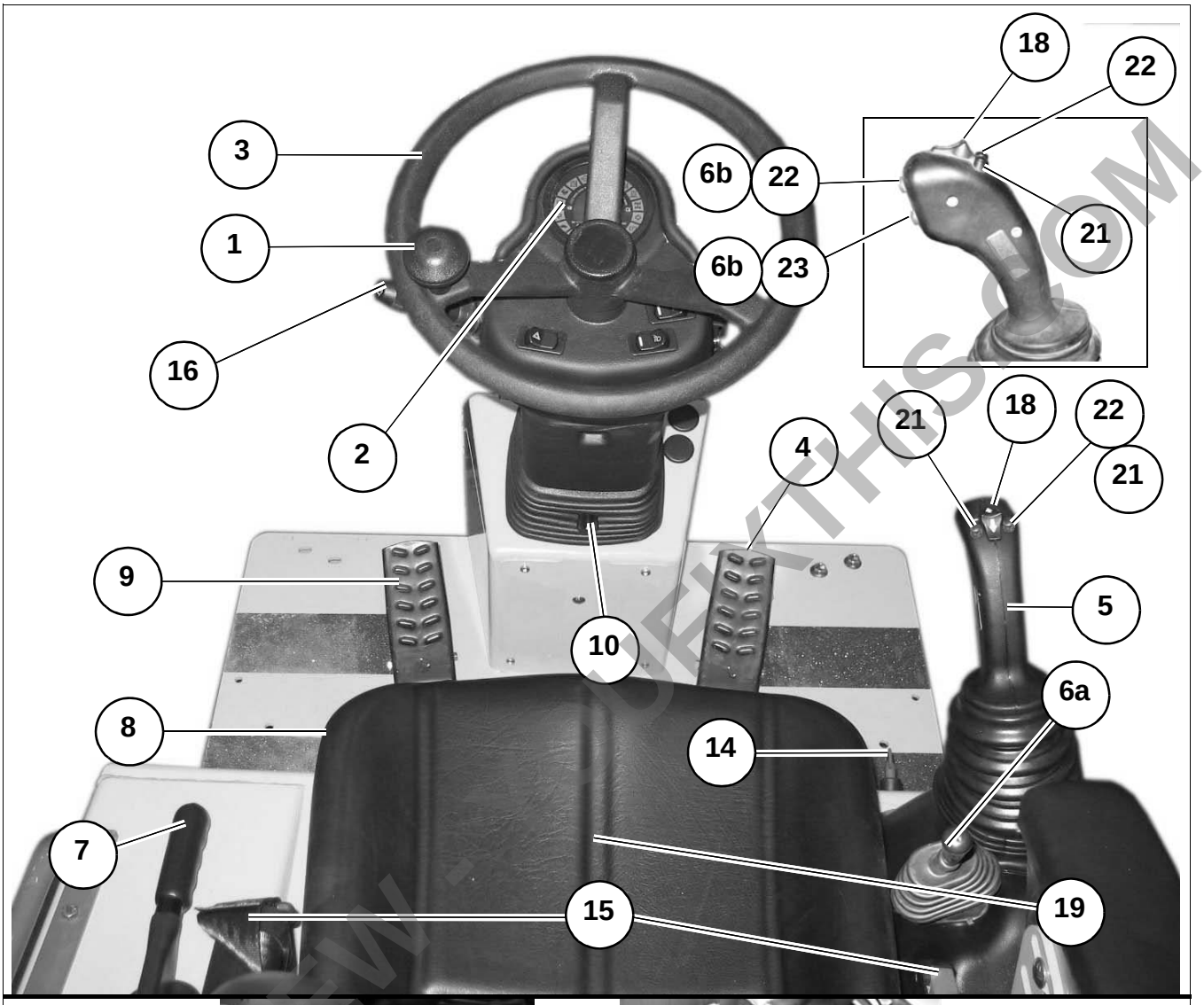


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Operation — Controls and Switches

Controls and Switches

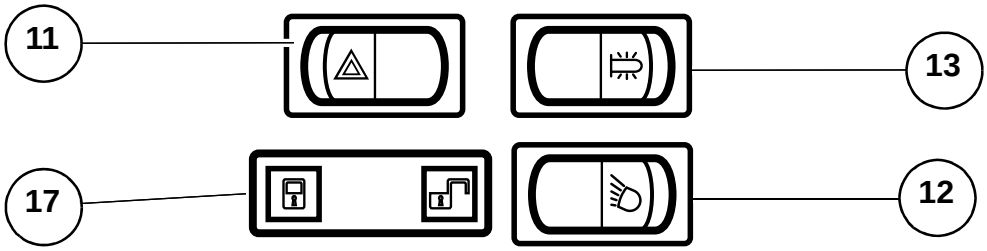




Located Behind Joystick 20



14 Located Inside Engine Compartment



NOTE: *Controls 11, 12, 13 and 17 are located on the steering column, below instrument panel 2.*

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Cab Dome Light

The dome light is located on the cab ceiling. Push button (1, Figure 4) to turn the light on/off.

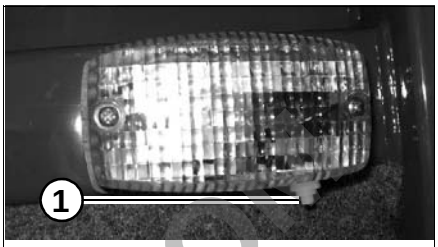


Figure 4 -- Cab Dome Light

Cab Defrost

Turn the vents (1, Figure 5), located on the left and right side of the cab, toward the window to defrost the window.

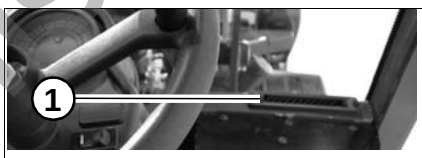


Figure 5 -- Vent

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Hydraulic Cylinder Disassembly/ Assembly

Except for some configuration differences, hydraulic cylinder disassembly, repair and assembly procedures will be mostly the same for all cylinders.

Refer to the parts manual for specific part and part orientation information for specific cylinders.

When backup rings are used with o-ring seals, always note the position of the backup ring (above or below the o-ring) when removing the seals for reassembly reference.

One-piece teflon piston seals can be difficult to install on the piston. Soaking the seals in hot 130°-140° F (54°-60° C), clean hydraulic oil for a short time prior to installation will make the seals more resilient and easier to install on the piston.

Before installing the piston and rod assembly into the barrel, lubricate the piston seals and wear rings liberally with clean hydraulic fluid. Using an engine piston ring compressor to compress the piston seals tightly for a short period of time will often aid in the assembly procedure.

Refer to the following pages for the disassembly / assembly procedures:

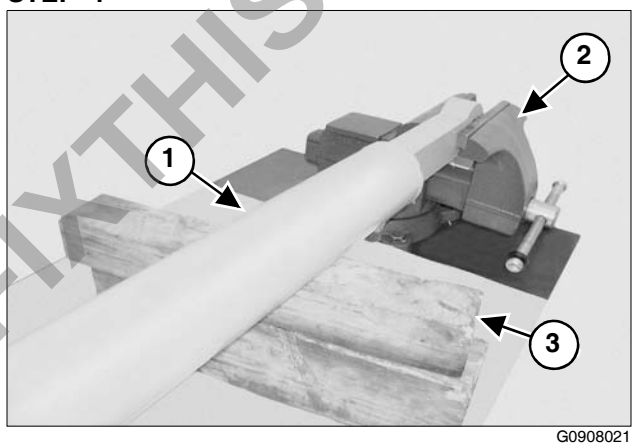
- “Cylinder Disassembly” on page 141.
- “Cylinder Assembly” on page 145.

Cylinder Disassembly

⚠ WARNING

When disassembling hydraulic cylinders, NEVER use pneumatic or hydraulic pressure to aid in removing the piston and rod assembly from the cylinder barrel. Ignoring this warning may result in severe injury or death.

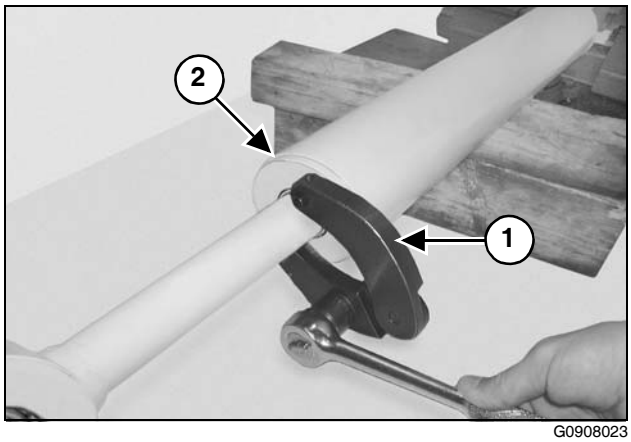
STEP 1



G0908021

Clamp the base end of the cylinder (1) in a vice (2). Position a wooden block (3) under the cylinder as shown.

STEP 2



G0908023

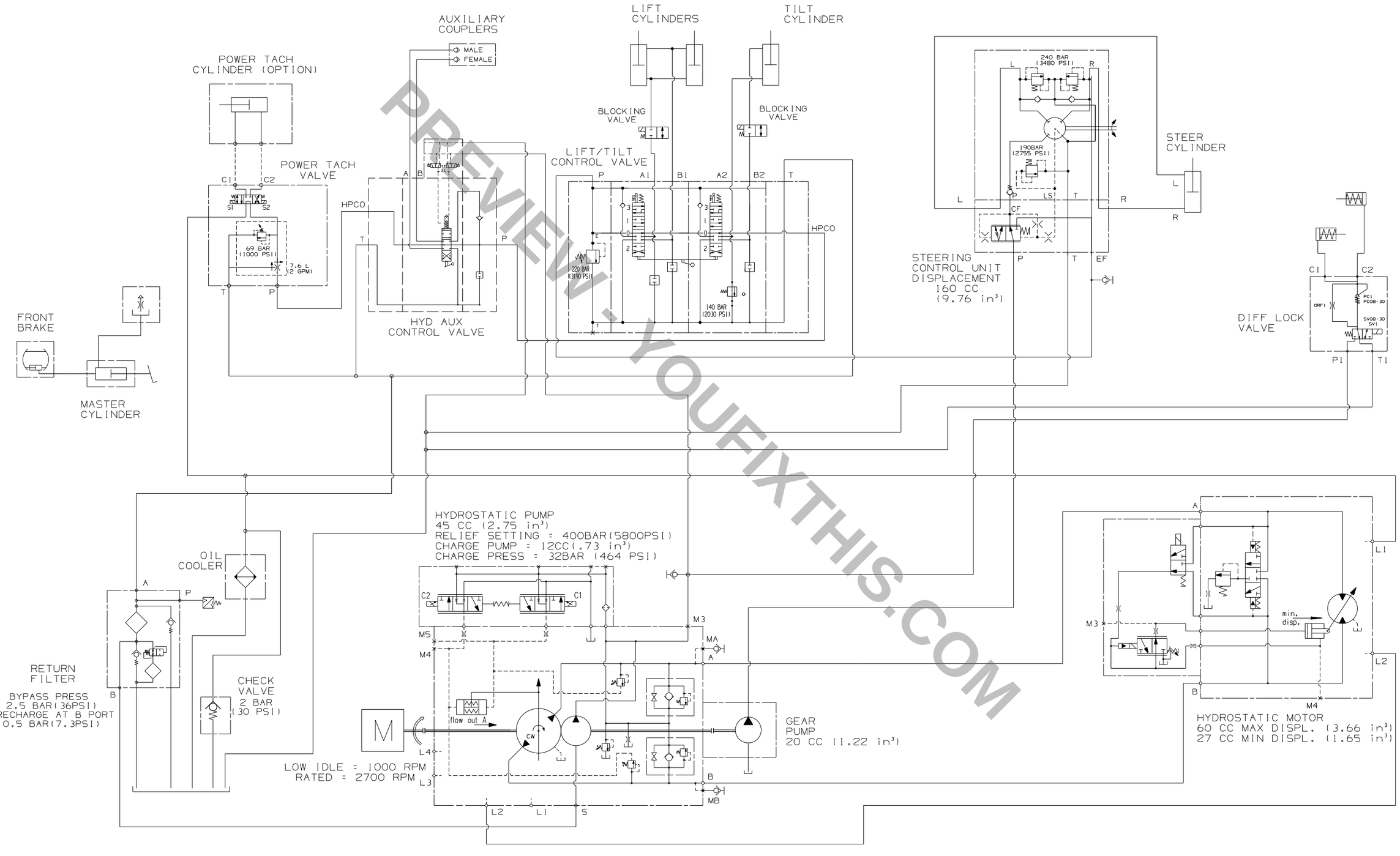
Loosen and remove the head gland (1) from the cylinder (2).

IMPORTANT: *Protect the polished surface finish on the cylinder rod at all times by covering the polished surface with impact-resistant material.*

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AL 400 Series Hydraulic Schematic – SN 41250 and Up



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Control Modules

The control modules, located behind the operator's seat on the right, provide switching, control logic and diagnostic functions.

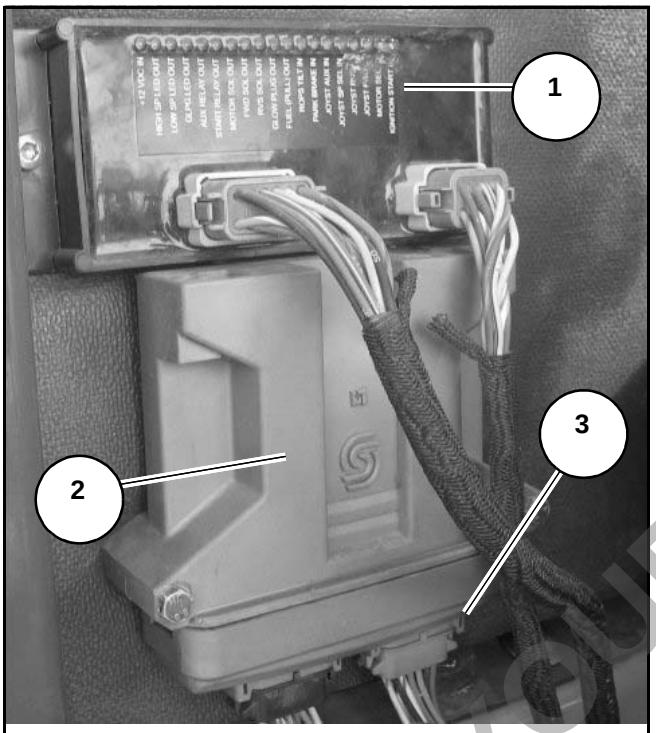


Figure 34 – Control Modules

1. Machine Controller
2. Drive Controller
3. LED Lights

Machine Controller

The machine controller provides the following functions:

- Glow plug control
- Starter logic
- Sends forward/reverse signal to drive controller

See "Machine Controller" on page 168 for more information about the machine controller.

Drive Controller

The drive controller provides computerized control of the drive system, and provides error-reporting functionality.

LED lights inside the cover indicate the following:

- Green steady on — Indicates power to the drive controller
- Red/green flashing — Indicates an error in the system

See "Drive Controller (Plus+1 Module)" on page 172 for more information about the drive controller.

Control Module Error Codes

Malfunctioning drive function may indicate a control module error condition.

The following describes control module error codes. Error codes are indicated by flashing LEDs (3, Fig. 34) located near the electrical connectors at the bottom of the module.

The LED flash pattern for error messages starts with four medium-length flashes, which signal the start of the message, followed by a pause. After the pause, a number of long flashes may occur, indicating the first digit for the code. After another pause, a number of short flashes occur indicating the second digit for the code. After a final pause, the flash pattern then repeats.

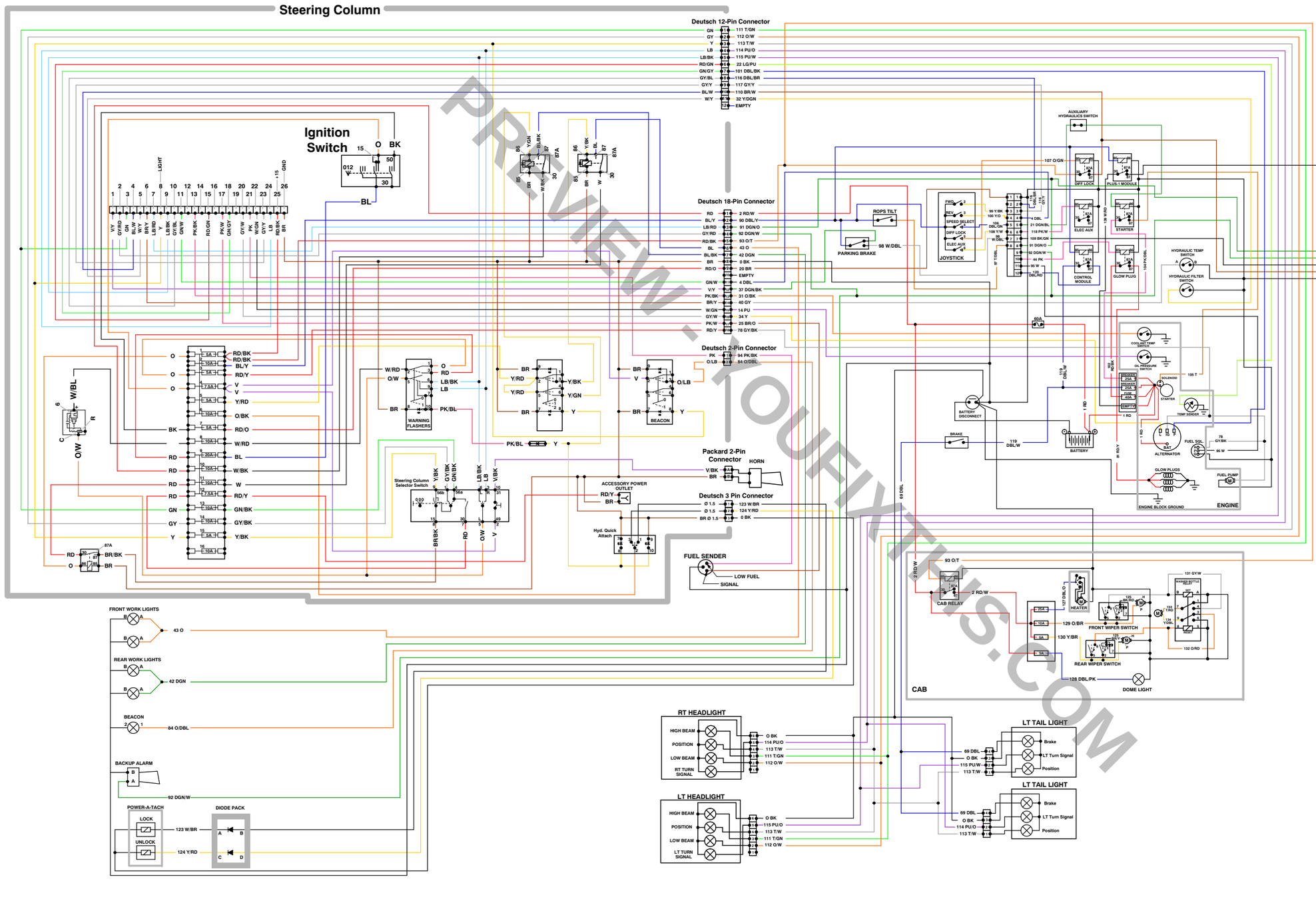
More than one error code may be displayed, one after the other.

To illustrate, the flash pattern for error code "13" would be: Four medium flashes (message start), pause, one long flash (first digit of error code), pause, three short flashes (second digit of error code), pause. The flash pattern then repeats.

Error Flash Code	Description
13	Watchdog Ready Error
15	Battery Voltage or Sensor Voltage Error
19	Pump Current Forward Error
23	Pump Current Reverse Error
27	Motor Current Error
31	Engine Speed RPM Error
35	FNR Shortcut Error
39	Inching Error
43	Driving Pedal Error
47	Mode Switch-2 Error
55	Brake Pressure Defeat Error (or Parking Brake Error or Brake Light Error)
59	Motor RPM and Direction Error
70	General CAN Receive Error

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AL 400 Series (Serial Numbers 41249 and below), AL 500 Series (Serial Numbers 51241 and below) Complete Electrical Schematic



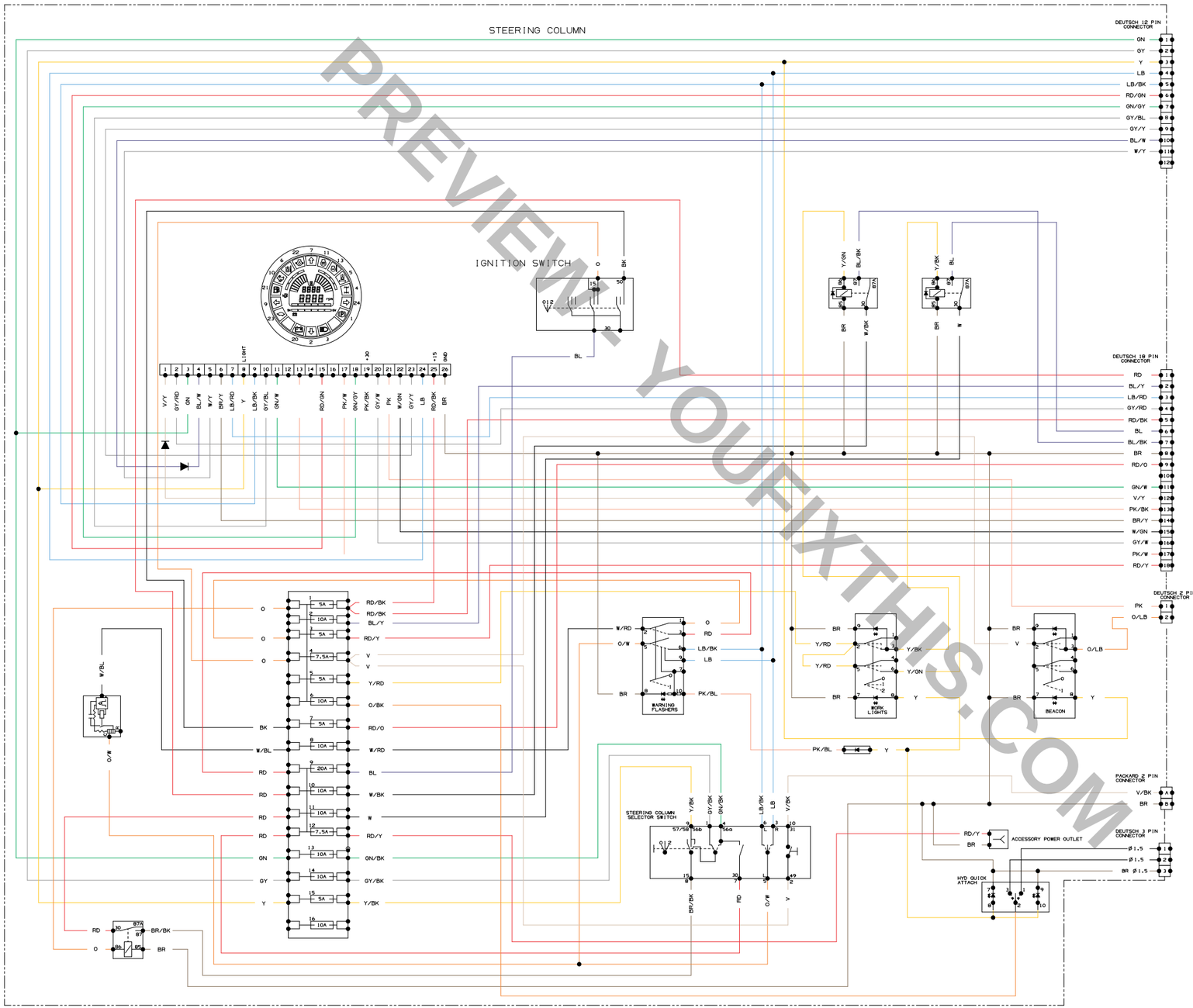
LB	LIGHT BLUE
DBL	DARK BLUE
BL	BLUE
W	WHITE
O	ORANGE
Y	YELLOW
GY	GREY
BR	BROWN
BK	BLACK
RD	RED
PK	PINK
LGN	LIGHT GREEN
GN	GREEN
DGN	DARK GREEN
V	VIOLET
PU	PURPLE
T	TAN

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AL 500 Series (Serial Numbers 51242 and up) Steering Column Electrical Schematic (Includes Air Conditioning Option)

STEERING COLUMN HARNESS



LB	LIGHT BLUE	BK	BLACK
DBL	DARK BLUE	RD	RED
BL	BLUE	PK	PINK
W	WHITE	LGN	LIGHT GREEN
O	ORANGE	GN	GREEN
Y	YELLOW	DGN	DARK GREEN
GY	GREY	V	VIOLET
BR	BROWN	PU	PURPLE
		T	TAN

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