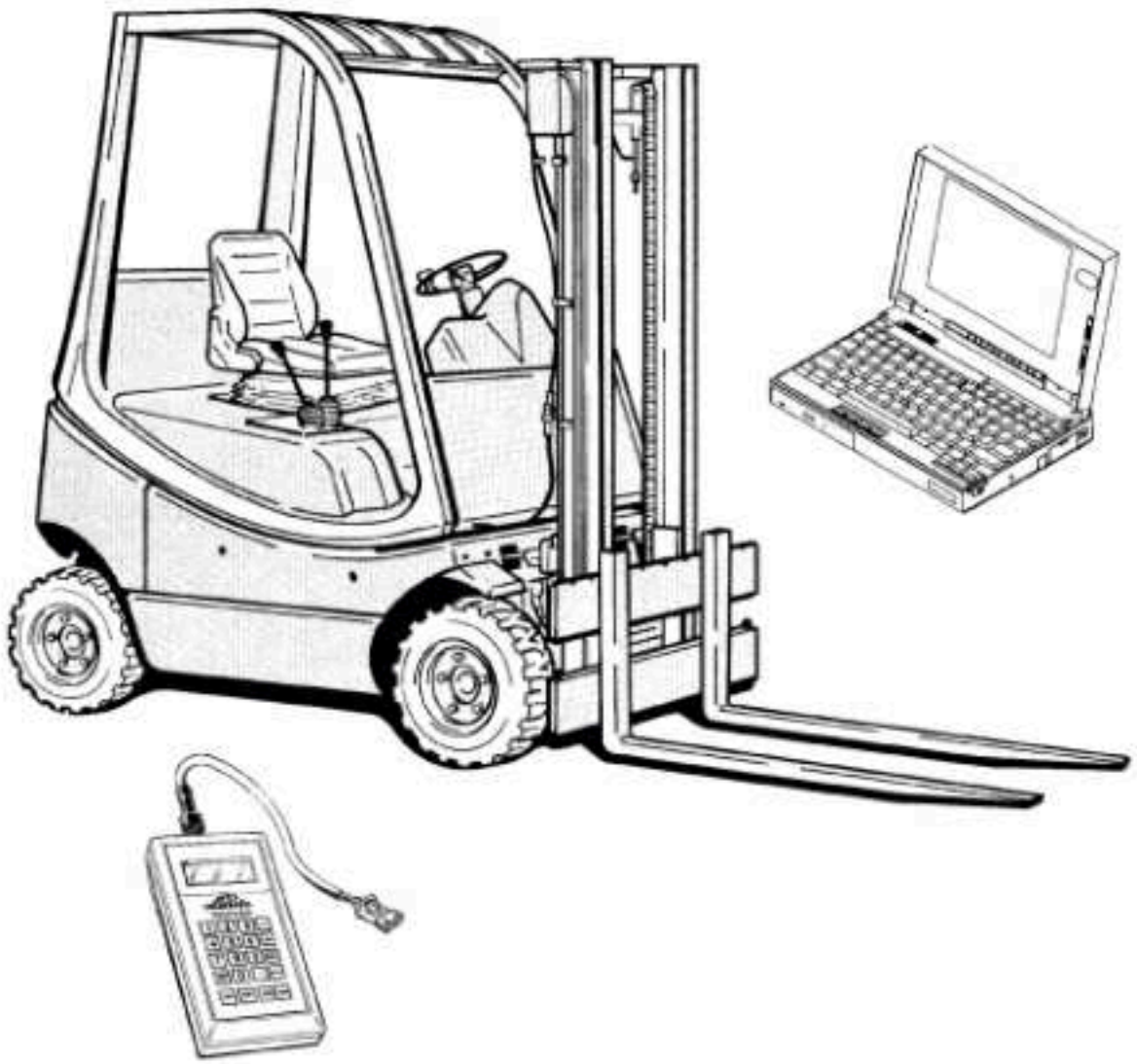
Service Training

Linde

Linde IC Engined Truck
H 12/16/18/20 D-03/T-03
Series 350
with Linde Hydraulic Control (LHC)



H01 / Chapter 1
350 0004 4701.0400

This training material is only provided for your use and remains the exclusive property of
LINDE AG Werksgruppe Flurförderzeuge und Hydraulik

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC Forklif... Order the manual at mid-west-tech.com >

Service Training

IC-ENGINED TRUCKS H 12/16/18/20 D-03/T-03, SERIES 350

1	Diesel engine	1
1.1	Engine specifications	1
1.2	Crankshaft	2
1.2.1	Adjusting alternator V-belt tension	2
1.2.2	Removing toothed belt	2
1.3	Fuel injection pump	5
1.3.1	Removal and installation of the fuel injection pump	5
1.3.2	Removing and installing the crankshaft sprocket	7
1.3.3	Check and adjust static injection pump timing	8
1.3.4	Checking engine timing	9
1.3.5	Stop leaks from the adapter of the injection pump	10
1.3.6	Adjust the idling speed and the governed speed (without load)	10
1.4	Fuel injectors	11
1.4.1	Remove and install fuel injectors	11
1.4.2	Servicing fuel injectors	12
1.4.3	Fuel injector parts	12
1.4.4	Check injector needle tip (visual check)	12
1.4.5	Check of fuel pressure	13
1.4.6	Check for leakages	13
1.5	Cylinder head	14
1.5.1	Cylinder head removal	14
1.5.2	Check cylinder head for distortion	14
1.5.3	Markings of cylinder head gaskets	14
1.5.4	Check piston at TDC	15
1.5.5	Fitting the cylinder head	15
1.5.6	Check compression pressure	17
1.5.7	Check hydraulic tappets	18
1.6	Glow plug system	19
1.6.1	Checking the glow plugs	19
1.6.2	Check the glow plugs	19
1.6.3	Glow plugs with burnt electrodes	20
2	Transmission	1
2.1	Digital electric-hydraulic control (LHC)	1
2.1.1	General	1

H01 / Chapter 1
350 804 4701.0400

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

2.1.2	Electronic control of truck speed		2
2.2	Schematic diagram of the drive unit		4
2.3	Technical data of the travel drive system		5
2.4	Hydraulic circuit diagram		7
2.5	View of the variable pump		11
2.6	Cross sectional view of drive pump		12
2.7	Electric-hydraulic adjustment		13
2.7.1	Hydraulic adjustment with electronic control		15
2.7.2	Electric-hydraulic control		16
2.7.2.1	Begin of pump control		17
2.7.2.2	Swash angle of variable pump		17
2.7.2.3	Hydraulic zero position		17
2.7.2.4	Hydraulic brake valve		18
2.8	Towing device		19
2.9	Drive axle AH 20 -01 with wheel drive, multiple disc brake and hydraulic motor		20
2.9.1	Repairing the reduction gear, multiple disc brake and hydraulic motor		22
2.9.2	Renewing the radial sealing ring of the planetary gear		23
2.9.3	Removing and installing the multiple disc brake and hydraulic motor with swashplate	02.01	26
2.10	Truck diagnostics and troubleshooting		30
2.10.1	Electrical system diagnostics		30
2.10.1.1	Working with the Linde Test Module		31
2.10.1.2	Diagnostics with a PC and the Linde Interface Converter		32
2.10.1.2.1	Linde Interface Converter		33
2.10.1.2.2	Installation of the Diagnostic software “Test & Setup”		33
2.10.1.2.3	Selecting the Linde Program		34
2.10.1.2.4	Starting the Diagnostic Program “Test & Setup”	02.01	35
2.10.1.3	Linde Diagnostic Program	02.01	36
2.10.1.3.1	Help Function		38
2.10.1.3.2	Overview of menu windows - LHC Software version 1.1 - 1.3	02.01	41
2.10.1.3.3	Menu windows in detail - LHC Software version 1.1 - 1.3	02.01	42
2.10.1.3.4	Overview of menu windows - LHC Software version 1.4 and 1.5	02.01	62
2.10.1.3.5	Menu windows in detail - LHC Software version 1.4 and 1.5	02.01	63
2.10.1.3.6	Overview of menu windows - LHC Software version 1.6	02.01	97
2.10.1.3.7	Menu windows in detail - LHC Software version 1.6	02.01	98
2.10.2	Hydraulic system diagnostics		131
2.10.2.1	Circuit diagram and overview for diagnostics		131

H01 / Chapter 1
350 804 4701.0201

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

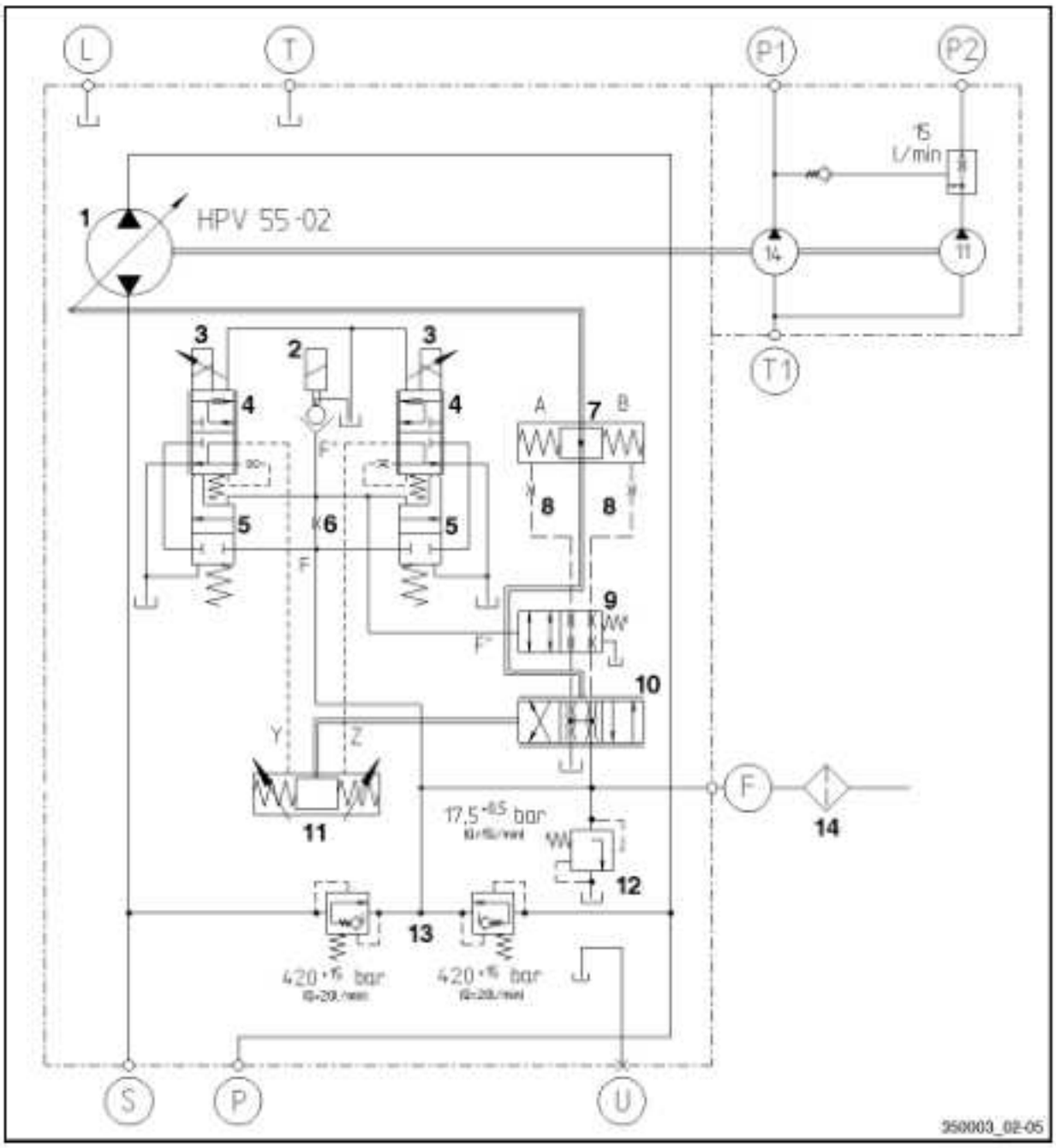
2.10.2.2	Test aids		133
2.10.2.2.1	Explanations to troubleshooting		133
2.10.2.3	Power-assisted steering		135
2.10.2.3.1	Troubleshooting without measurement of boost and maximum pressure		135
2.10.2.3.2	Troubleshooting with measurement of boost and maximum pressure		135
2.10.2.4	Hydraulic brake system		137
2.10.2.4.1	Functional test		137
2.10.2.4.2	Troubleshooting		137
2.10.2.5	Hydrostatic travel drive		140
2.10.2.5.1	Troubleshooting		140
4	Steering system		1
4.1	Schematic diagram of the steering system		1
5	Controls		1
5.1	Pedal stroke adjustment instructions		2
5.2	Adjustment instructions for the speed control		4
5.3	Engine speed sensor adjustment instructions		6
6	Electrical system		1
6.1	Basic diagram Diesel version	02.01	1
6.2	Basic diagram LPG version	02.01	7
6.3	Diagram for optional equipment		13
6.4	Layout of electrical installation		21
6.5	Composite instrument		22
7	Hydraulic system		1
7.1	Schematic		1
7.2	Sealing of the control valve		2
7.3	Setting of the pressure-limiting valve		3
9	LPG model of IC-engined fork truck H 12/16/18/20 T-03, series 350		1
9.1	Engine		1
9.1.1	Engine specifications	02.01	1
9.1.2	Toothed belt		2
9.1.2.1	Overall view of toothed belt guard		2
9.1.2.2	Removing, installing, tensioning the toothed belt		3

H01 / Chapter 1
350 804 4701 0201

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

2.7 ELECTRIC-HYDRAULIC ADJUSTMENT

CIRCUIT DIAGRAM



1 Hydraulic variable pump HPV 55 -02
2 Release valve
3 Solenoid
4 Proportional valve
5 2/2-way valve
6 Nozzle Ø 1 mm
7 Spool
8 Servo circuit nozzles
9 4/2-way valve
10 Pilot valve
11 Spool
12 Boost pressure valve
13 Combined boost and maximum pressure valve
14 Change filter

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

VERSION 1.6

58 Current for gas shutoff valve is too low
The vehicle detects too low a current value at the solenoid for gas shutoff valve 1Y5
Possible causes: cable loom has an open connection to solenoid 1Y5 of the gas shutoff valve or in the solenoid
Truck response: W

59 Status of release valve
The controller can not detect if release valve 1Y4 (solenoid) is activated or not.
Possible causes: release valve 1Y4 defective, cable loom
Truck responses: W – B

61 Engine speed too high
This error code appears if the engine speed is over 3000 rpm for 10 seconds.
Possible causes: injection pump; proportional solenoid
Truck response: W

62 Sudden change in RPM signal from over 800 to 0 rpm
The vehicle no longer detects any engine speed, although the engine was not shut down with the ignition key.
Possible causes: speed sensor 1B1 defective, cable loom to the speed sensor has an open connection
Truck response: W

65 Tilt pressure signal of 6 bar without RPM
The controller senses an active (closed) pressure switch 1S1 although no engine RPM exists --> window 4
Possible causes: pressure switch 1S1 defective, cable loom from pressure switch 1S1 is shorted

66 Lift pressure signal of 14 bar without RPM
The controller senses an activated (closed) pressure switch 1S2, although no engine RPM exists. --> window 4
Possible causes: pressure switch 1S2 defective, cable loom from pressure switch 1S2 shorted
Truck response: W

67 Lift and tilt signals incompatible (14 bar before 6 bar)
The normal switching sequence, first 1S1 then 1S2, is out of sequence. --> window 4
Possible causes: connectors of both pressure switches 1S1 and 1S2 are interchanged, pressure switch 1S1 defective, cable loom from pressure switch 1S1 has an open connection.
Truck responses: W

70 - 79 Mutual monitoring of both processors
The internal communication between the master and the safety processor is faulty.
Possible cause: LHC-module 1N2 defective
Truck responses: W – E – L – F – S

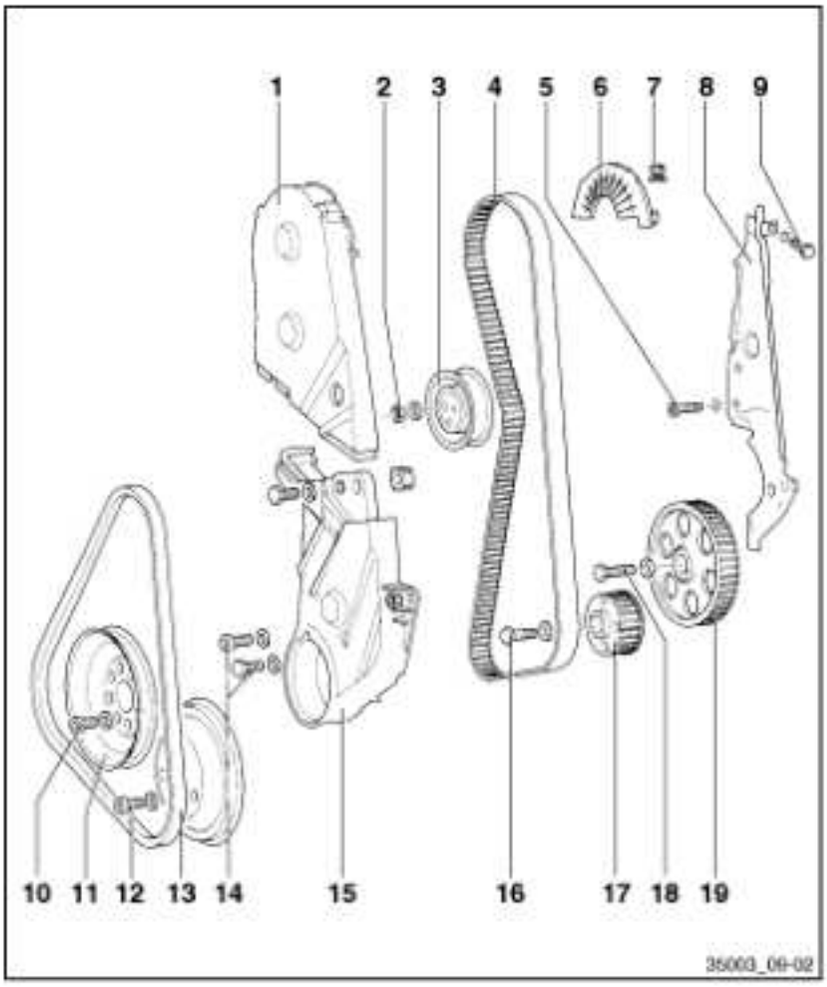
80 - 99 Safety processor error messages
The safety processor is detecting errors in LHC module 1N2.
Possible cause: LHC module 1N2 defective
Truck responses: W – E – L – F – S

H01 / Chapter 1
350 804 4701 .0201

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

9.1.2 TOOTHED BELT

9.1.2.1 OVERALL VIEW OF TOOTHED BELT GUARD

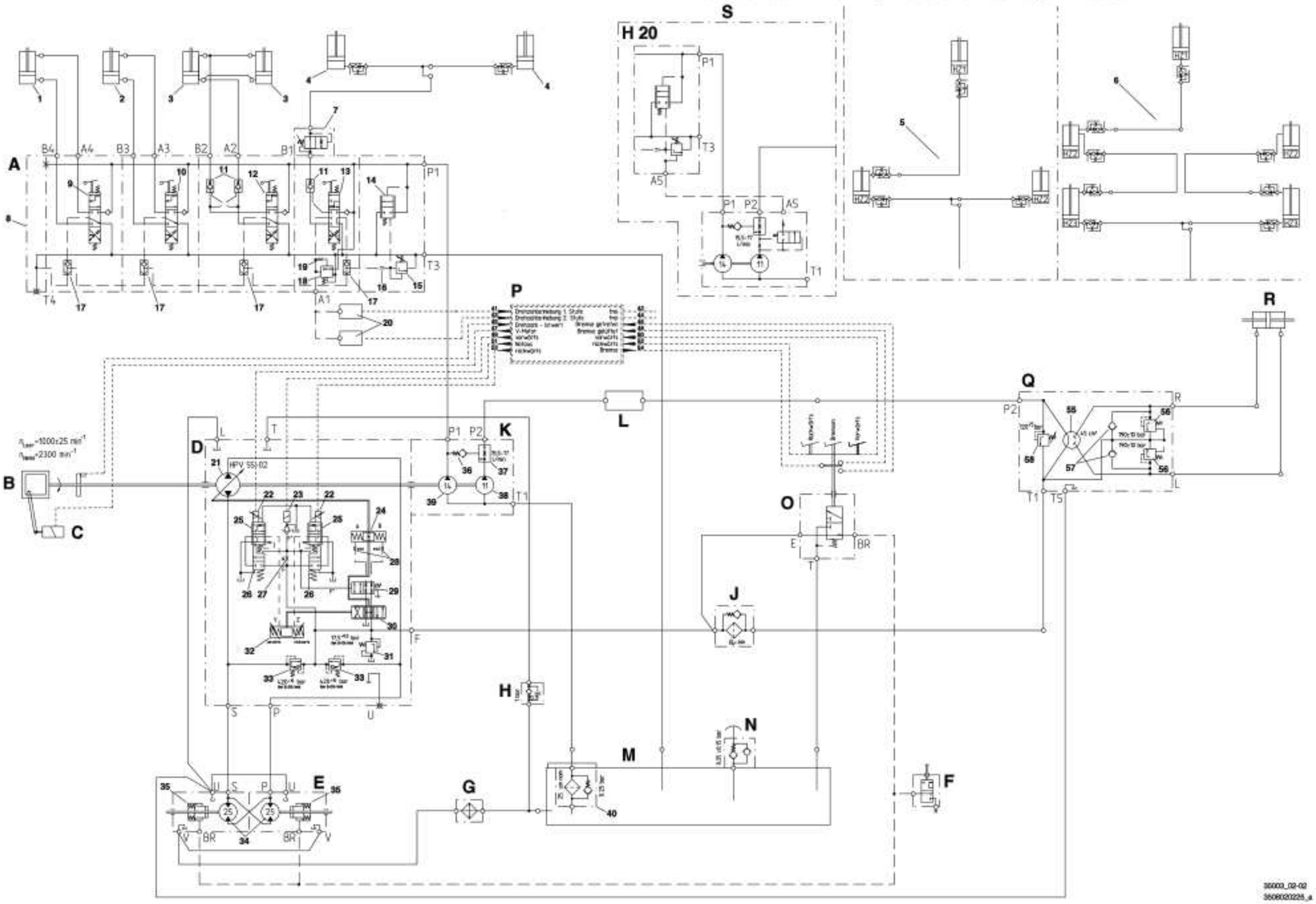


1 Upper toothed belt guard
2 Fastening nut (45 Nm)
3 Idler pulley
4 Toothed belt
5 Fastening screw (30 Nm)
6 Toothed belt guard
7 Nut (10 Nm)
8 Rear toothed belt guard
9 Fastening screw (10 Nm)
10 Fastening screw (20 Nm)
11 V-belt pulley
12 Fastening screw (20 Nm)
13 V-belt
14 Fastening screw (10 Nm)
15 Lower toothed belt guard
16 Hex head screw (180 Nm)
17 Crankshaft sprocket
18 Fastening screw (80 Nm)
19 Intermediate shaft sprocket

H01 / Chapter 1
350 804 4701 0400

MidWestTech | Linde H 12, H16, H18, H20 D-03, T-03 Series 350 IC Engine with LHC F... Order the manual at mid-west-tech.com >

HYDRAULIC CIRCUIT DIAGRAM, H 12/16/18/20 D-03/T-03, SERIES 350



Order the manual at mid-west-tech.com >