Pneumatik &Hidrolik

“Sistem Hidrolik & Komponennya”

Oleh : Andreas Pujianto

SEMESTER IV
PRODI MEKANISASI PERIKANAN
POLITEKNIK KELAUTAN DAN PERIKANAN SORONG

Sistem Hidrolik

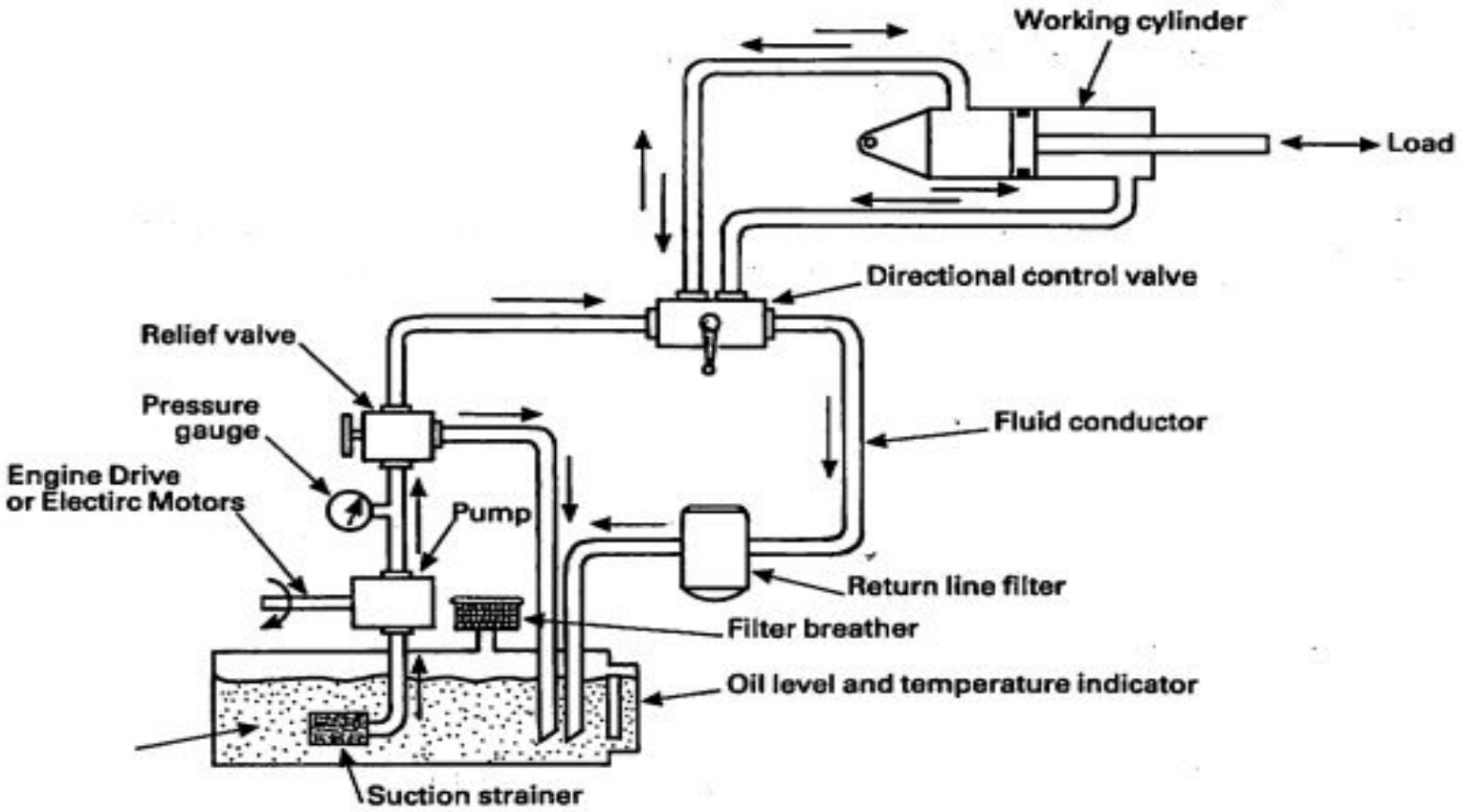
- Sistem hidrolik adalah sebuah sistem yang menggunakan fluida hidrolik (Minyak) untuk menghasilkan gerakan atau daya dengan jarak dari sumber daya dan orang untuk mengendalikannya.

- Contoh : Sistem hidrolik dapat menghasilkan gerakan atau daya di atas dek dari sebuah pompa hidrolik di ruang mesin.

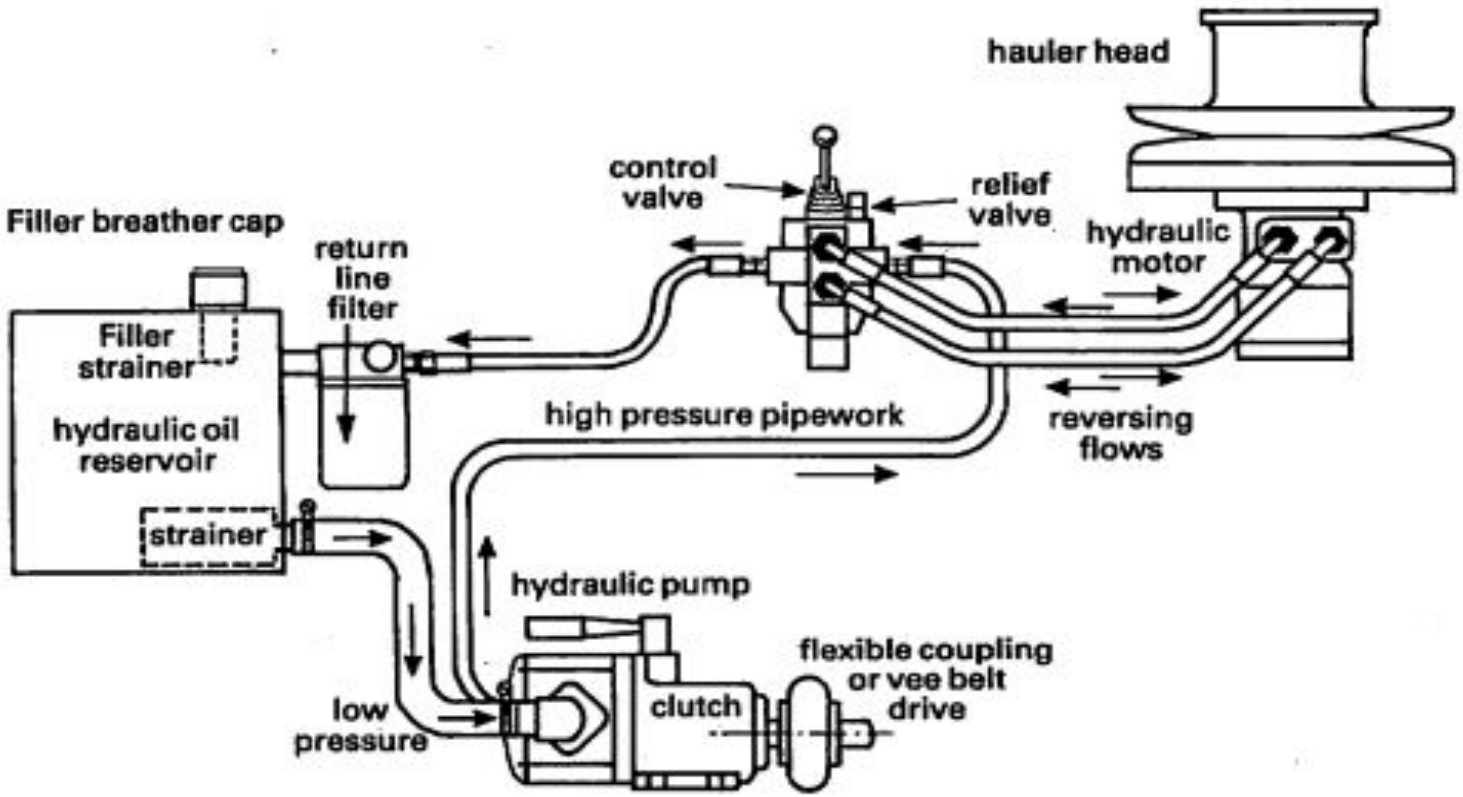
Komponen Dasar Sistem Hidrolik

- Tangki (reservoir) untuk menyimpan fluida
- Pompa untuk menggerakkan fluida di dalam sistem
- Katup untuk mengontrol tekanan, arah, dan aliran dari fluida.
- Aktuator (Silinder atau Motor) Mengubah energi fluida menjadi gaya mekanik dan menghasilkan daya

Contoh Sistem Hidrolik menggunakan Silinder untuk Gerakan Linier



Contoh Sistem Hidrolik menggunakan Motor untuk Gerakan Rotari

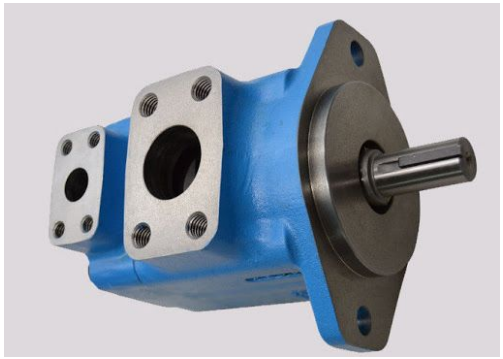


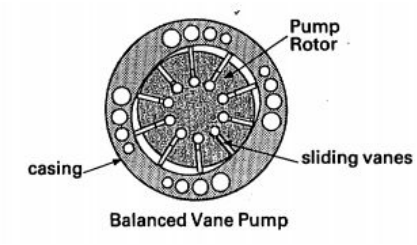
Tangki (Reservoir)

- Tangki harus cukup besar untuk menyimpan minyak hidrolik yang dibutuhkan untuk mengisi sistem dan untuk cadangan.
- Pada umumnya tangki harus dapat menyimpan 2 sampai 3 kali kapasitas pompa (liter/menit) pada sistem
- Pada tangki harus dipasang indikator level minyak hidrolik. Dan untuk beberapa sistem hidrolik ada yang menggunakan termometer

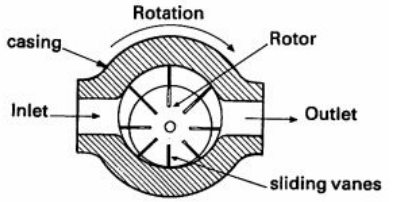
Pompa

- Pompa yang digunakan dalam sistem hidrolik adalah positive displacement type

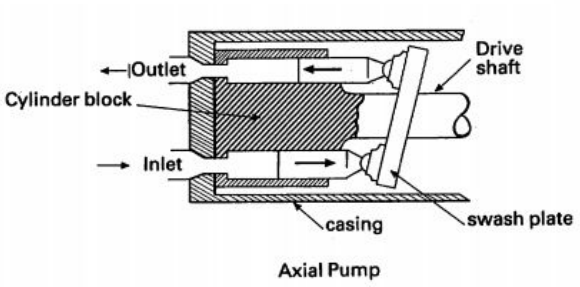




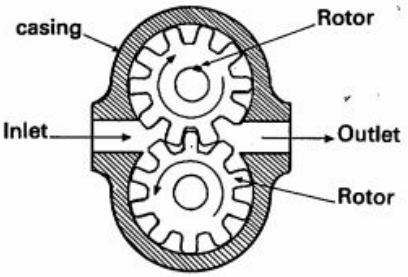
Balanced Vane Pump



Unbalanced Vane Pump



Axial Pump

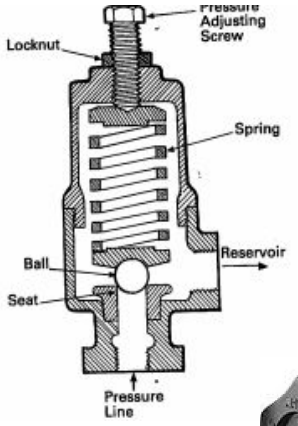


External Gear Pump

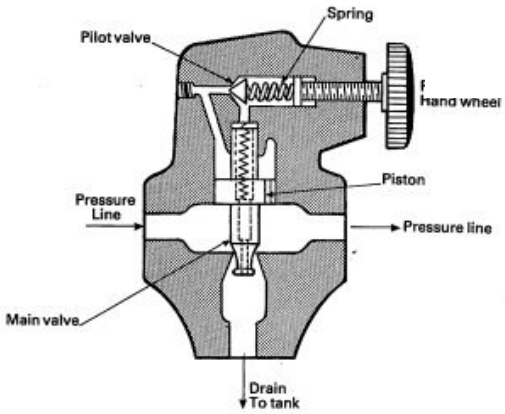
Relief Valve

Katup Pengontrol Tekanan

- Positive displacement pump dapat menghasilkan tekanan yang sangat tinggi.
- Tekanan di dalam sistem akan meningkat jika aktuator (silinder hidrolik) menahan beban.
- Setiap sistem hidrolik dipasangi dengan relief valve setelah saluran outlet pompa.
- Katup pengontrol tekanan (relief valve) akan mengembalikan minyak hidrolik yang berlebih ke tangki jika tekanan dalam sistem melebihi tekanan normal operasi.



Untuk sistem dengan aliran kecil

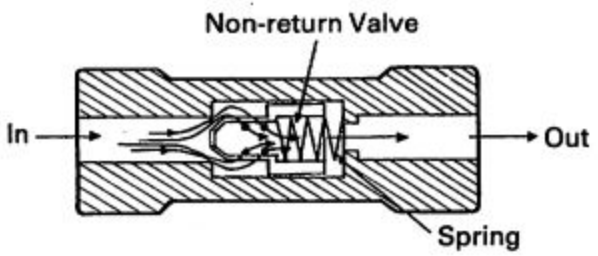


Untuk sistem dengan aliran besar

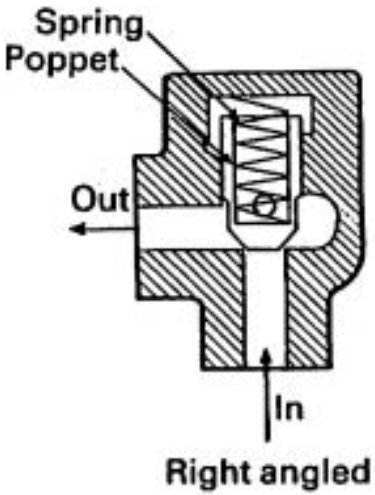
Check Valve

Check Valve

- Katup ini sama dengan relief valve tetapi tidak mengembalikan minyak ke tangki
- Katup ini berfungsi untuk membatasi tekanan dalam pipa dan mencegah aliran balik



In line

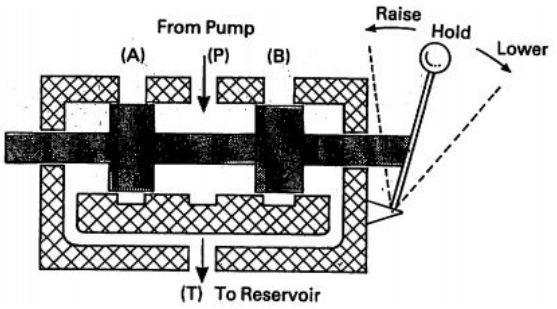


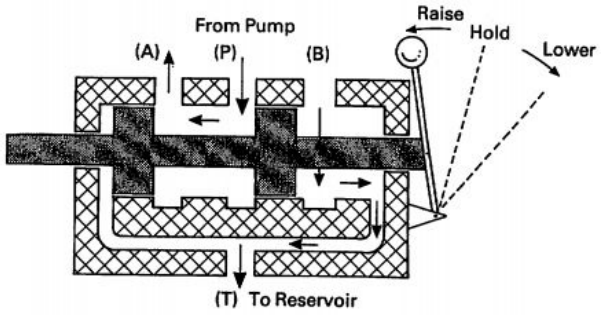
Right angled

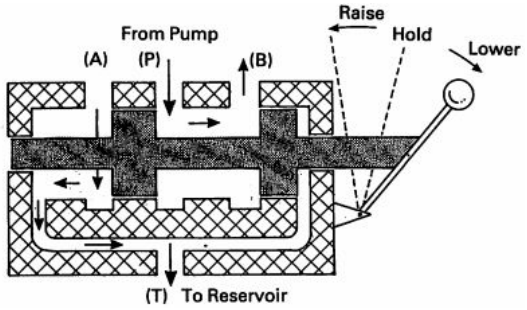
Directional Control Valve

Katup Pengatur Arah

- Katup ini berfungsi untuk mengarahkan aliran minyak hidrolik ke satu sisi atau sisi lain dari aktuator



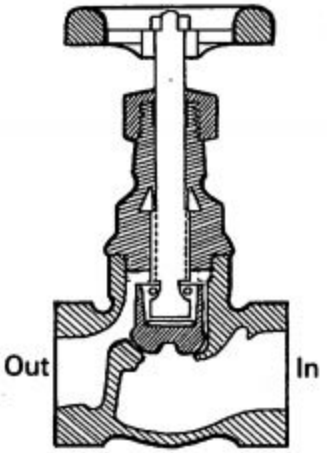




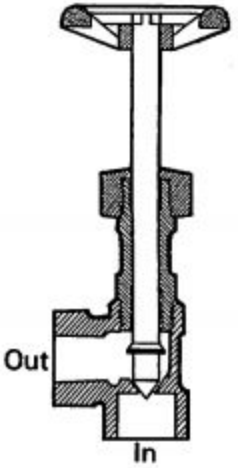
Throttle Valve

Katup Aliran

- Katup ini berfungsi mengatur aliran minyak hidrolik ke aktuator dan juga menutup aliran minyak jika dibutuhkan



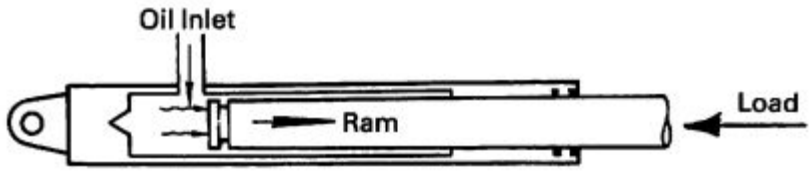
Globe valve



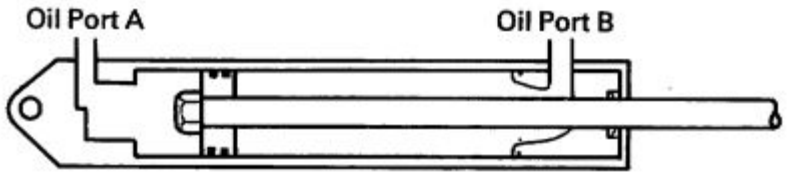
Needle valve

Linier Aktuator

- Tekanan minyak hidrolik menekan permukaan ram melawan beban
- Ketika tekanan beban berkurang pada ram, minyak hidrolik kembali ke tangki



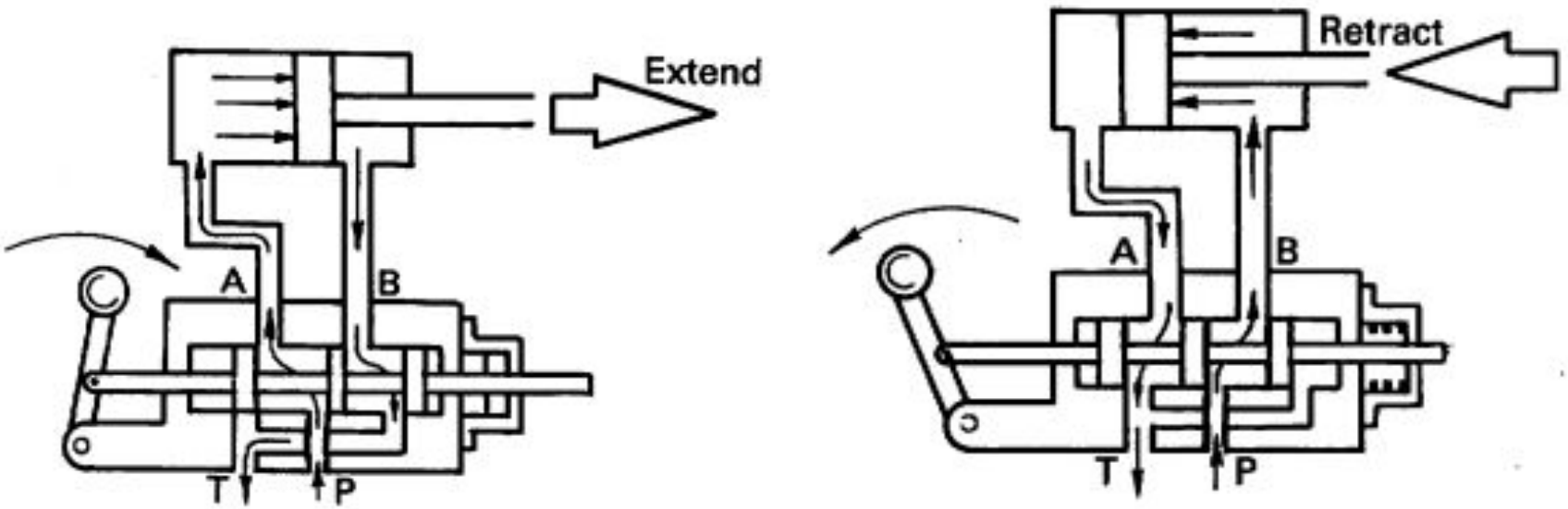
Aktuator jenis Single acting



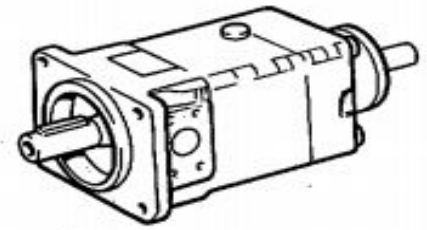
Aktuator jenis double acting

Double Acting Linier Aktuator

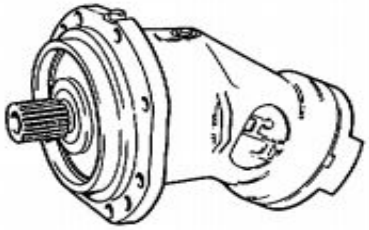
- Cara Kerja liner aktuator jenis double acting



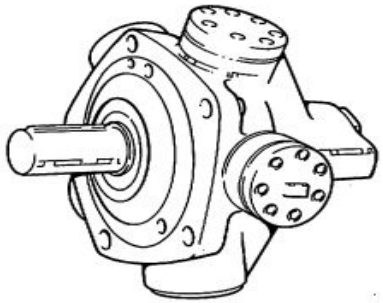
Rotary Actuators



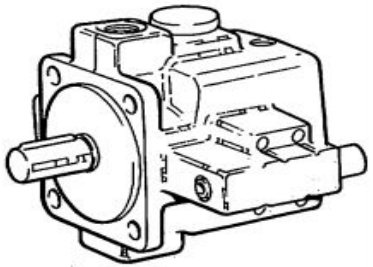
In-line piston pump



Angled piston pump



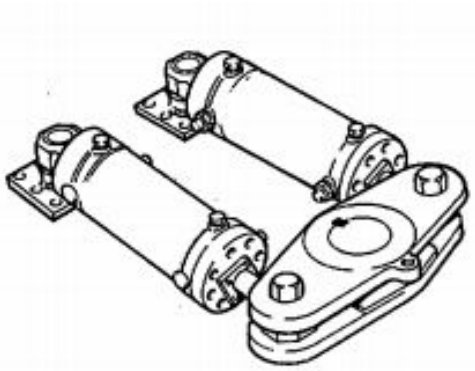
Radial piston pump

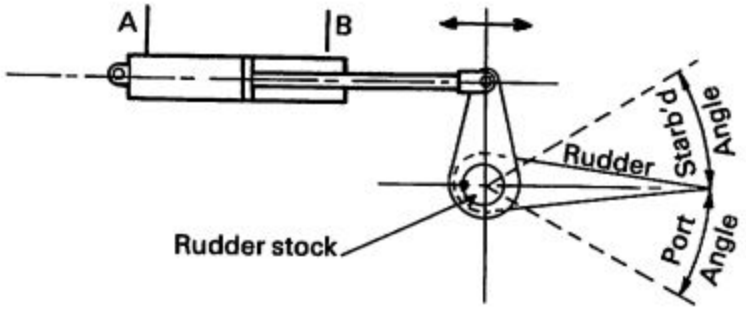


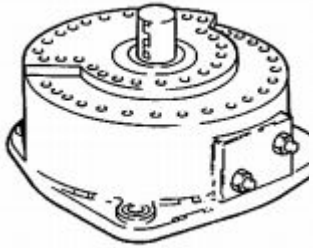
Vane pump

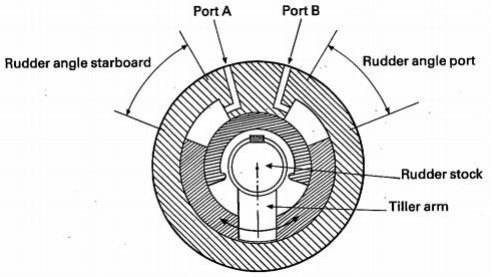
Steering Motors (Semi-Rotary Actuators)

- Digunakan untuk sistem kemudi hidrolik



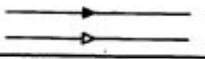
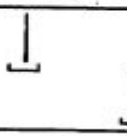






Simbol Sistem Hidrolik

Simbol Pipa

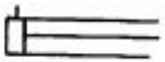
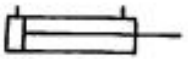
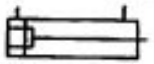
LINES AND LINE FUNCTIONS	
LINE, WORKING	
LINE, PILOT (L>20W)	
LINE, DRAIN (L<5W)	
CONNECTOR	
LINE, FLEXIBLE	
LINE, JOINING	
LINE, PASSING	
DIRECTION OF FLOW, HYDRAULIC (OIL) PNEUMATIC (COMPRESSED AIR)	
LINE TO RESERVOIR ABOVE FLUID LEVEL BELOW FLUID LEVEL	
RESTRICTION, FIXED	
RESTRICTION, VARIABLE	

Simbol Pompa

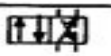
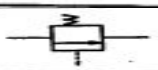
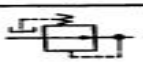
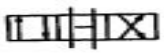
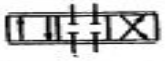
PUMPS	
PUMP, ONE WAY, FIXED DISPLACEMENT	
PUMP, ONE WAY, VARIABLE DISPLACEMENT	
PUMP, REVERSIBLE, FIXED DISPLACEMENT	
PUMP, REVERSIBLE, VARIABLE DISPLACEMENT	

Simbol Sistem Hidrolik

Motor dan Silinder

MOTORS AND CYLINDERS	
MOTOR, ROTARY, FIXED DISPLACEMENT	
MOTOR, ROTARY, VARIABLE DISPLACEMENT	
MOTOR, OSCILLATING	
CYLINDER, SINGLE ACTING	
CYLINDER, DOUBLE ACTING	
CYLINDER, DIFFERENTIAL ROD	
CYLINDER, DOUBLE END ROD	
CYLINDER WITH CUSHIONS (□) BOTH ENDS	

Simbol Katup

BASIC VALVE SYMBOLS	
CHECK VALVE	
MANUAL SHUT OFF VALVE	
BASIC VALVE ENVELOPE (OR BODY)	
VALVE, SINGLE FLOW PATH, NORMALLY CLOSED	
VALVE, SINGLE FLOW PATH, NORMALLY OPEN	
VALVE, MAXIMUM PRESSURE (RELIEF)	
BASIC VALVE SYMBOL, MULTIPLE FLOW PATHS	
FLOW PATHS BLOCKED IN CENTRE POSITION	
MULTIPLE FLOW PATHS (ARROW SHOWS FLOW DIRECTION)	
UNLOADING VALVE, INTERNAL DRAIN, REMOTELY OPERATED	
PRESSURE REDUCING VALVE	
DIRECTIONAL VALVE, TWO POSITION, THREE CONNECTION	
DIRECTIONAL VALVE, THREE POSITION, FOUR CONNECTION	
VALVE, INFINITE POSITIONING (INDICATED BY HORIZONTAL BARS)	

Simbol Sistem Hidrolik

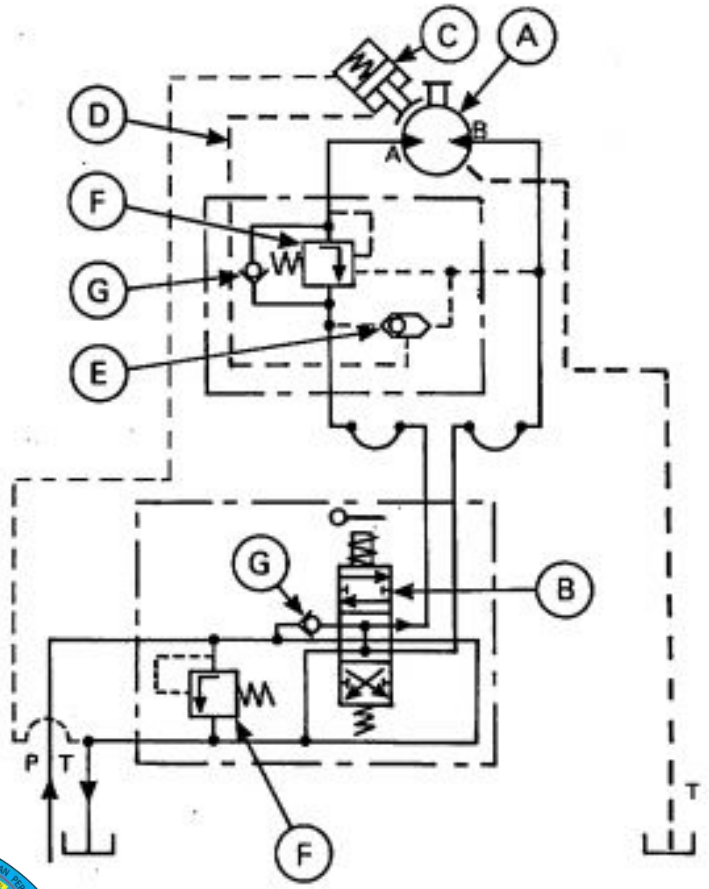
Cara Pengoperasian

METHODS OF OPERATION	
PRESSURE COMPENSATOR	
DETENT	
MANUAL	
MECHANICAL	
PEDAL OR TREADLE	
PUSH BUTTON	
LEVER	
PILOT PRESSURE	
SOLENOID	
SOLENOID CONTROLLED, PILOT PRESSURE OPERATED	
SPRING	
SERVO	

Macam-macam komponen

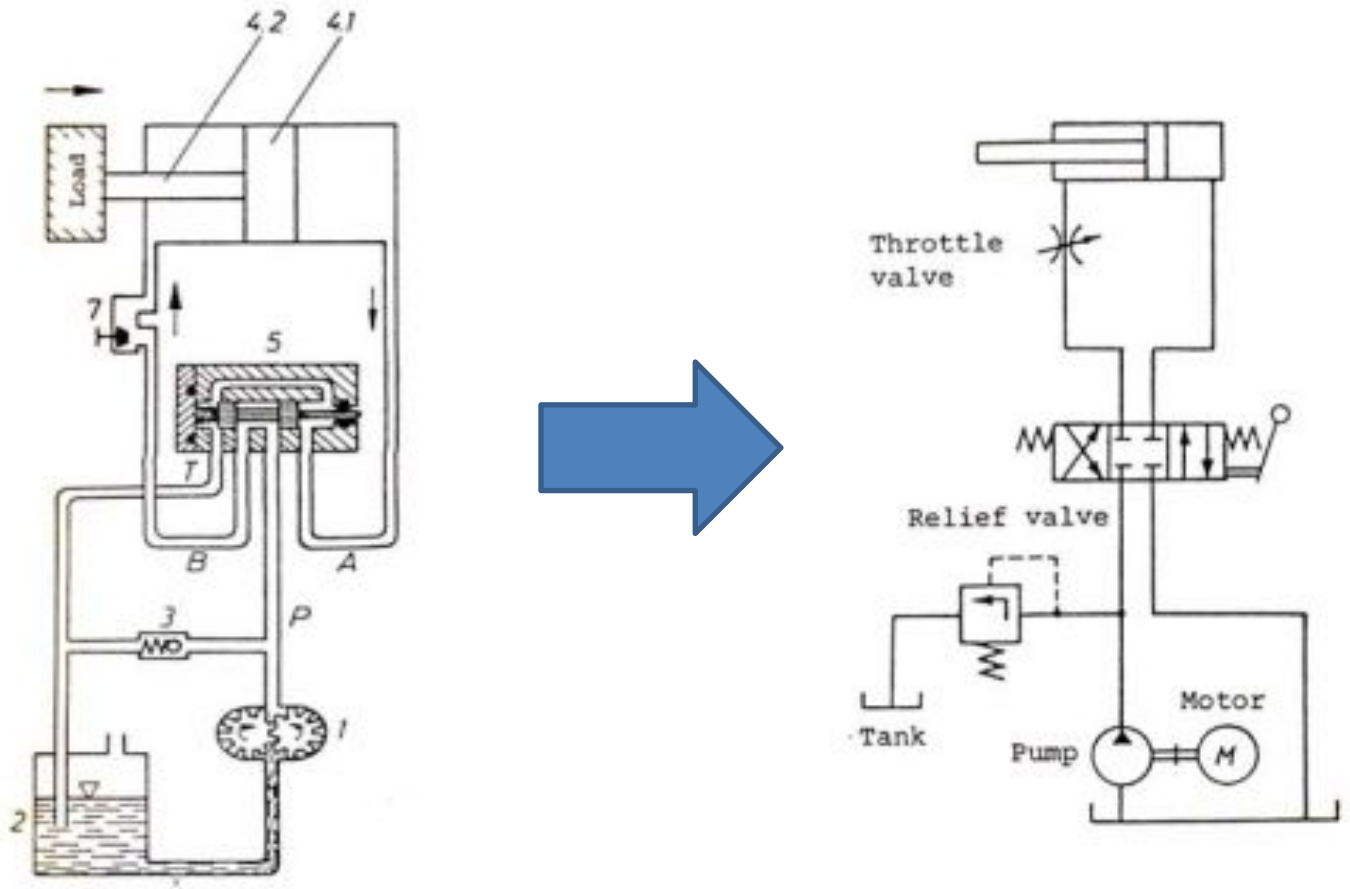
MISCELLANEOUS UNITS	
DIRECTION OF ROTATION (ARROW IN FRONT OF SHAFT)	
COMPONENT ENCLOSURE	
RESERVOIR, VENTED	
RESERVOIR, PRESSURIZED	
PRESSURE GAUGE	
TEMPERATURE GAUGE	
FLOW METER (FLOW RATE)	
ELECTRIC MOTOR	
ACCUMULATOR, SPRING LOADED	
ACCUMULATOR, GAS CHARGED	
FILTER OR STRAINER	
HEATER	
COOLER	
TEMPERATURE CONTROLLER	
INTENSIFIER	
PRESSURE SWITCH	

Contoh Diagram Sistem Hidrolik

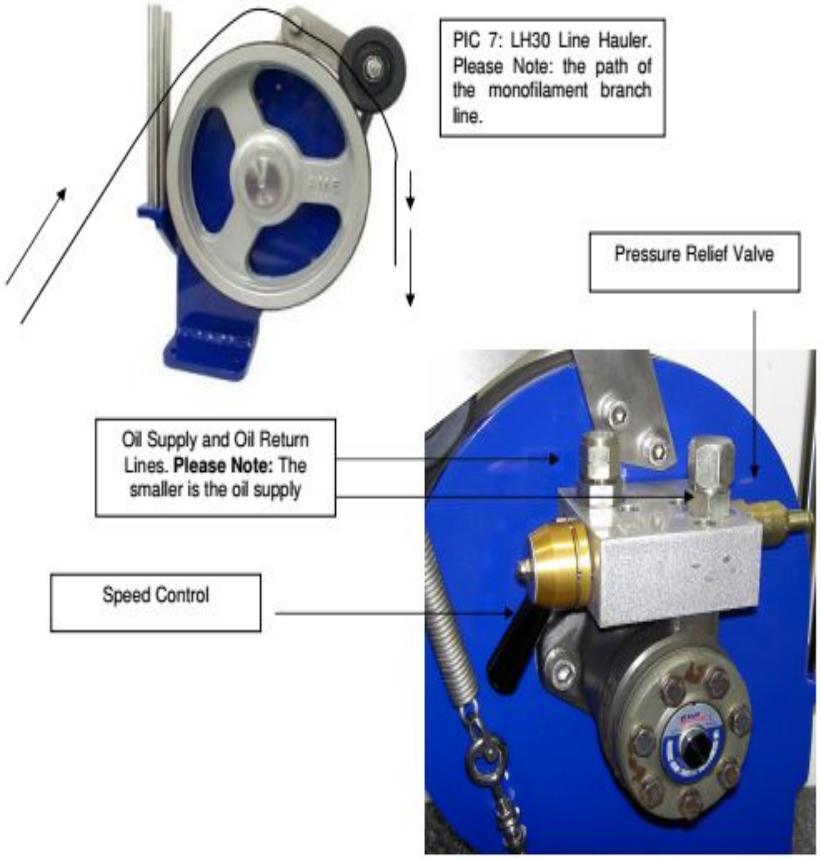


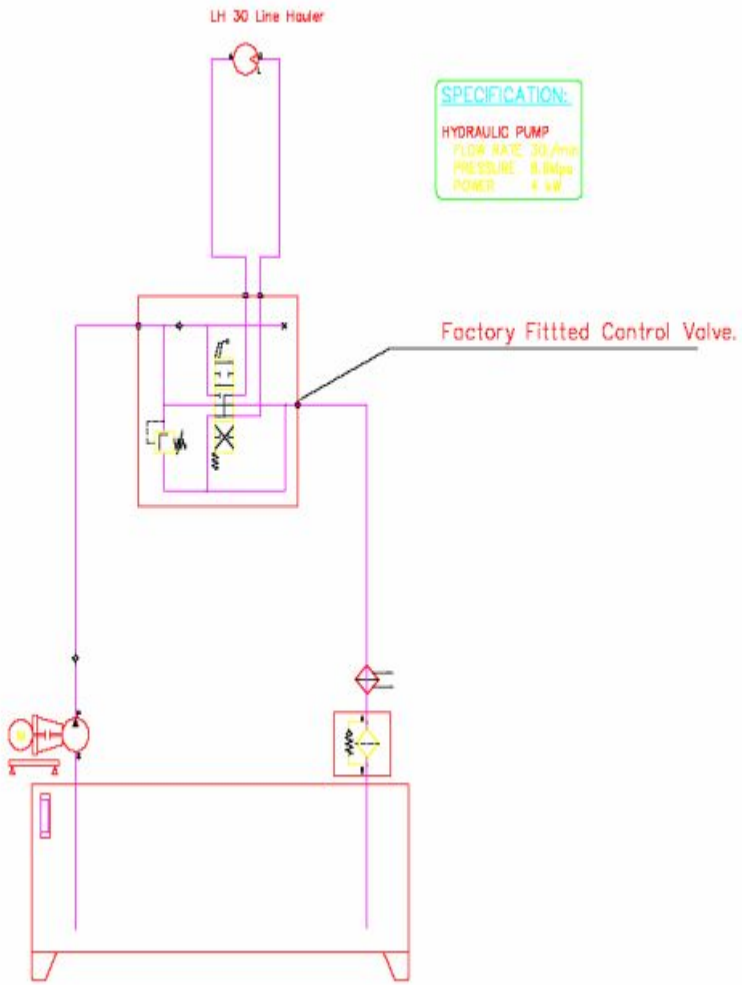
A. Reversible Motor dengan Rem ©
B. Katup Pengatur arah
C. Silinder untuk rem
D. Pipa tekanan ke C dari Saluran A atau B pada reversible motor
E. Non Return valve dua Cara
F. Relief Valve
G. Non Return Valve

Cara Menggambar Skema Hidrolik



Bagian-Bagian dari Line Hauler





Bagian-Bagian dari Power Block

InMac-Kolstrand 20" Power Block Complete with
Yoke-Mounted PowerGrip and Hydraulic Swivel Arrangement

Outstanding Features

- **Lightweight/Super-Strong Aluminum Alloy Castings Used Throughout**
- **Equipped with proven White Hydraulics RE Hydraulic Motor Drive for Long Life in the Field**
- **2" Diameter Stainless Steel Shaft with Sealed Roller Bearings Supports 20" Diameter Sheave and Intended Load with Ease**
- **Rubberized Cleated Sheave Really Grips However is Gentle on the Net**
- **Optional Balanced Yoke-Mounted PowerGrip Eliminates Net Slippage for Faster Net Hauling**
- **PowerGrip Control Panel allows PowerGrip to Be Controlled From Deck-Level Work Station**

Performance:

With White RE 500200 Motor
Based on 16 GPM @ 1500 PSI

2,800 Lbs Net Pull – 52 Sheave RPM

InMac-Kolstrand PowerGrip Control Panel

InMac-Kolstrand Marine Equipment,
Available From:

INTEGRITY MACHINING INC.

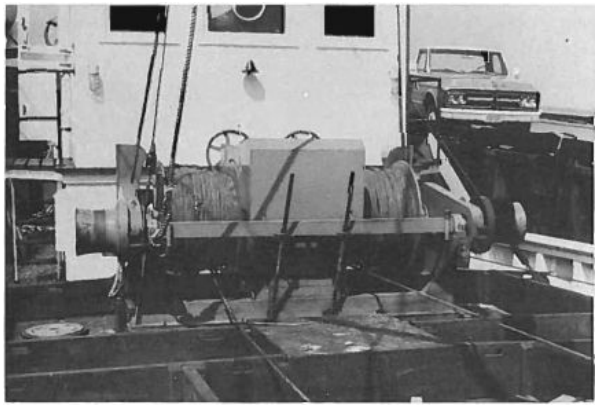
KOLSTRAND

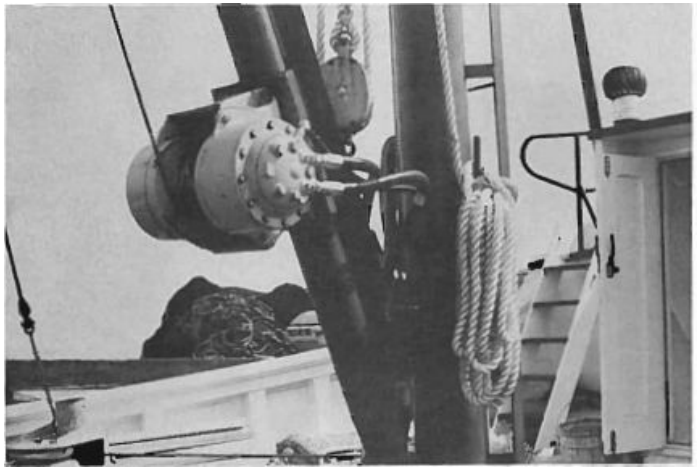
4733 Ballard Avenue N.W.
Seattle, WA 98107 USA
Phone & Fax: 206-784-2500
E-mail: kal@kolstrand.com
www.kolstrand.com

Bagian-Bagian dari Winch Trawl

Net Drum

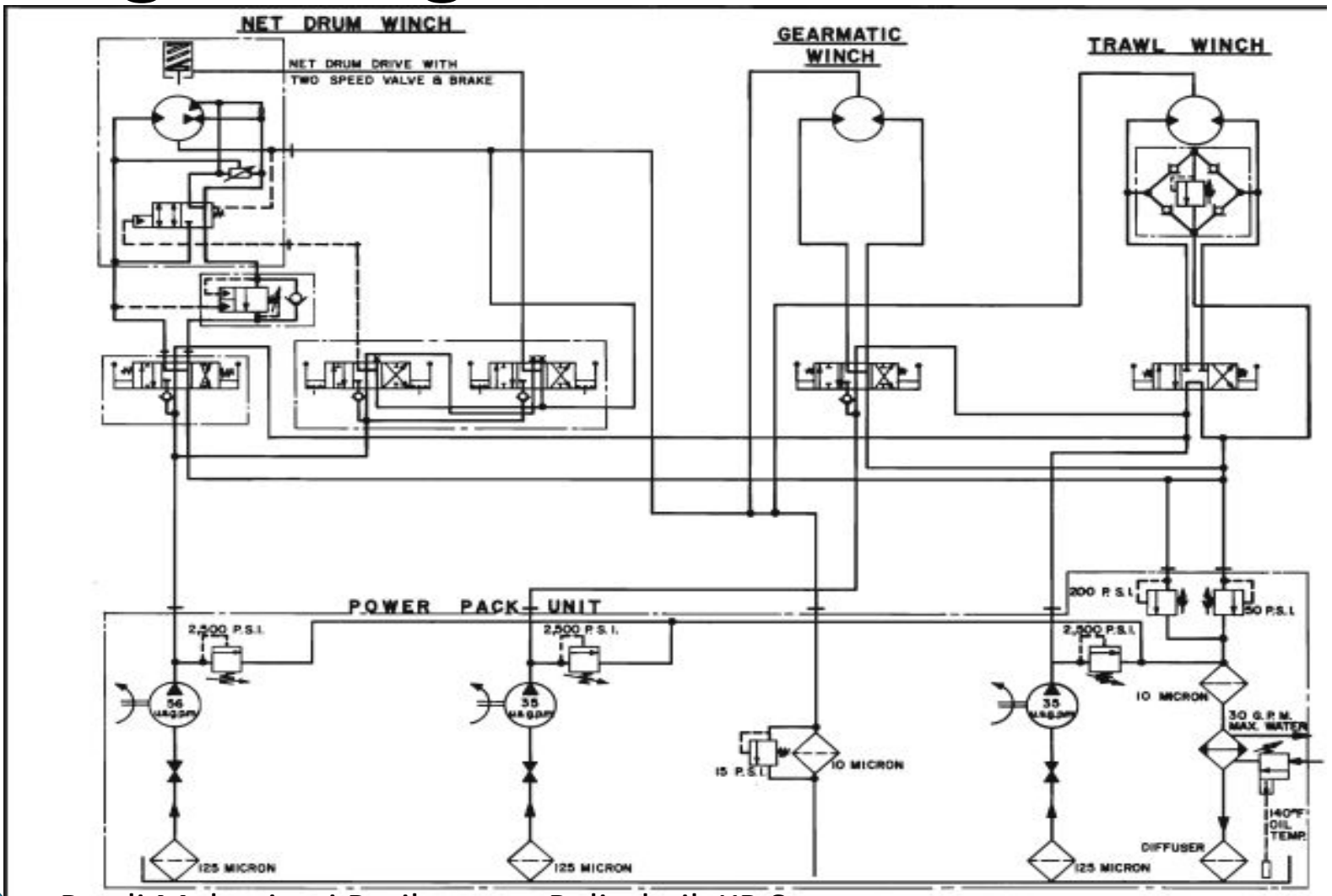
Trawl winch





Germanic winch

Bagian-Bagian dari Winch Trawl




POLITEKNIK KELAUTAN DAN PERIKANAN
KAMASAN MANDASWAN
2001
SORONG