

Pengenalan Kepada Perkhidmatan Mekanikal dalam Bangunan

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Perkhidmatan Mekanikal Dalam Bangunan

- Fungsi Perkhidmatan Mekanikal Dalam Bangunan
 - Ibarat sistem yang mengerakkan sebuah patung (mannequin)
 - Jantung (pam)
 - Saluran darah (sistem perpaipan)
 - Saluran najis (sistem pembetungan)
 - Paru-paru (Ventilation)

Perkhidmatan Mekanikal Dalam Bangunan (1)

AM

- Sistem Penyejukan dan Pengalihan Udara
- Sistem Pencegah Kebakaran
- Buel Fuel(Diesel/Petrol)
- Pemampat Udara
- Internal Cold water and sanitary plumbing
- Sistem Lif
- Sistem Kelengkapan Dapor
- Sistem LPG
- Sistem Pam Penggalak
- Sistem Kebok Wasap

Perkhidmatan Mekanikal Dalam Bangunan (2)

KHAS

- Sistem Gas Perubatan Berpusat
- Sistem Pensteril
- Sistem Air Panas
- Sistem Peralatan Makmal
- Sistem Bilik Sejuk / Bilik Bersih
- Sistem Dobi
- Sistem Dandang (Boiler)
- Sistem Penunu (Incinerator)
- Sistem Gas Makmal

Sistem Penyamanan dan Pengalihan Udara (ACMV)

- Tujuan ACMV
 - Keselesaan – suhu, kelembapan, kebisingan, bau,
 - Kebersihan dari udara luar
 - Persekitaran yang terpelihara (Control Environment)

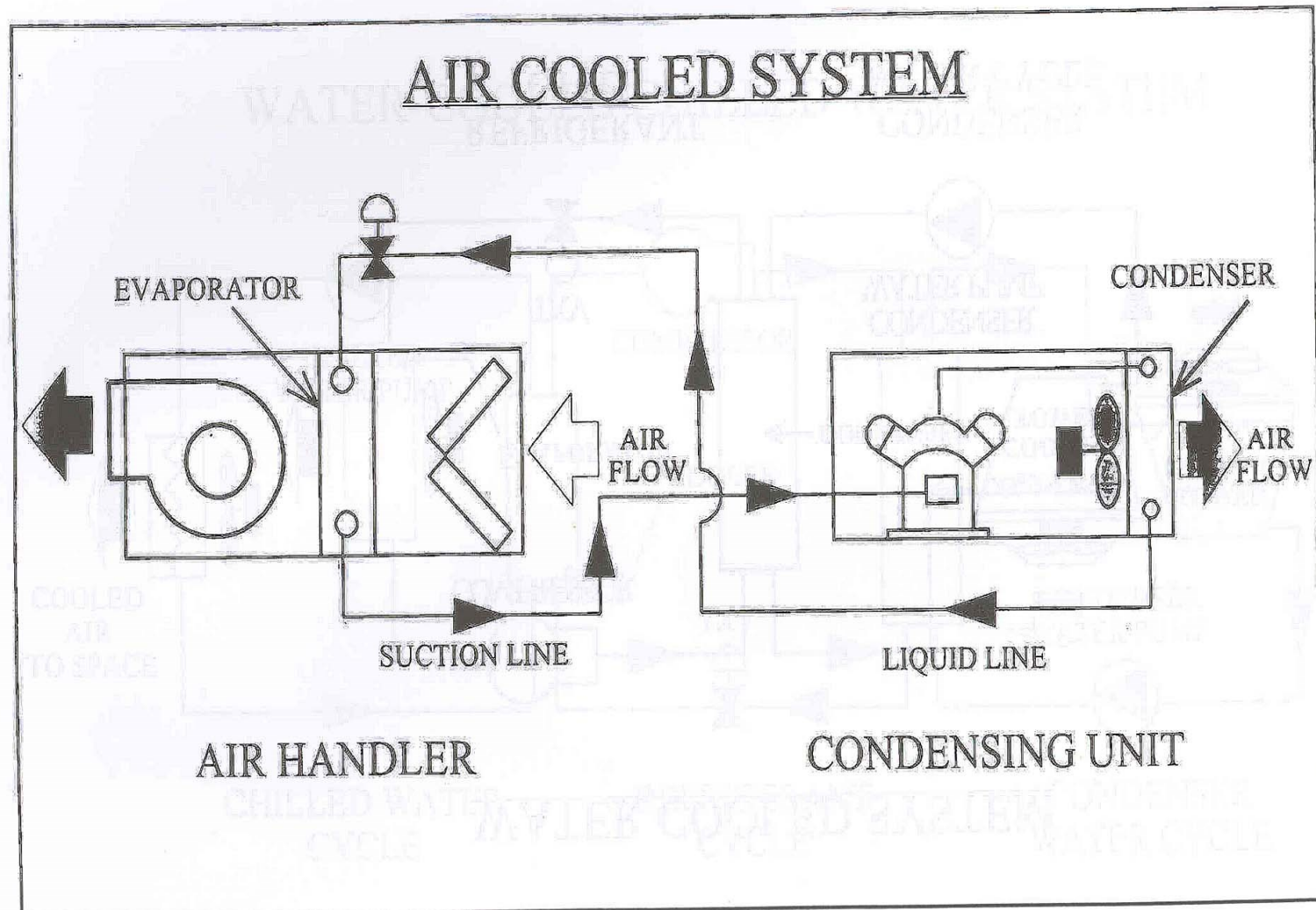
Sistem Penyejukan Udara

- Jenis mengikut medium penyejuk
 - Refrigerant (DX unit)
 - Air (Chilled Water)
- Jenis mengikut sistem
 - Terpisah (Split)
 - Split unit – Air Cooled Split / Water Cooled Split
 - Fan coil
 - Kemasiap (Package)
 - Window
 - Air cooled Package
 - Water Cooled Package

Keperluan Am – Sistem Penyamanan Udara

- Keperluan ruang dan beban bagi Loji Pengokol, Pam, Menara Penyejuk, Make-up water Tank
- Laluan paip – trench, buried, walkway
- Ukuran dan lokasi riser
- Ukuran sesalur (ducting) bagi menentukan ruang kelegaan atas siling dan bawah beam
- Ukuran bilik AHU
- Ukuran FCU dan ruang siling yang mencukupi
- Lokasi split unit biar sesuai dan aesthetic
- Lokasi Starter/Switchboard
- Lokasi outdoor unit – praktikal dan aesthetic

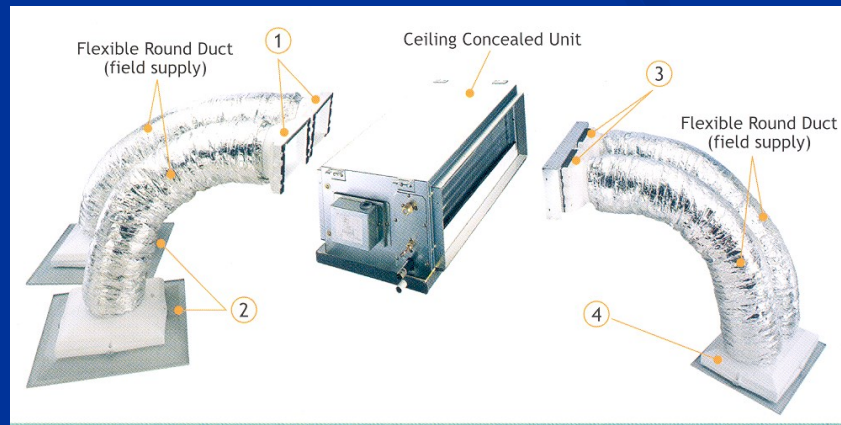
Air Cooled System



Indoor Unit



Indoor Unit (Ceiling Concealed and Fan Coil Ducted)



Outdoor Unit

OUTDOOR UNITS



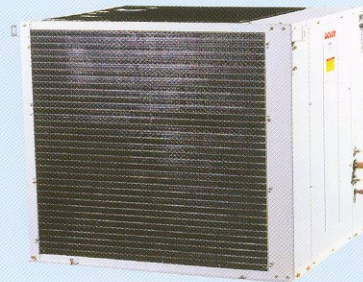
AMC100C



ALC35C/40C/50C/60C



AMC75C



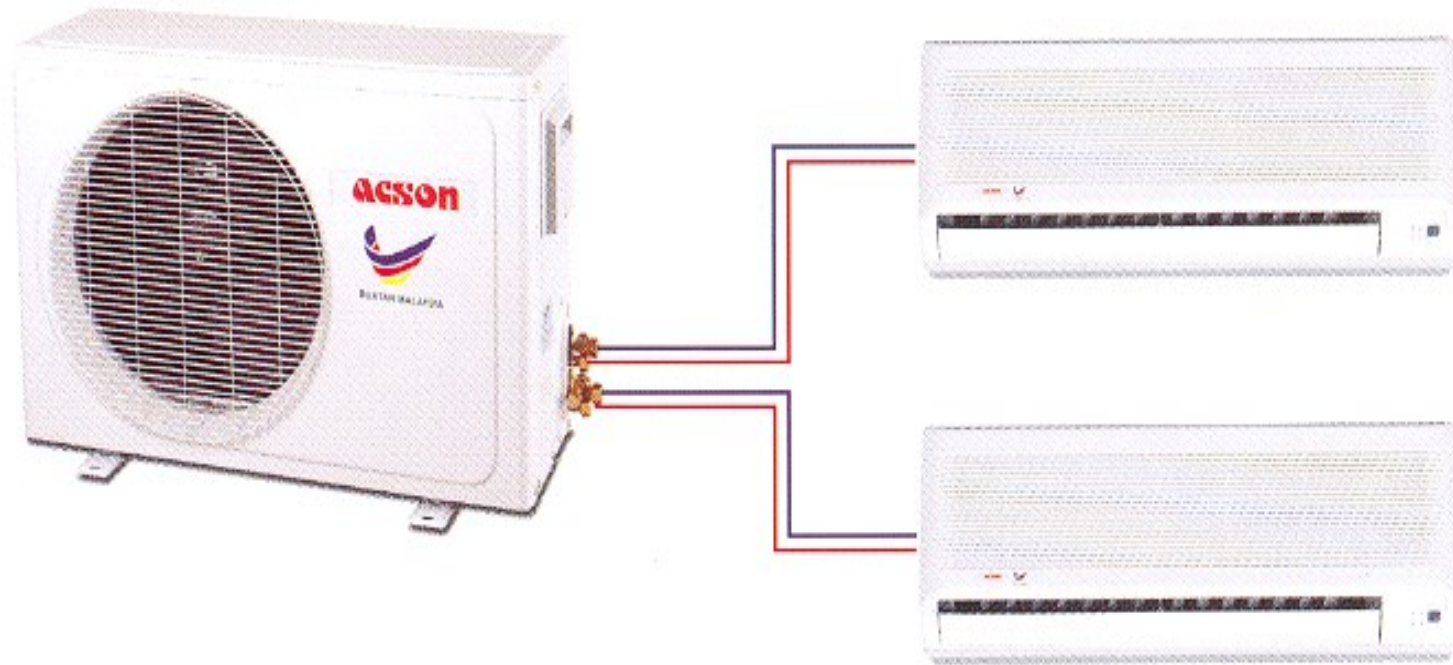
* AMC 100B/125B



AMC 150C

* Unit come with standard vertical air discharge configuration and convertible for horizontal air discharge application.

Multisplit

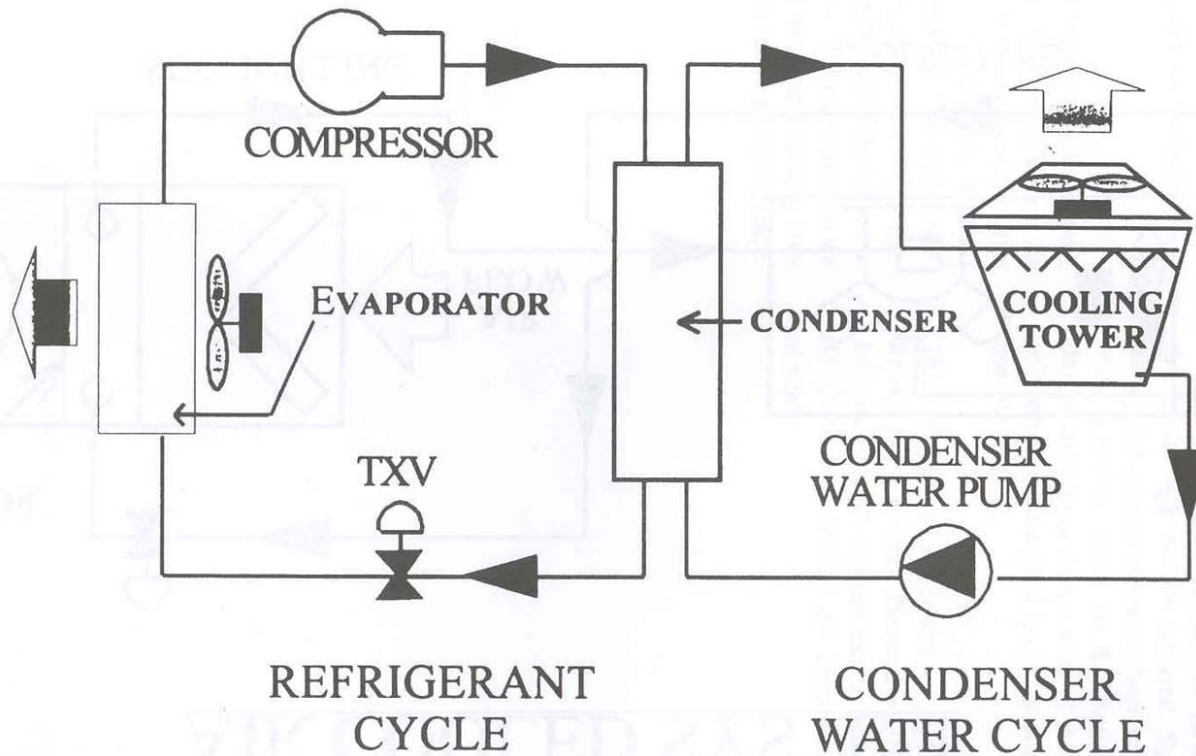


Condensing Unit



Water Cooled DX System

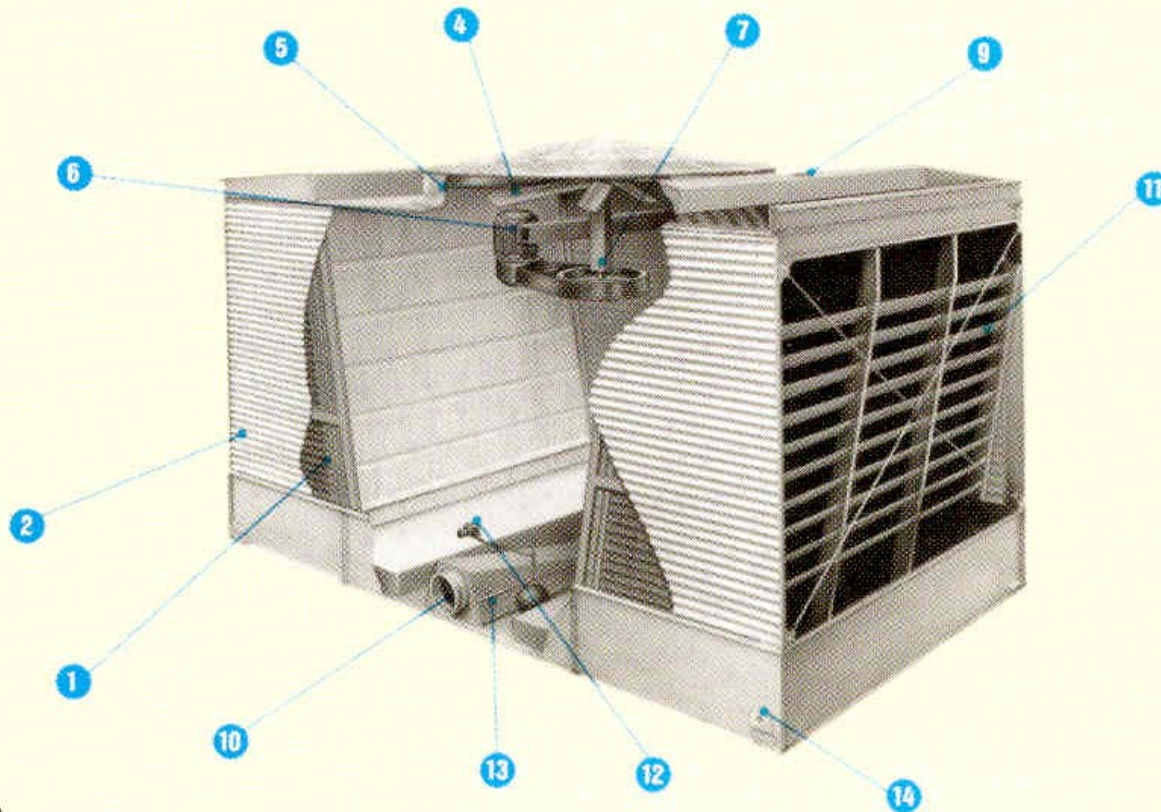
WATER COOLED SYSTEM



Water Cooled Package

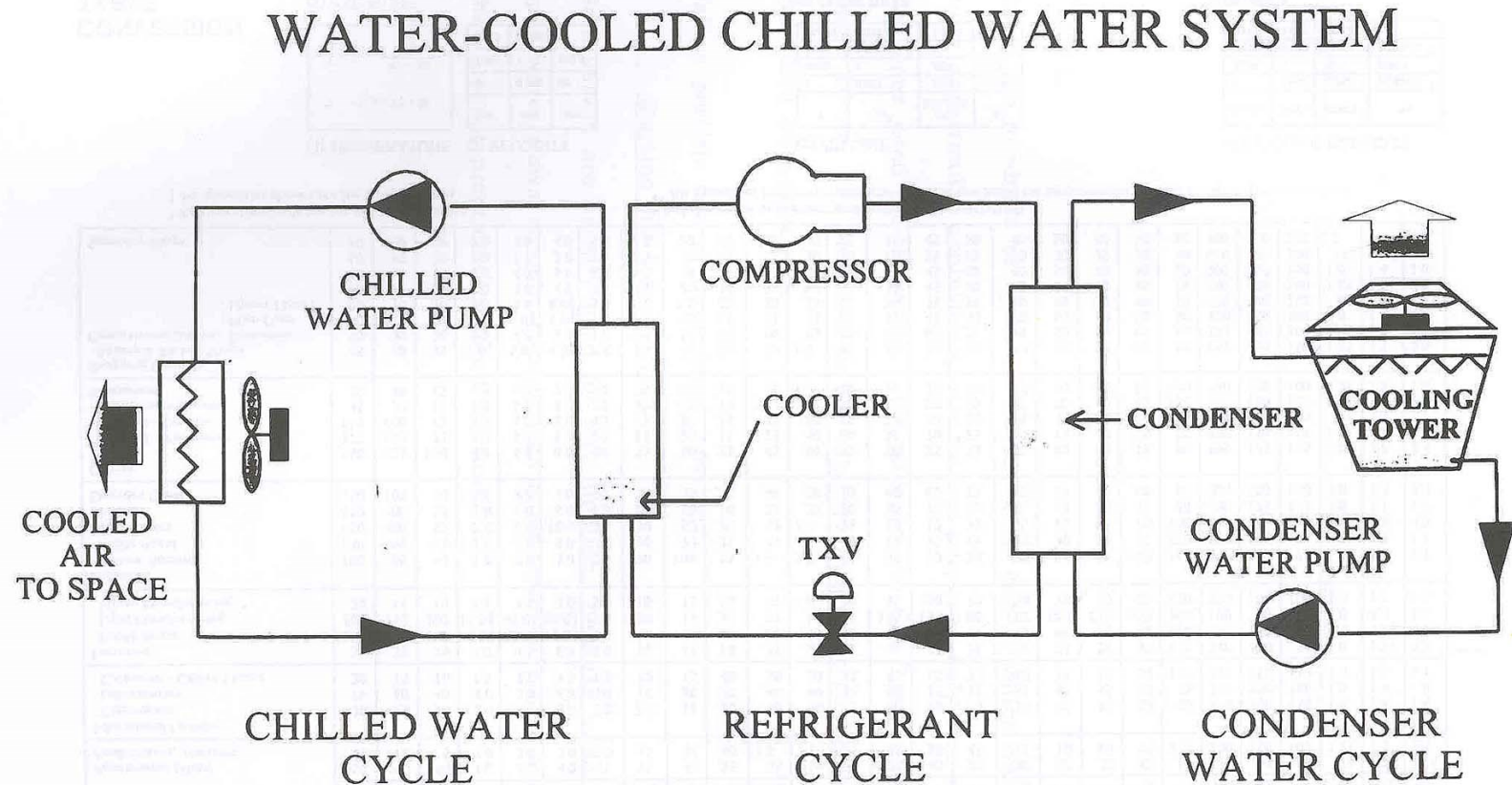


Cooling Tower

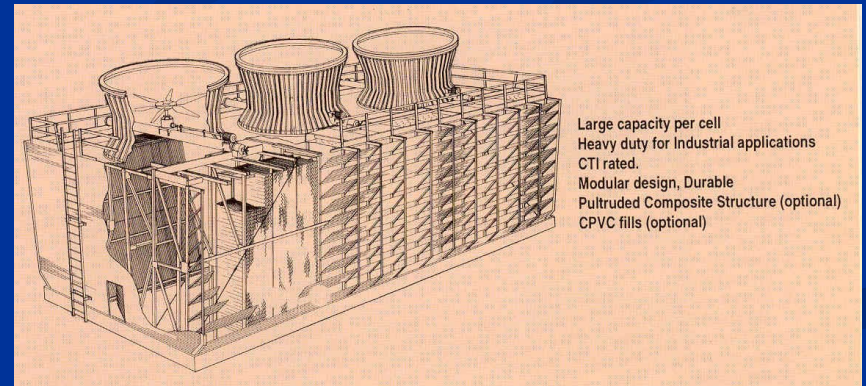
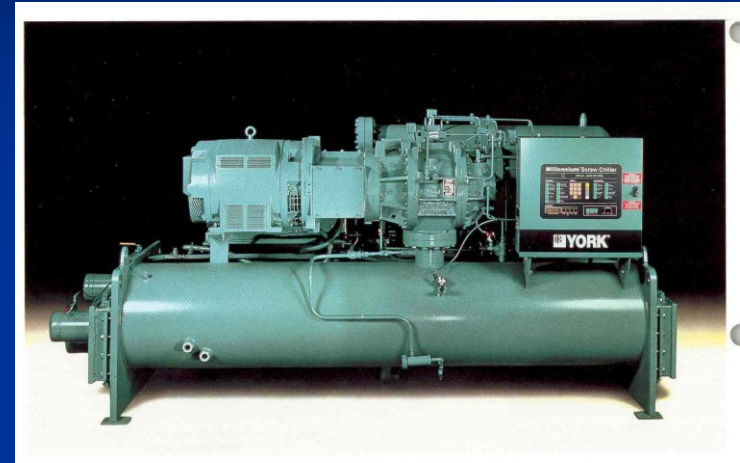
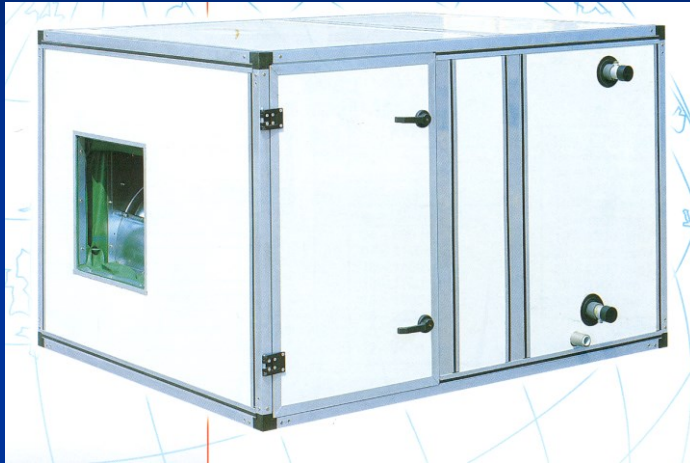


1. BACross® WET DECK SURFACE WITH INTEGRAL DRIFT ELIMINATORS
2. HEAVY-DUTY CONSTRUCTION
3. BALTDRIIVE® PowerTrain
4. AXIAL FLOW FAN
5. FAN CYLINDERS
6. FAN MOTOR
7. FAN SHAFT BEARINGS
8. ACCESS DOOR
9. WATER DISTRIBUTION SYSTEM
10. WATER OUTLET
11. AIR INLET LOUVERS
12. WATER MAKEUP VALVE ASSEMBLY
13. STRAINER
14. LIFTING DEVICES

Water Cooled Chilled Water System



AHU, Chiller, Cooling Tower, Make-up Water Tank



Large capacity per cell
Heavy duty for Industrial applications
CTI rated.
Modular design, Durable
Pultruded Composite Structure (optional)
CPVC fills (optional)

Sistem Pencegah Kebakaran

■ Tujuan

- Mengesan punca kebakaran awalan (asap/bahang)
- Mengesan kebakaran dan Mencegah kebakaran dari merebak secara automatik
- Melawan Kebakaran Kecil / Besar secara manual
- Mengurangkan asap semasa berlakunya kebakaran

Sistem Pencegah Kebakaran (1)

Alat Pasangan Tetap (Melawan dan Mencegah Kebakaran dari merebak) –Manual dan Otomatik

- Sistem Gelong Hos (Hose Reel)
- Sistem Pancur Kering (Dry Riser)
- Sistem Pancur Basah (Wet Riser)
- Sistem Semburan (Sprinkler)
- Sistem Hydrant
- Sistem CO₂/Gas Inert Berpusat (Otomatik)

Sistem Pencegah Kebakaran (2)

Alat Pasangan Tidak Tetap (Mudah Alih) –
(Portable Fire Extinguisher)

- Melawan dan Mencegah Kebakaran dari merebak - Manual
 - Sistem Pemadam Api Debu Kering (Dry Powder)
 - Sistem Pemadam Api Gas CO₂
 - Sistem Pemadam Api Foam

Sistem Pencegah Kebakaran (3)

Alat-alat Pemasangan Lain

- Alat Pengesan dan Penggera Kebakaran (Fire Alarm and Detection System)
- Sistem Tekanan Udara (Pressurization) Tangga
- Sistem Tekanan Udara (Pressurization) Lobi Lif
- Sistem Smoke Spill
- Lif Bomba
- Telefon Bomba
- Alat Pembesar Suara-ray (Public Address System)
- Lampu isyarat Kecemasan /Tanda Pintu Keluar

Keperluan Am Sistem Pencegah Kebakaran

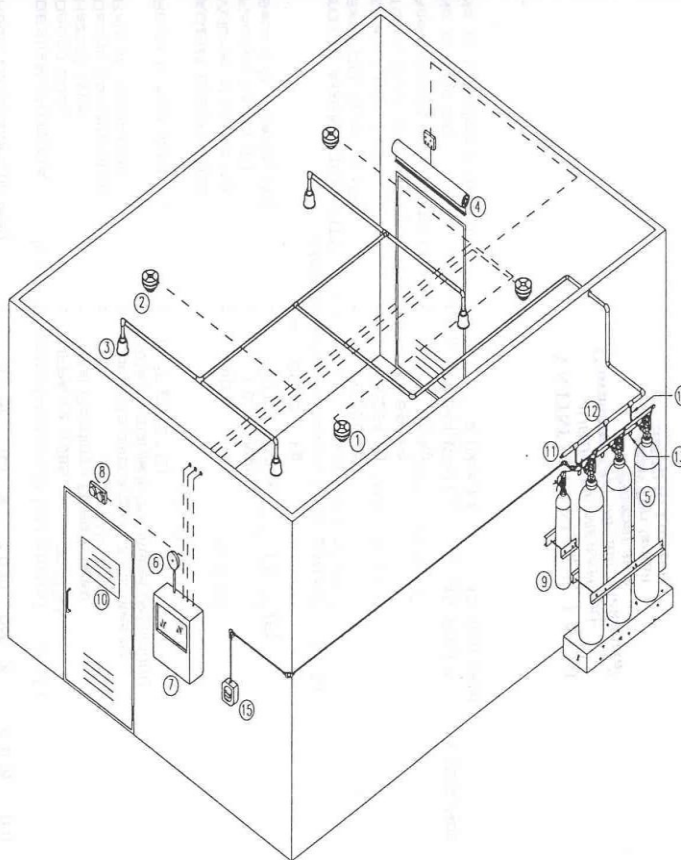
- Kenalpasti ukuran riser yang diperlukan – perlu kenalpasti jenis sistem pencegah kebakaran dan saiz paip
- Kenalpasti saiz pam dan ukuran bilik yang sesuai
- Kenalpasti saiz tangki air dan beban muatan untuk struktur
- Kenalpasti laluan paip – perlu trench, walkway,
- Kenalpasti lokasi smoke spill / pressurised staircase / lobby dan tentukan ukuran sesalur

Sistem CO2

Figure 12.1 CARBON DIOXIDE EXTINGUISHING SYSTEM TYPICAL ARRANGEMENT DRAWING

COMPONENT / EQUIPMENT

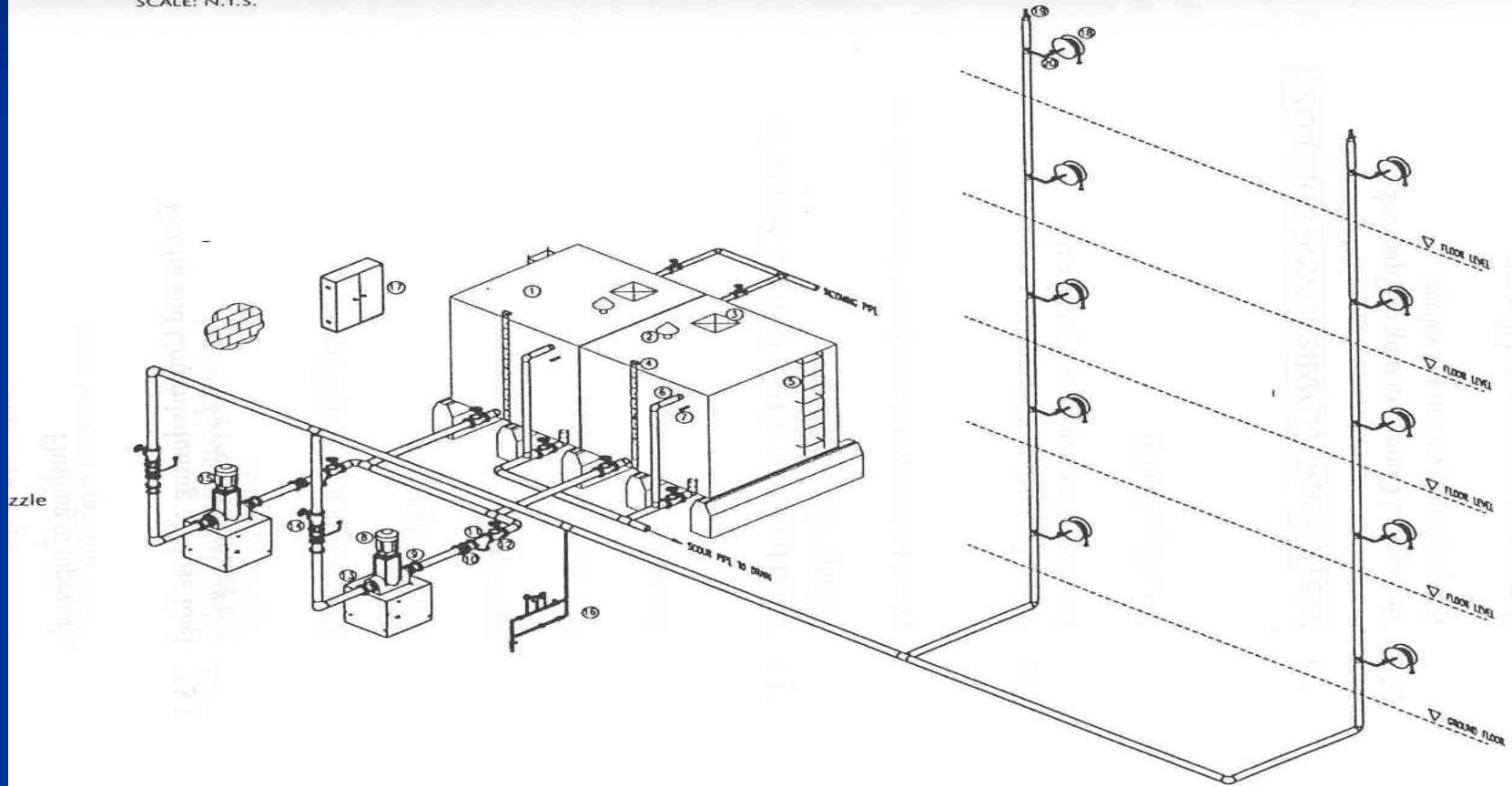
- 1 Heat Detector
- 2 Smoke Detector
- 3 Extinguishing Nozzles
- 4 Fire Curtain (for Louvre Door / Opening)
- 5 CO₂ Cylinder c/w Accessories
- 6 Alarm Bell
- 7 Key Switch
- 8 Double Inter-lock Control Panel c/w Back Up Battery
- 9 Normal / Discharge Light
- 10 Pilot Cylinder c/w Solenoid Valve
- 12 Safety Plug
- 13 Piping Manifold
- 14 Copper Tubing
- 15 Discharge Hose c/w Check Valve
- 16 Manual Pull Station



Sistem Gelong Hos

Figure 7.1 HOSE REEL SYSTEM TYPICAL ARRANGEMENT DRAWING

SCALE: N.T.S.



Sistem Gelong Hos

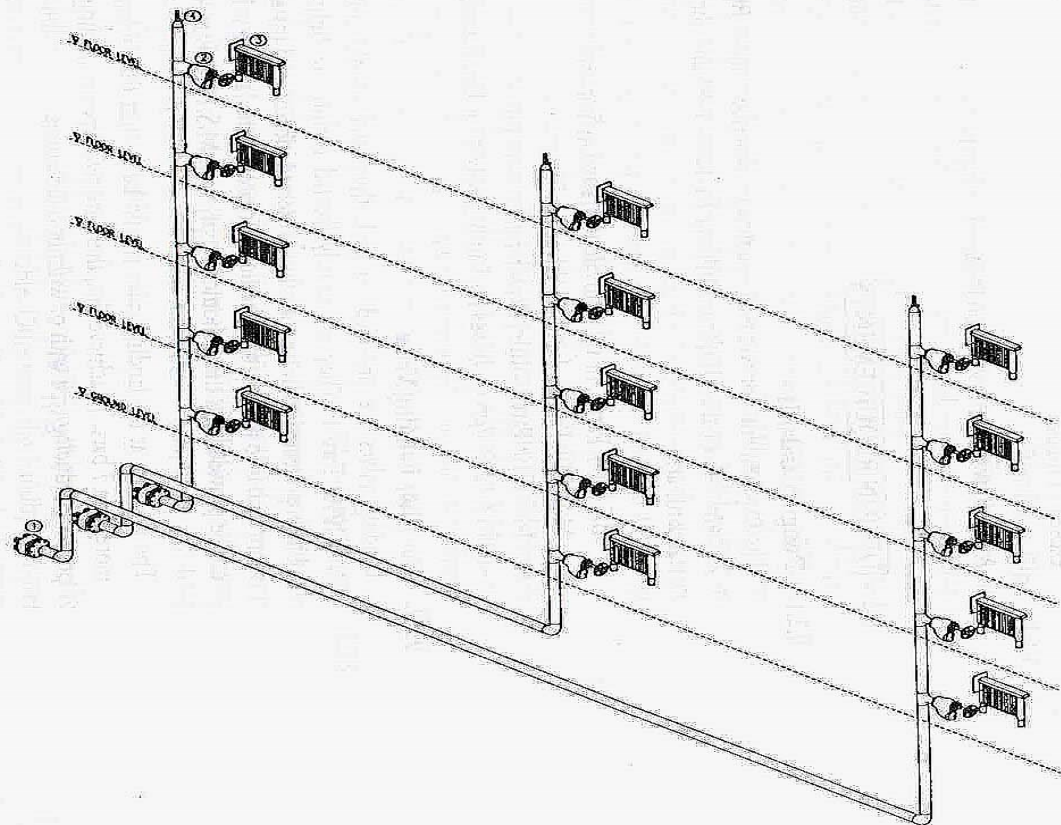


Dry Riser Schematic

Figure 8.1 DRY RISER SYSTEM TYPICAL ARRANGEMENT DRAWING
SCALE: N.T.S.

COMPONENT / EQUIPMENT

- 1 4-Way Breeching Inlet
- 2 Landing Valve
- 3 Hose Cradle
- 4 Air Release Valve c/w Ball Valve



Sprinkler Tank, Pumps and Header



SISTEM LIF

- Keperluan Lif
- Jenis-jenis Lif
- Kategori Lif
- Ciri-ciri Lif (Lift Characteristic)
- Komponen Utama Lif
- Keperluan Awalan Struktur Sistem Lif

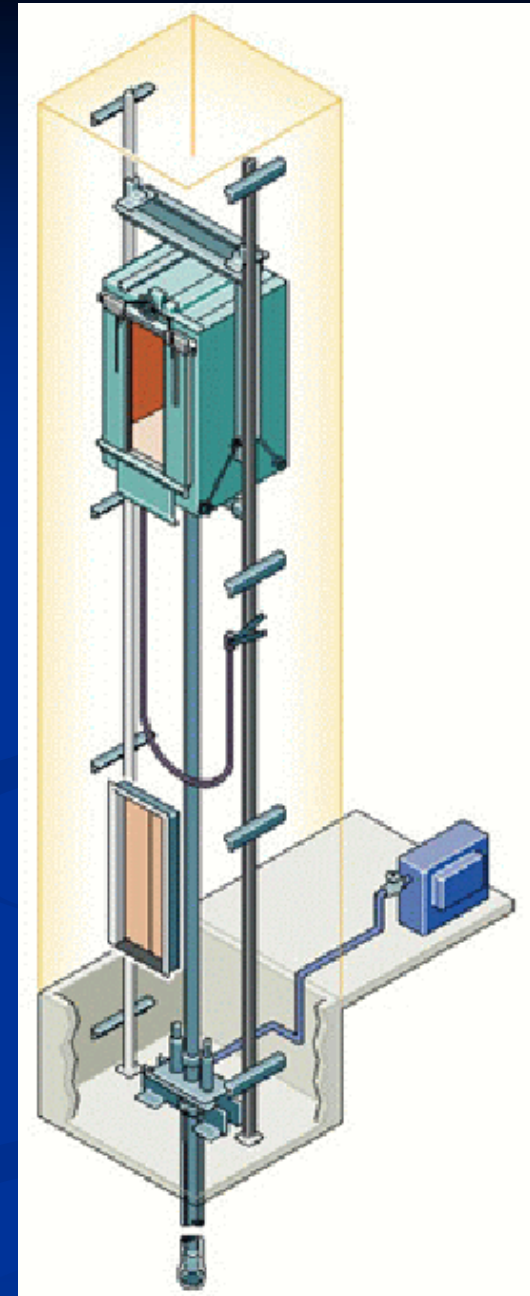
Keperluan Sistem Lif

- AKTA KILANG DAN JENTERA
 - Electric Passenger and Goods Lifts Regulations 1970, as published in Factories & Machineries Act 1967
- BRITISH STANDARD OR THE AMERICAN NATIONAL STANDARD SPECIFICATION FOR ELECTRIC LIFTS
 - BS 5655 Pt. 1 to 10
 - ANSI/ASME A 17.1 - 1981
- UBBL
- CUSTOMER NEED

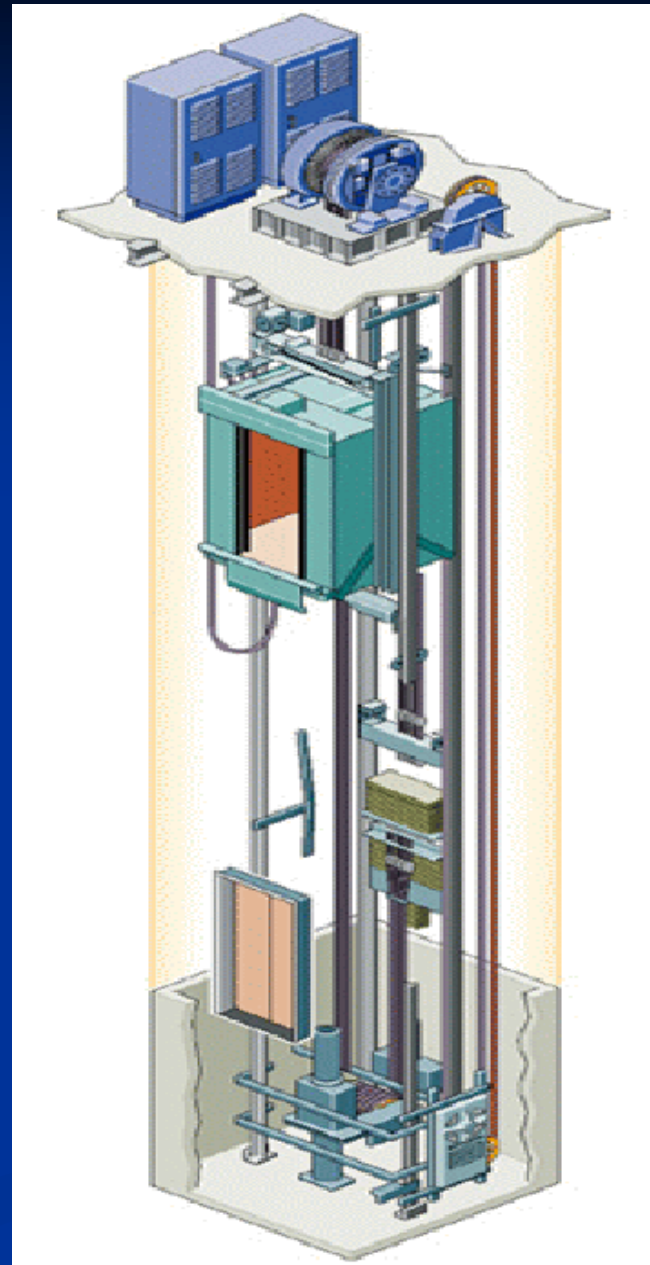
Jenis-jenis Lif

- Lif Hydraulik
- Lif Elektrik

Lif Hydraulik



Lif Elektrik



Kategori Lif

- Lif Penumpang (Passenger Lifts)
- Lif Katil/Penumpang (Bed/Passenger Lifts)
- Lif Barangan/Perkhidmatan (Goods/Service Lift)
- Lif Bomba (Bomba Lift)

Ciri-Ciri

■ Lif Penumpang

- Kapasiti 6 – 23 orang (1600 kg)
- Kelajuan 1.0 – 3.0 m/s

■ Lif Katil/Penumpang

- Kapasiti 23 orang (1600 kg)
- Kelajuan 1.0 – 1.6 m/s

CIRI-CIRI

■ Lif Barangan/Penumpang

- Kapasiti > 900 kg
- Kelajuan 0.5 to 3.5 m/s

■ Lif Bomba

- Kapasiti 6 – 23 orang (1600 kg)

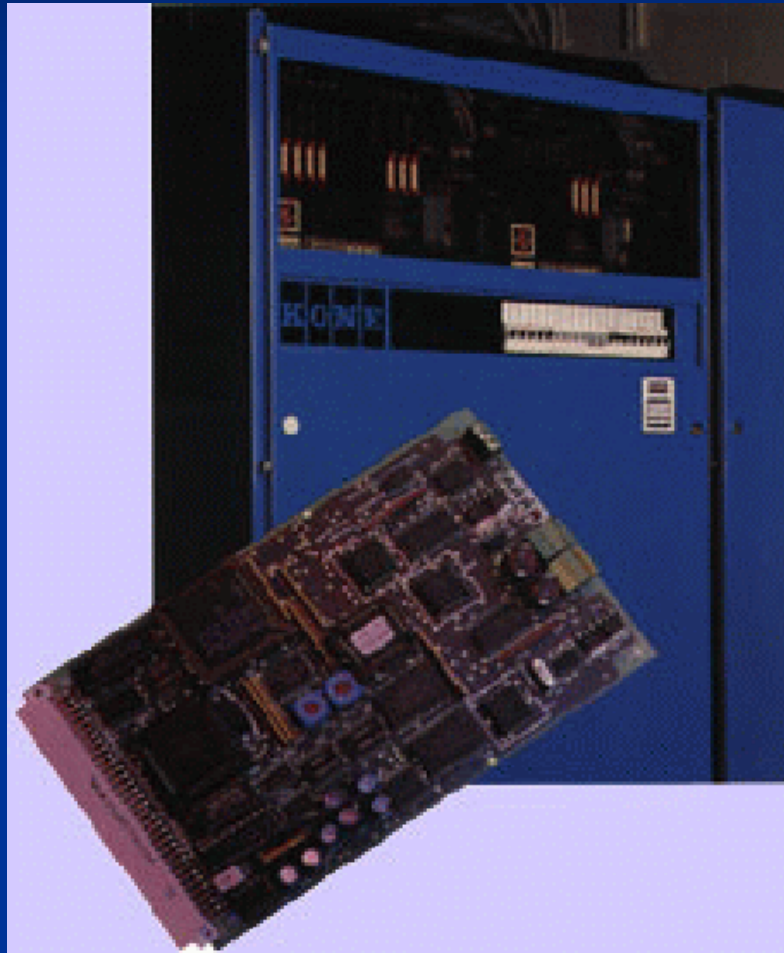
Komponen Utama Lif

- Bilik Lif Motor (Lift Motor Room)
 - Lif Motor
 - Motor 2 arah untuk membawa lif ke atas dan ke bawah (AC, ACVV, DCVV)
 - Selector
 - Record position of lift car and transmit messages to the controller
 - Controller
 - Controls overall operation of the lift
 - Governor
 - Triggering the safety gears to stop the lift should the over speeds on its downwards travel

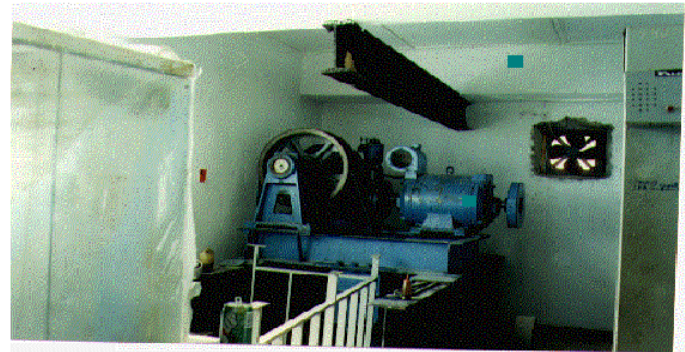
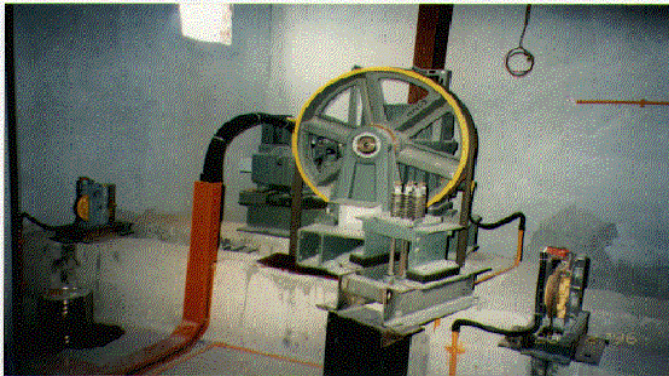
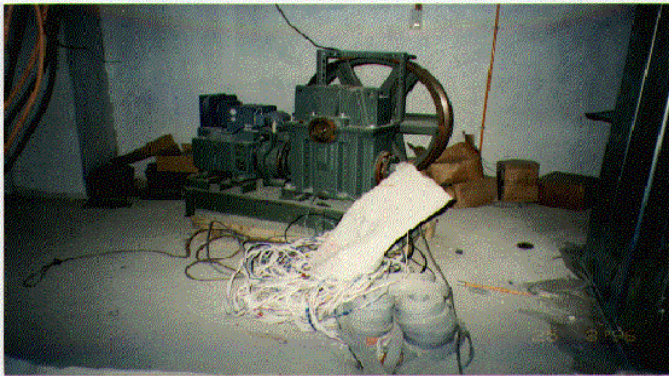
Komponen Bilik Lif Motor - Controller



Controller



Lif Motor dan Governor



Bilik Lif Motor

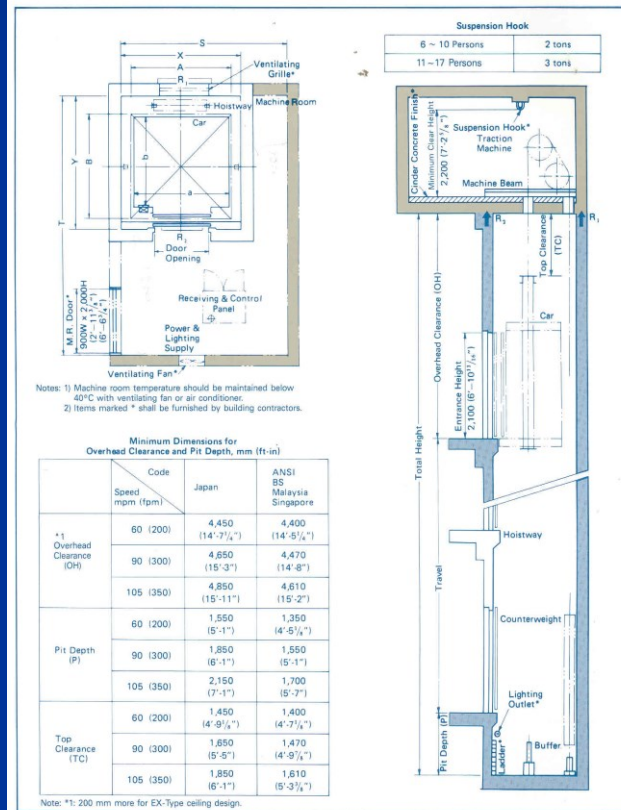


Komponen Utama – Lift Shaft

- Lift Car and Door
 - To contain people and goods
- Counterweight
 - To balance the load of the car to ease motor load
- Hoisting Rope
 - To hoist the car and counterweight up and down the shaft via motor
- Buffer
 - To stop descending lift or counterweight should it overtravel by absorbing the kinetic energy
- Guide Rails
 - To guide the travel of the car and counterweight

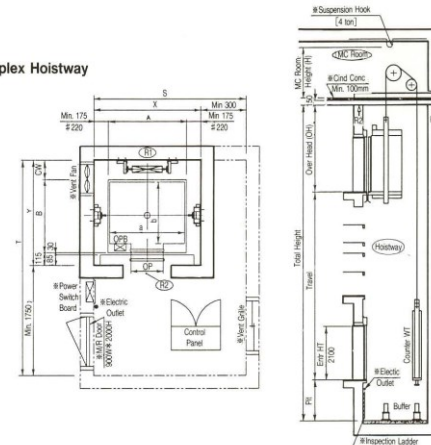
Lift Shaft Section

Hoistway and Machine Room

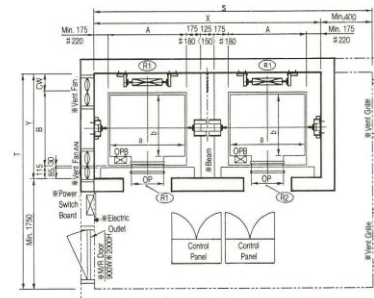


60 MPM INV Elevator Plan

Simplex Hoistway



Duplex Hoistway

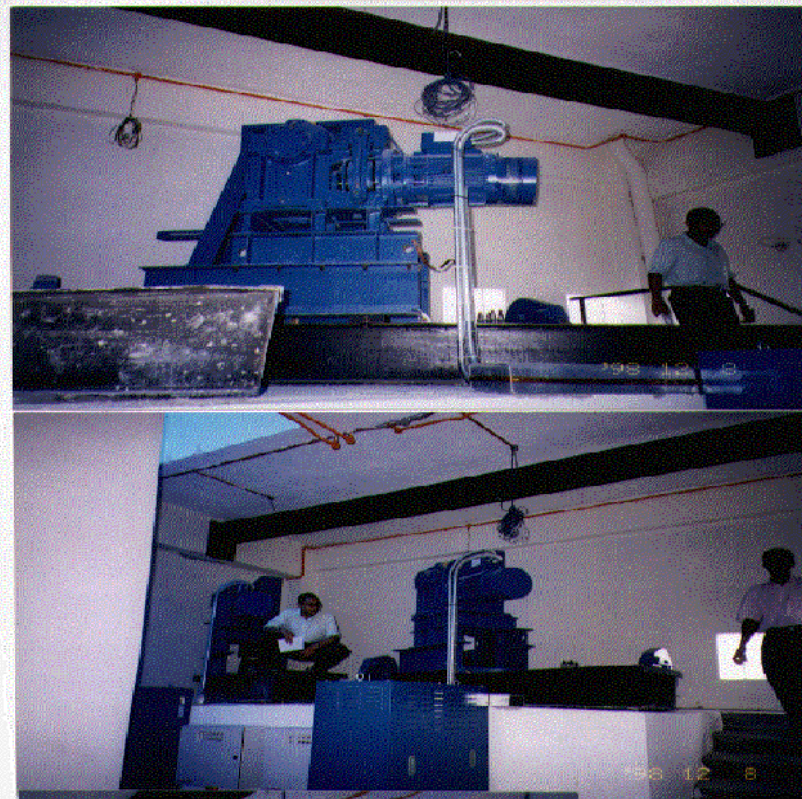


Remarks

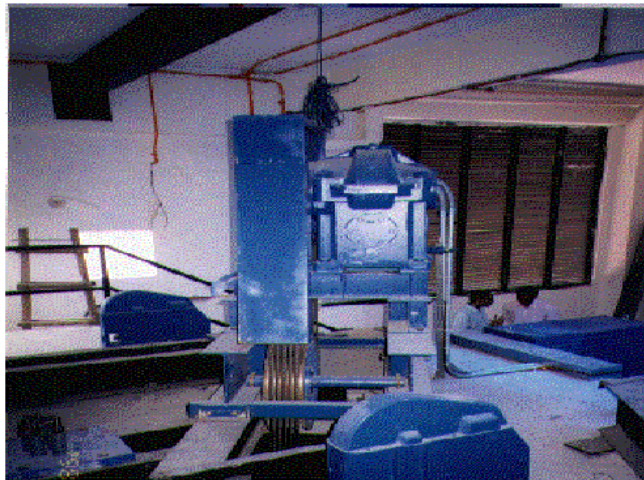
- Items marked * shall be supplied by the building contractor.
- Dimensions marked # are for more than 1150kg capacity.
- () dimension is only for 24 persons capacity.

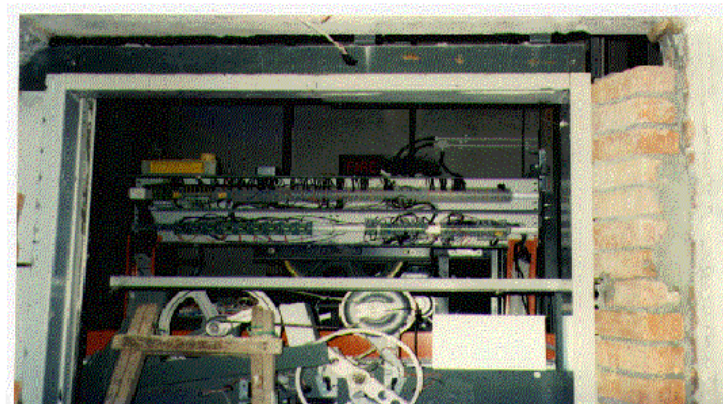
Lift Car and Door





Rope





SPEED CONTROL

- AC 1 & AC2 (Geared)
- ACVV – Variable Speed (Voltage) geared motor
- DCVV – Geared & Gearless
- Hydraulic

Kerja-kerja Persediaan Awalan Awam untuk Pemasangan Lif

- Dimensi Lift Shaft
- Beban Hoisting Beam / Hook
- Dimensi Bilik Lif Motor
- Dimensi Lif Door Opening (Struktur)
- Kedalaman Lift Pit
- Beban Elektrik

LOBI LIF



Lift Door and Lift Car

ENTRANCE DESIGN



JS - 200

DOOR : STAINLESS ETCHING
JAMB : STAINLESS HAIRLINE
H.I.B. : HIB - P01

CAR DESIGN



CD - 01

CEILING : DX - 01
PANEL : STEEL PAINTING
DOOR : STEEL PAINTING
C.O.P. : OP - 102
C.P.L. : CPI - D01
FLOORING: LUCKSTRONG

Car Operating Panel and Hall Button & Indicator

CAR OPERATING PANELS



OP - H01 (FOR HANDICAPPED)



HALL INDICATOR BUTTON

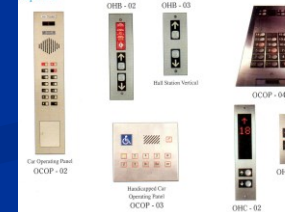


SIGNAL FIXTURES

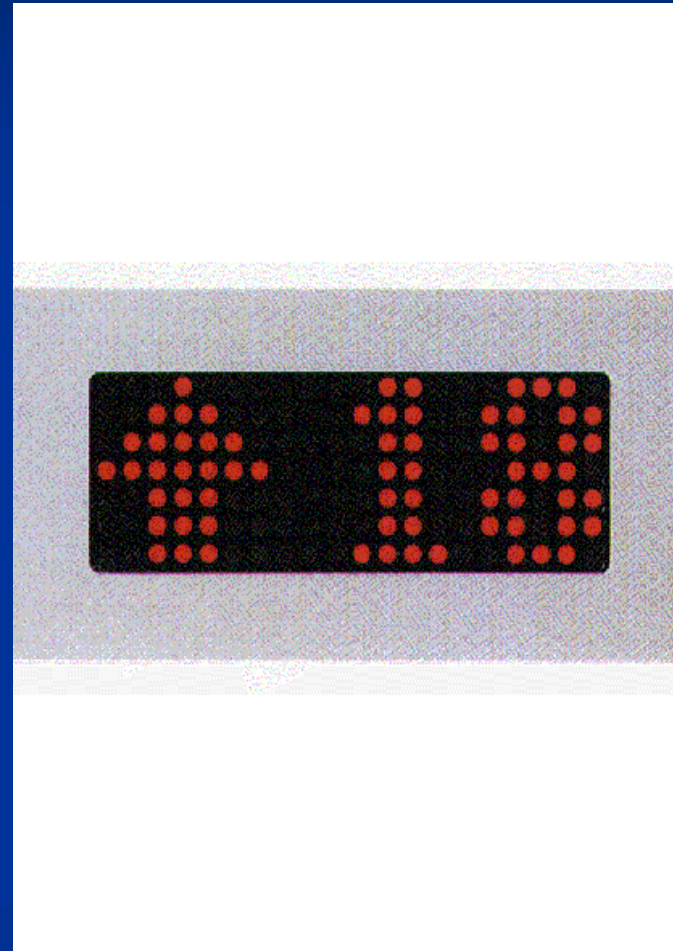
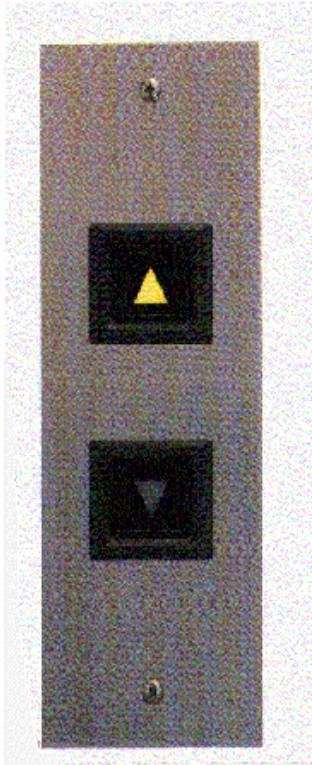
Standard



Optional



Hall Button & Hall Indicator



THANK YOU

- ▶ Semoga ilmu ini dapat dimanfaatkan dan dipanjangkan
- ▶ Assalamulaikum w.r.b dan Salam Sejahtera

Sistem Gelong Hos (Hose Reel System)

- Sistem Manual untuk pertolongan awal
- Bagi api yang kecil – mencegah dari merebak
- Sistem paip bersama dua Pam (Duty & Standby),
 - Tangki (minima 2000 igal pemasangan biasa 2400 igal / 3200 igal)
 - Paip 2'' (50mm) atau 2 1/2''

Sistem Pancur Basah (Wet Riser)

- Sistem Manual – Memadam Kebakaran
- Bangunan melebihi 100'
- Seperti Pancur Kering tetapi mempunyai pam dan tangki air
- Terdapat dua jenis Breeching Inlet – 2 way dan 4 way

Sistem Pancur Kering (Dry Riser)

- Sistem Manual – Memadam Kebakaran
- Bangunan 60' – 100' (6 – 10 tingkat)
- Dua batang paip (6" menaik & 4" menurun) dan lurus menegak dengan injap (landing valve) pada setiap tingkat
- Injap menerima air (Breeching Inlet) pada tingkat bawah untuk Bomba

Sistem Semburan (Sprinkler)

- Sistem Mencegah Kebakaran dari merebak Secara Otomatik
- Bangunan yang luas
- Sprinkler beroperasi pada suhu 60-90deg C (kebiasaan 70 degC)

Sistem CO2 / Gas Inert

- Mengesan dan mencegah kebakaran dari merebak
 - Untuk menjaga peralatan mahal seperti Bilik Server / Bilik Elektrik