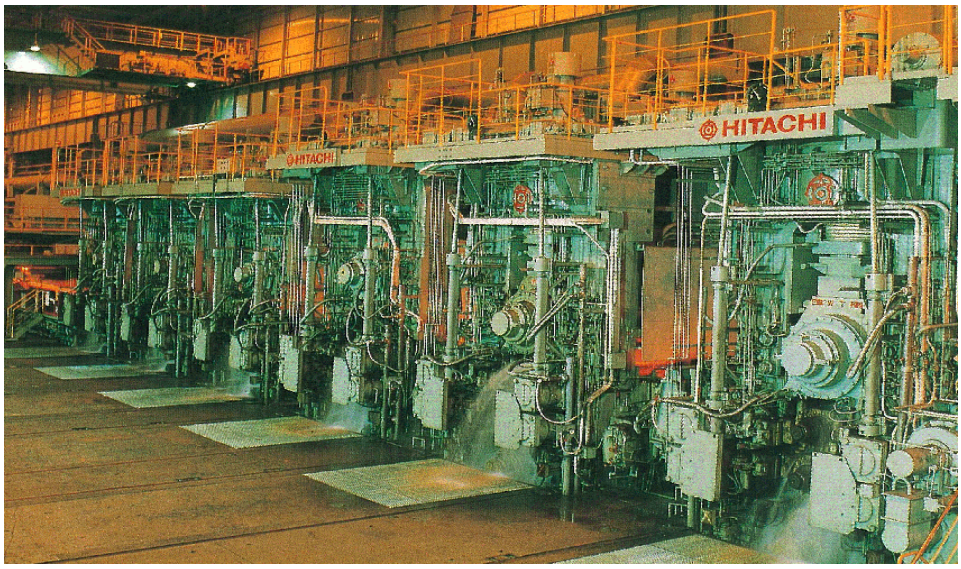
HYROP CONTROL PANEL
HISEC04 ／ R700



三菱日立製鉄機械株式会社
Mitsubishi-Hitachi Metals Machinery, Inc.

HYROP CONTROL PANEL (R700)

2009.06

Outline of HYROP

HISEC／R700 is structured using micro processors(CPU). Closed loop operation process which require high-speed operation is constructed by exclusive use counter board. Interface and compensation process which require high-accuracy and multifunctional operation is constructed by MAIN CPU board. So, it can realize high accuracy, multi-function use, and high response and performance.

What is HYROP？

HYROP means "Hydraulic Roll Positioning Device" and use strong Force Motor Valve (FMV) for roll gap control of rolling mill.

＊：MOOG servo valve etc. is also applicable.

- High speed response HYROP → AGC accuracy will be grade up
- Change of servo mechanism

HYROP－M （mechanical servo）

⇩

HYROP－F （use FMV : electro-hydraulic servo）

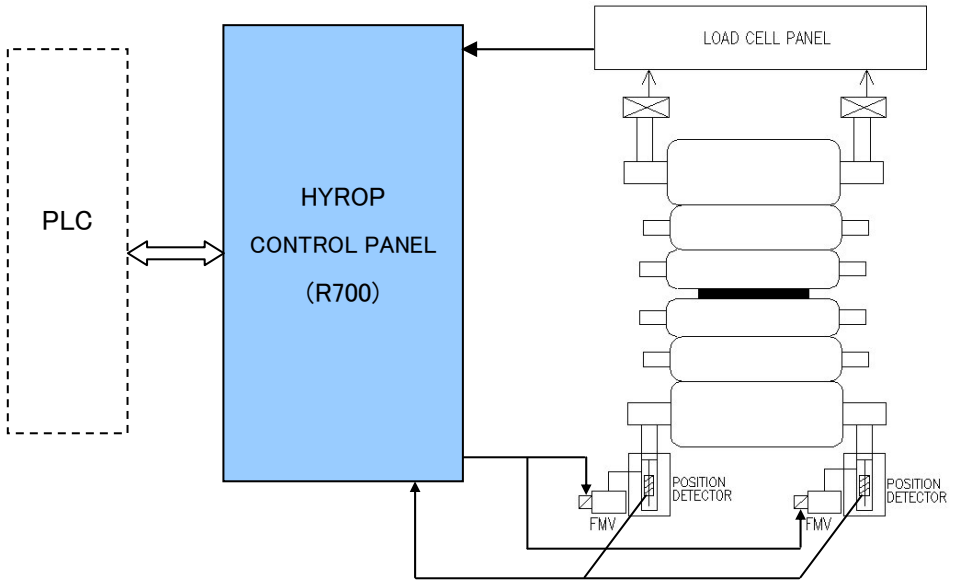
Structure of HYROP - F

Using FMV 、and connect to hydraulic, cylinder directly.

Strong direct drive type servo valve → High response、Capable for anti-contamination、No need spool feedback control.

- High resolution (1 μm) CYL position detector.: Absocorder、Magnescale
- Multi-microcomputer structure

High accuracy, High response, Multi-function DIGITAL SERVO CONTROL



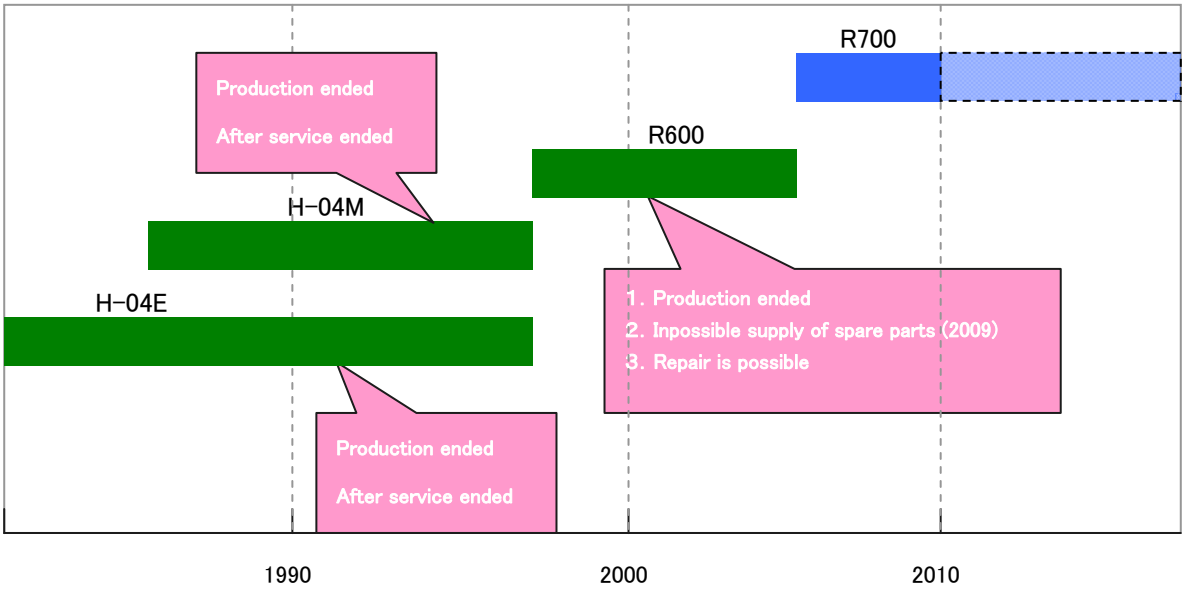
Features of HYROP control panel
(HISEC04/R700)

We developed the third generation HYROP control panel using the latest CPUs

- Our own development → Steady service over a long period.
- High speed digital processor → High speed response
  - High accuracy position control.
  - Controlling two stands by one HYROP panel.
  - Compact panel structure for Tandem mill etc.
- Contain all of standard library routines. → HYROP is tuned to your particular needs. (i.e. any type of cold mill, hot mill and skin pass etc.)
- High level monitoring function → On-line monitor : real time monitoring of internal control signals.
  Off-line monitor: data storage in memory continuously and stopped by trigger and can draw chart.
  Operation history allows identifying faulty place.
- System test function included → Step response test, mill modulus measurement function included.
- Touch panel → Displaying oil height, machine status, faulty record and guidance for trouble shooting.
- Expandability → Compatible with hardware and software of upper PLC by ECI consolidation system
- Network with PLC → 100Mbps local network
- Many application records. → Applied to TCM、RCM、SPM、ZRM、several types of HSM and modernization / replacement.

History of HYROP control panel

Model change of control panel(R700)



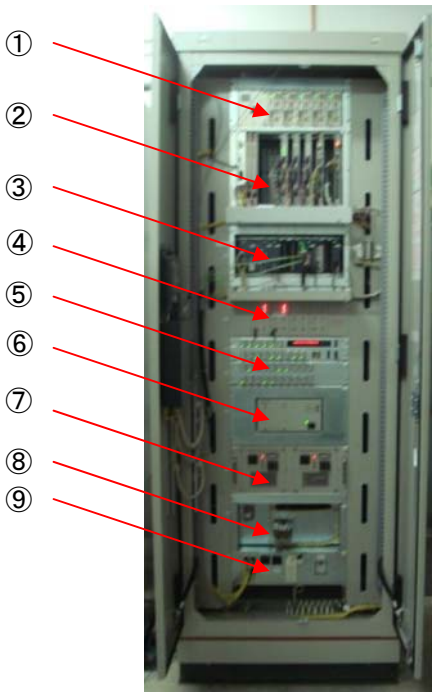
Performance of the latest version of HYROP (R700) compared with older versions

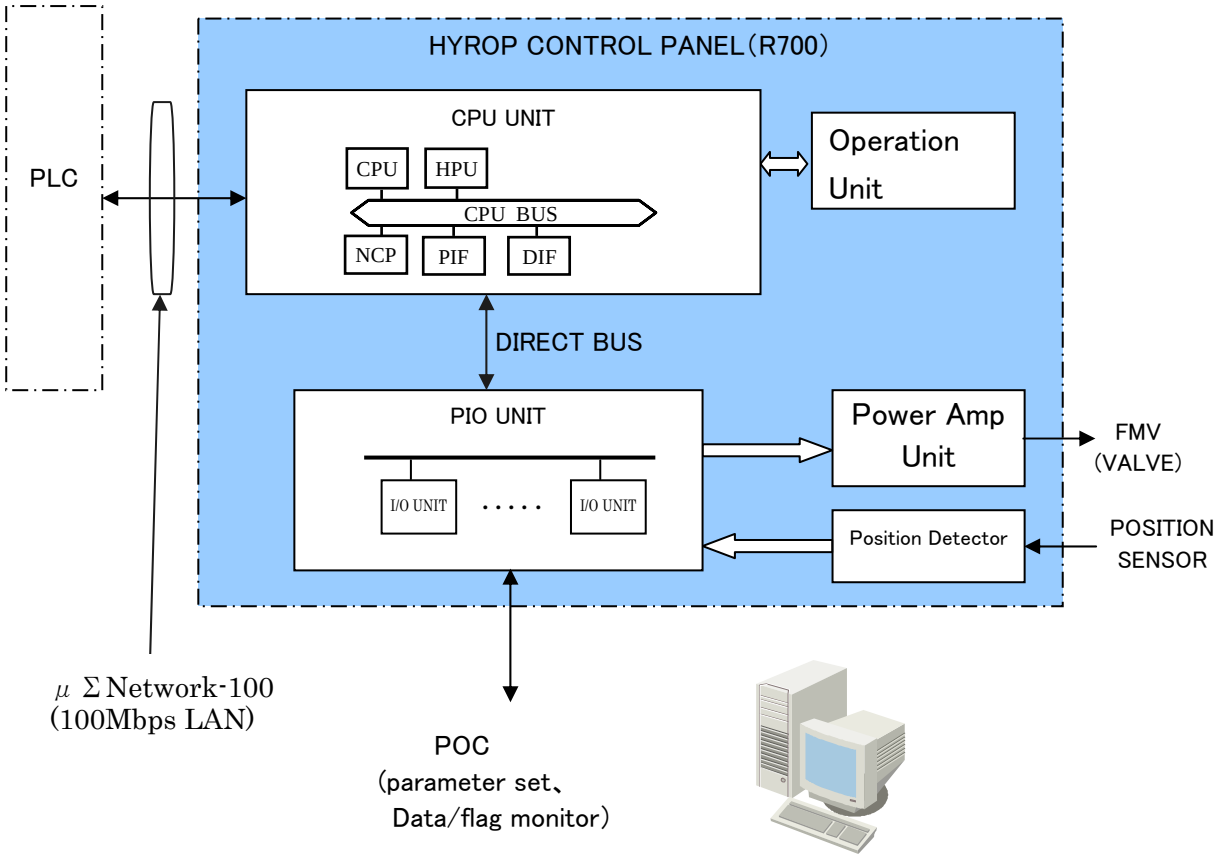
Item	HYROP (H04E) (production ended)	HYROP (R600) (production ended)	HYROP (R700)
CPU	POWER PC603e 33MHz	POWER PC603e 100MHz	SH－4 160MHz X 2
Memory	512KB	32MB	64MB
Touch panel	NO	YES	YES
Trace function	NO	NO	NO
Test function	NO	NO	NO
Control unit	Board type	Board type	Board type
PANEL	1 std／1PANEL	1 std／1PANEL 5 std／3PANEL（TCM）	1 std／1PANEL 5 std／3PANEL （TCM）

Construction of HYROP control panel

Control Panel is construction by multi microcomputer So, it can realize high accuracy and high response

① Power Supply Unit
② PIO Unit
③ PLC(R700)
④ PIF Console
⑤ Relay Unit
⑥ Position Detector
⑦ Power Amplifier Unit
⑧ Powewr Relay Unit
⑨ Power Supply Unit



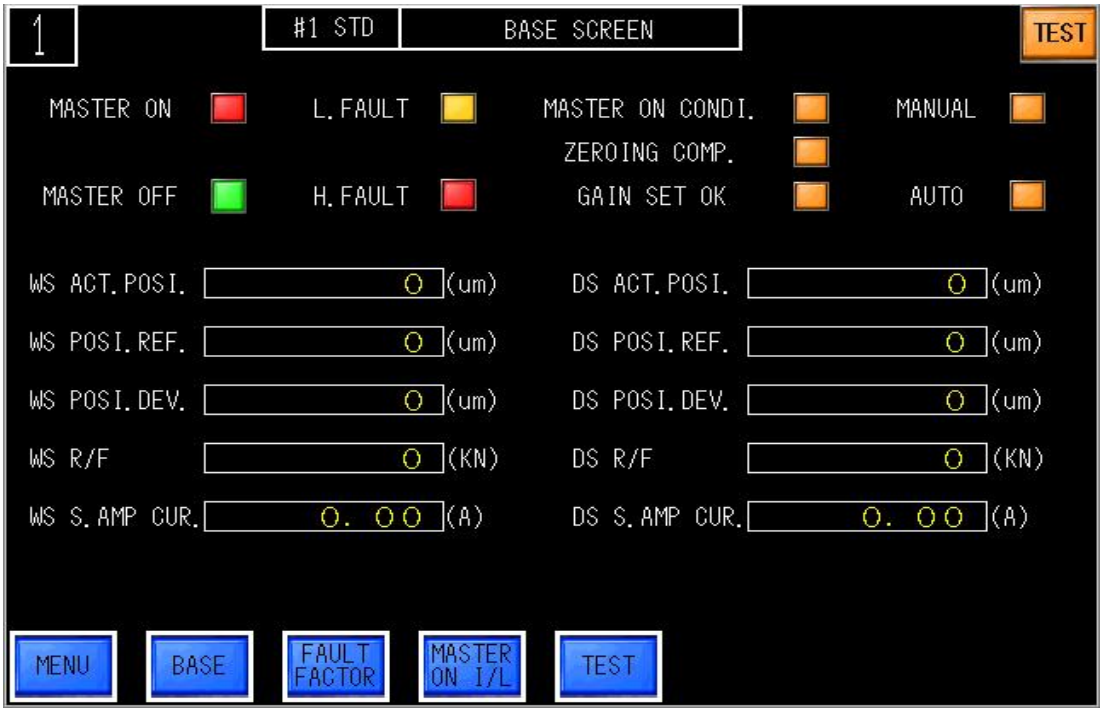


Specifications of HYROP control panel

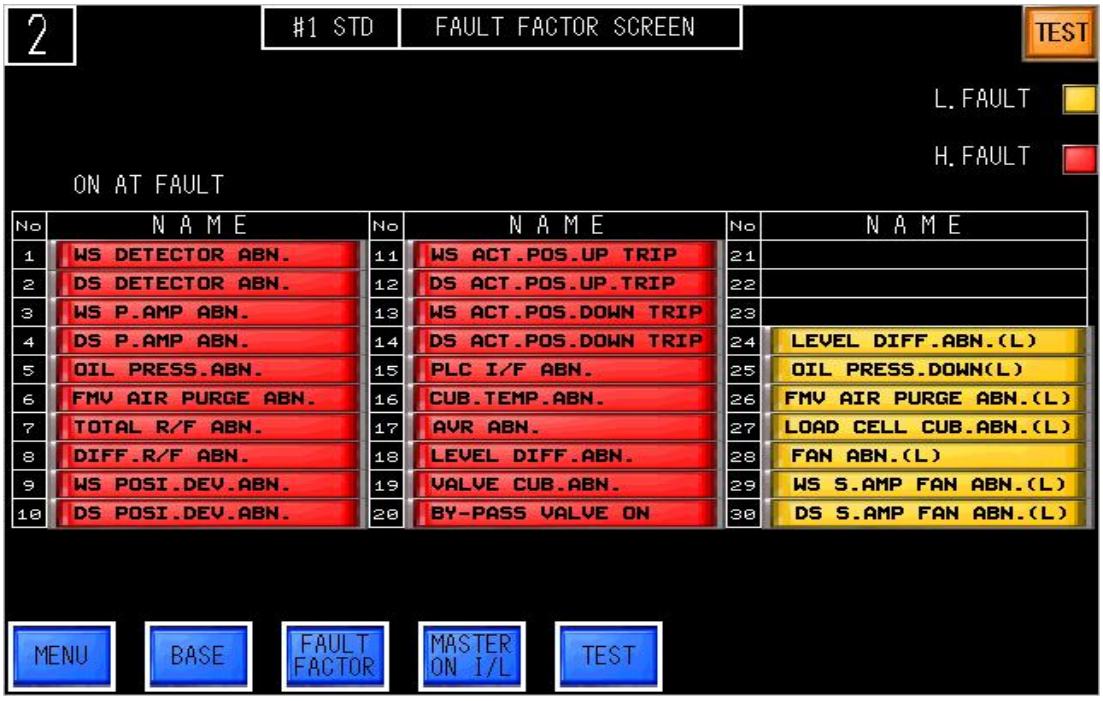
- Position Detector
  Magnescale or Absocorder
- Servo-Valve
  FMV(MOOG valve also available)
- Basic function
  Position control loop : position data take、deviation calculation、control signal output
  Compensation : deferential pressure、leak 、dither
- Manual handling
  Both side open/close : WS・DS same direction same number drive
  Levering : center levering type
- Automatic control (with line control PLC)
  AGC : Automatic gauge control
  APC : Automatic position control
  ALC : Automatic levering control
  MMC : Mill modulus control
  REC : Roll eccentricity control
  CPC : Constant pressure control
  Q.OPEN : Quick open control
- Display
  Oil height、fault list、trouble shooting etc.
- Panel
  Closed stand alone
- Power consumption
  AC100/110V、50/60Hz、1φ、2KVA
- Environment condition
  Temperature in operation : 0～+40 ℃
  Temperature in shut-off : －10～+60 ℃
  Humidity : 10～80 %RH (no water drop)
  Dust : Less than 1.0 mg/m^3
  Vibration : ±0.5 mm 1,000rpm
  Shock : 10G
- Size／weight
  - RCM (1 std／1PANEL)
    950(W)×920(D)×2,437(H) mm ／ 450kg
  - TCM (5 std／3PANEL)
    2,700(900×3)(W)×920(D)×2,487(H) mm ／ 1,350kg

Display of operation unit

Main display page

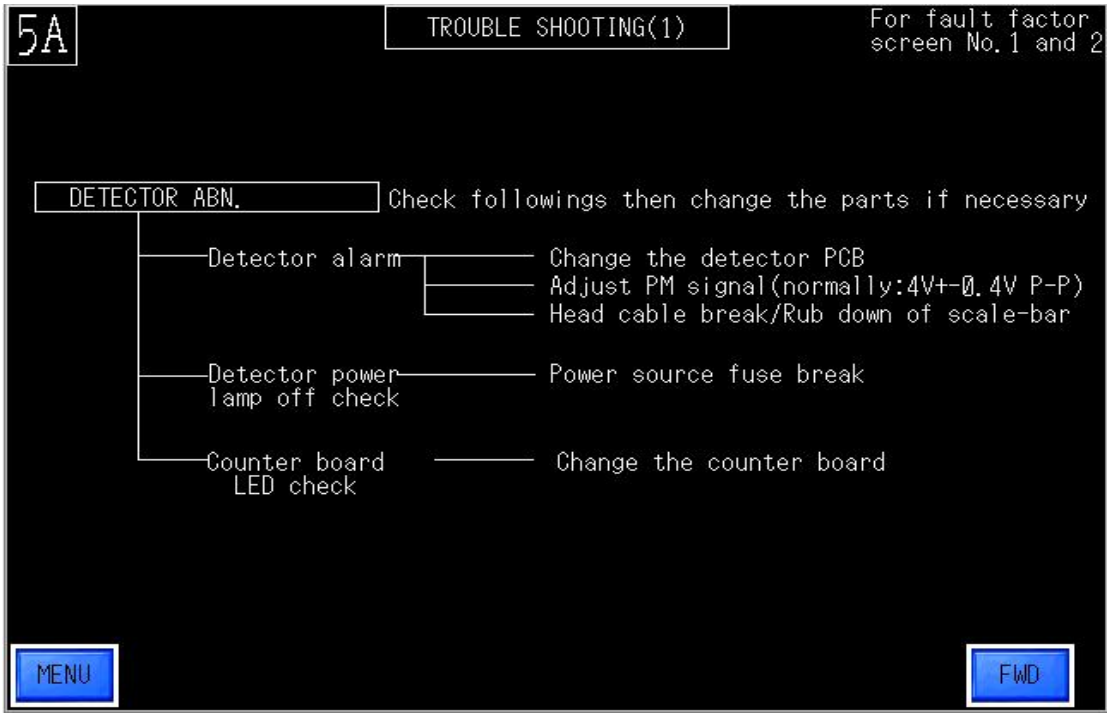


Fault display page



Display of operation unit

■ Trouble shooting display page



An example of data trace function

It will help you to find cause of trouble

Standard function①High speed data gathering function ②Abnormal data storage function ③Trend chart display function

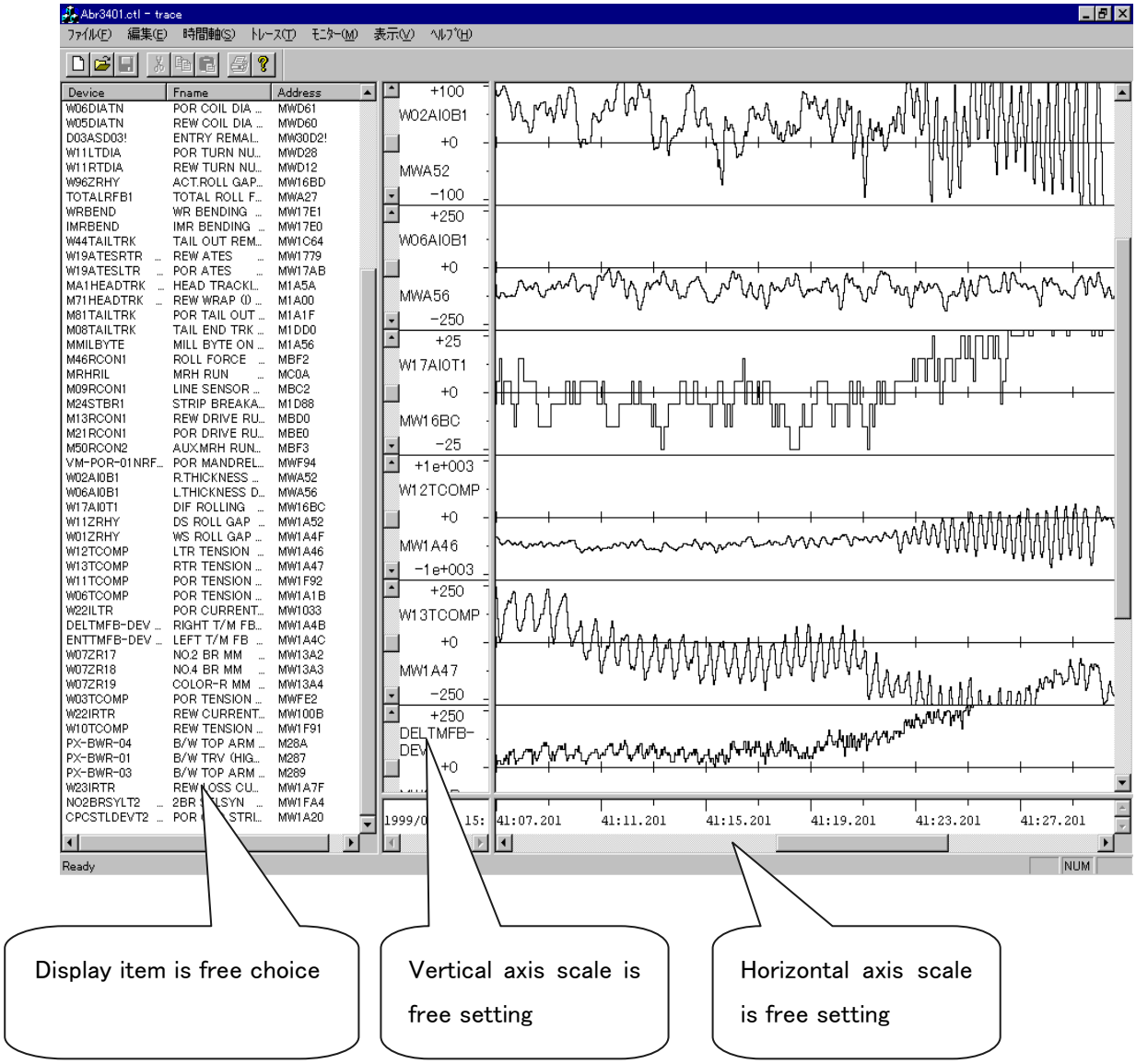
①High speed data gathering function

- ・Sampling time(data gathering cycle) : Min.20msec(sampling time is variable)
- ・Data shelf life(standard) : 72 hour(20msec select)

②Abnormal data storage function

- ・Storage timing(abnormal realization) : Abnormal flag(registration)"ON"
- ・Standard case registration
  - Equipment fail(line stop factor)
  - Manual stop
  - Operation stop

This function is stand up for trouble shooting of equipment abnormal or operation abnormal

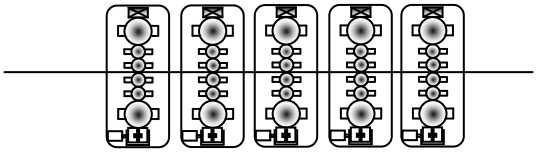


Applied Mill types ／ Supply records

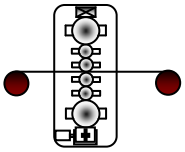
Many kinds of control have been realized.

Applied Mill types

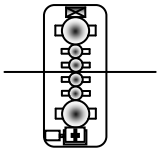
TCM



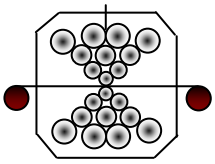
RCM



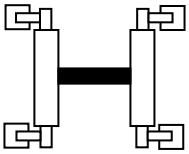
SPM



ZRM



HSM（Edger）

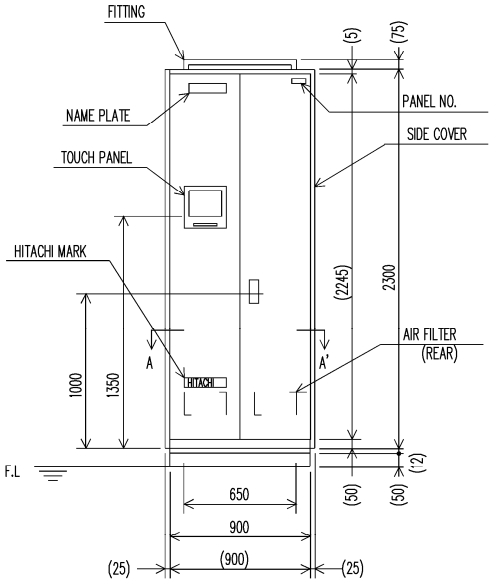


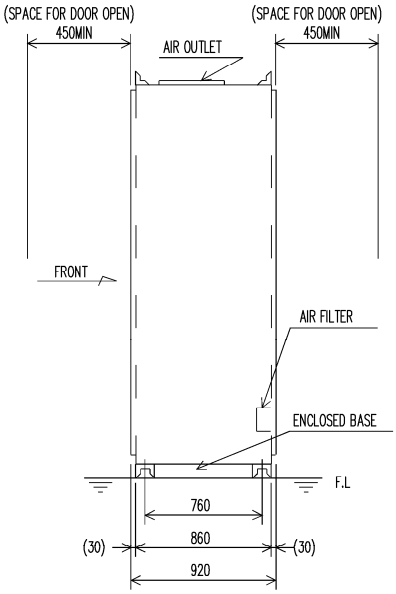
Supply records

Japan、China、Korea、Taiwan、Thailand、Vietnam、India、USA、Europe（CE marking gotten）、Africa、over 300 panels have delivered.

Outline drawings of panel

1 std／1 PANEL





5 std／3 PANEL