

TOKYO
KEIKI



Autopilot PR-2000 Series

Autopilot system PR-2000



TOKYO KEIKI INC.

The PR-2000 series autopilot, widely regarded as a system with stable performance and easy operation for fishing boats, coastal vessels and merchant ships, has long enjoyed great popularity among all users, with more than 16,000 units sold over. It is available in a stand type which is connected with a separately installed gyrocompass, magnetic compass or GPS compass and a GYLOT® type which combines gyrocompass and autopilot into a single form. And a console type integrating gyrocompass, GPS compass and all other necessary nautical equipment are also available. In addition, it is possible to connect with steering gear unit made by TOKYO KEIKI or other manufactures.

Features

Easy to use system design

The Design is considered visibility and usability with human engineering.

Upgraded economic efficiency and course stability

The PID(Proportional+Integral+Differential) control and dual gain-based weather adjustment minimize propulsion power losses with improved course stability, so that steering can be carried out with greater saving in fuel costs.

Light weight and compact size power unit

Downsizing of the power unit is satisfied with TOKYO KEIKI's hydraulic instruments cramming TOKYO KEIKI's superior technology of electro-hydraulics. The space and weight become 30% less.

Silent solenoid valve

High performed wet type solenoid valves are utilized. The noise of switch selection becomes small and oil leak is shut out from push pin. Noise reduction and easy maintenance are satisfied. In addition, the ADC solenoid coil are utilized too. It minimize the burden of the coil by inrush current and over current.

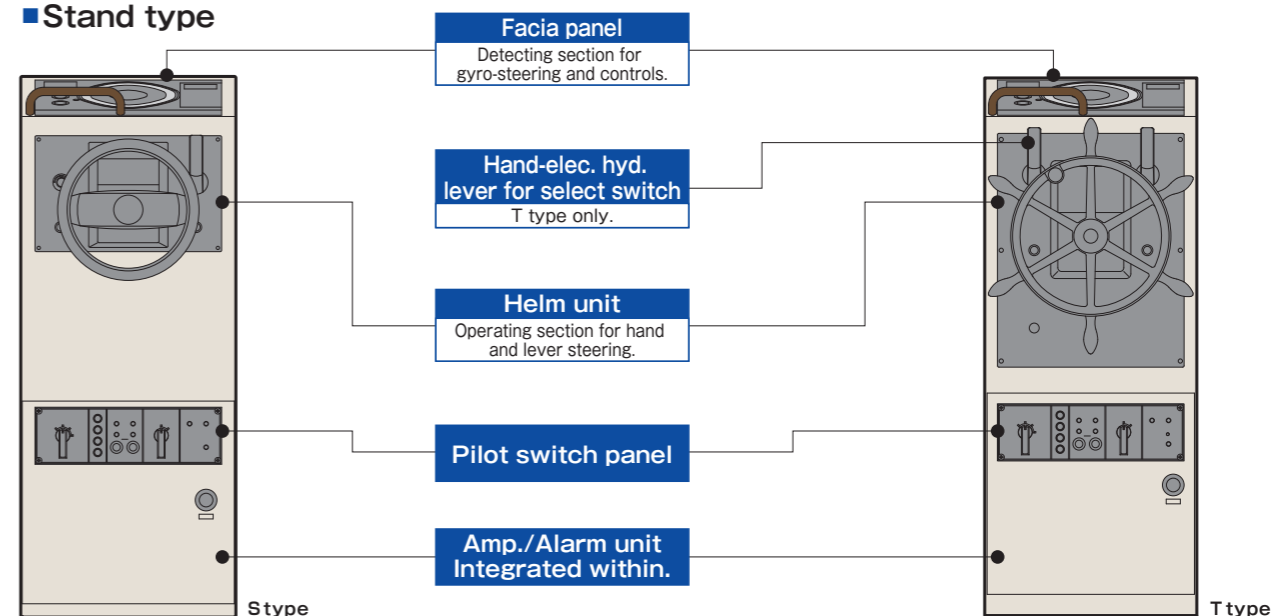
Certainly safety

In the automatic steering by GPS compass, when there is an abnormality in GPS compass will occur an alarm from the autopilot.

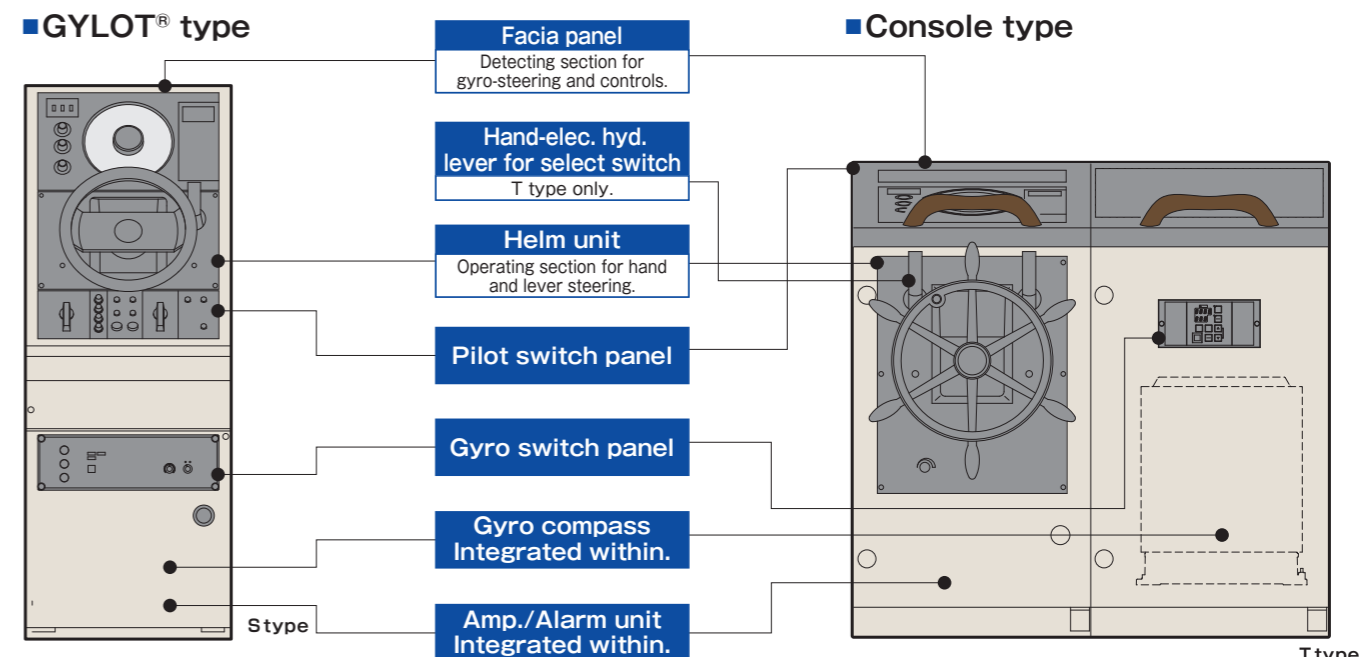
Various systems

Stand type, GYLOT® type, console type and other various forms are provided to meet the purpose of the vessel.

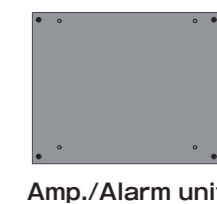
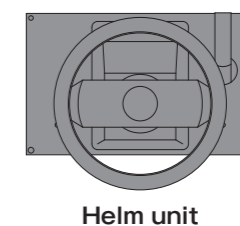
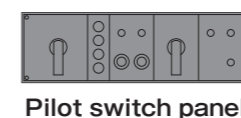
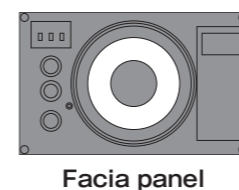
■ Stand type



■ GYLOT® type

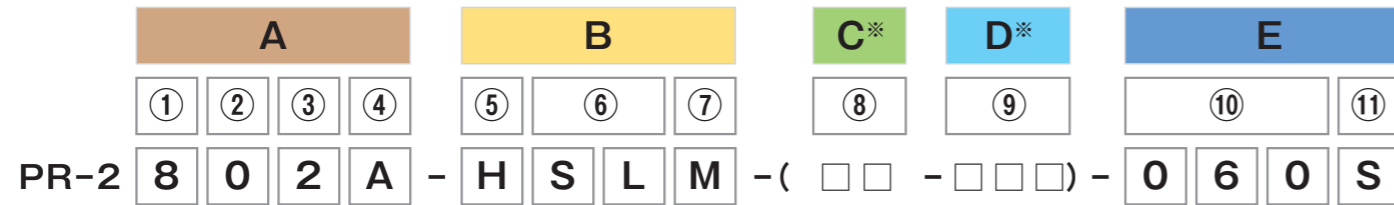


■ Unit type Each units are incorporated to a console.



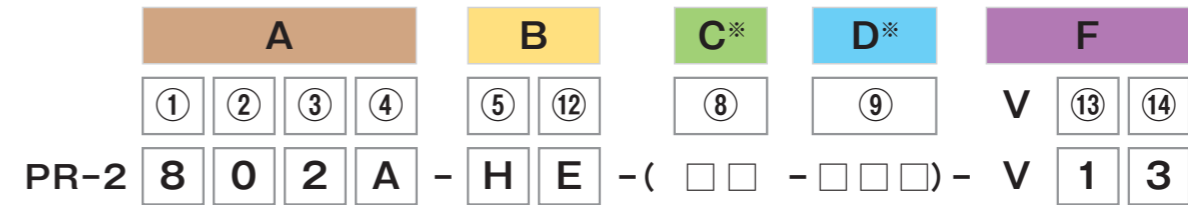
MODEL CODE BREAKDOWN

■ Case of connection with TOKYO KEIKI's steering gear system



※ special specifications (No indication if it is not special specification)

■ Case of connection with other manufacture's steering gear system



■ Case of automatic steering only

In the PR-2000 series does not support the specifications [ZZ-type] of automatic steering only. It is supported only by PR-9000 series, please consider.

A	B	C*	D*	E	F (PR-2000-□E only)		
① [Type of compass] 1 : Magnetic compass 2 : ES-110 Gyrocompass 7 : Gyrocompass made by other manufacture ☆1 8 : TG-8000 Gyrocompass 9 : Without AUTO mode	⑤ [Rudder turning angle] Nothing : 35° W : 45° F : 60° H : 70°	⑧ [Type of Aux. steering stand] Nothing : No connection U1 : Water-proof type (AUTO-HAND-REMOTE, with rudder angle indicator) UC : Non-watertight type (AUTO-DIAL-REMOTE CONTROL)	⑨ [Special rudder control] ☆3 Nothing : Single rudder rod (pump 100%×1) D11 : Twin rudder rod connection type (pump 100%×1) D12 : Twin rudder rod connection type (pump 100%×2) Without parallel operation (Dual power unit) D15 : Twin rudder rod connection type (pump 50%×2) With parallel operation (Dual power unit) T11 : Twin rudder (pump100%×1 2sets) W12 : Single rudder and dual power unit (pump100%×2) Without parallel operation T12 : Twin rudder (pump100%×2 2sets) With/Without parallel operation (Depend on specification) W13 : Single rudder and dual power unit (pump100%×2) With parallel operation W15 : Single rudder and dual power unit (pump50%×2) With parallel operation	⑩ [Rudder torque] ☆3 To be indicated in case of TOKYO KEIKI's steering gear system 020 : 2.0tf · m 025 : 2.5tf · m 040 : 4.0tf · m 060 : 6.0tf · m 085 : 8.5tf · m 100 : 10 tf · m 130 : 13 tf · m (Only 2 power units type) 170 : 17 tf · m (Only 2 power units type) 200 : 20 tf · m (Only 2 power units type) 250 : 25 tf · m (Only 2 power units type)	⑬ [Power supply for solenoid valve used in other manufacture's steering unit] 1 : AC110V 2 : DC24V ⑭ [Control of solenoid valve used in other manufacture's steering gear unit] 1 : 1pcs. Solenoid valve control 3 : 2pcs. Solenoid valves parallel control		
② [Special spec] 0 : Standard 1 : ES-110 + Magnetic compass 8 : ES-110 + GPS compass	⑥ [Type of steering gear unit] ☆3 TOKYO KEIKI electro-hydraulic system SS : Standard SL : Emergency hyd. Line (including aux. manual pump and oil tank) independent type TS : Manual pump in steering stand type TL : Manual pump in steering stand with independent emergency hyd. Line (including aux. manual pump and oil tank) type SP : Power unit 2sets					⑦ [Rudder turning speed] ☆3 Nothing : Standard M : Approx. 1.5times higher speed H : Approx. 2times higher speed	⑪ [Hydraulic piping] S : Steel pipe (supplied by customer) R : High pressure hose (supplied by TOKYO KEIKI)
③ [Type of stand] 1 : Stand type 2 : GYLOT® type ☆2 3 : Console type 4 : Unit type	⑫ [Type of steering gear unit] Other manufacture's electro-hydraulic system E : Power unit for combination with a electro-magnetic valve control system other than those manufactured by TOKYO KEIKI					☆1 : Input signal is 90X,24V step or External Heading IEC61162-1,-1Ed.2,-2. ☆2 : In the case of steering gear unit is S□type and E type, you can select GYLOT®. ☆3 : There are times when it may be impossible to correspondence. In these case, please contact TOKYO KEIKI's sales offices.	
④ [Type of gyrocompass] Nothing : Other than TG-8000 A : TG-8000 B : TG-8500 that corresponds to the high-speed ship							

Functions		Performance Explanations
Steering mode	AUTO Steering mode(FU) MAGNETIC, GYRO Steering mode(FU)	<ul style="list-style-type: none"> AUTO steering using the heading of a gyrocompass, a magnetic compass or GPS compass. Ensures excellent course stability and saving fuel with the PID(proportional + Integral + Differential) control and dual gain based on weather adjustment. The magnetic compass and controller manufactured by TOKYO KEIKI are used in MAGNETIC steering mode. It is an option to select either of the two compasses(Gyrocompass - GPS compass or Gyrocompass - Magnetic compass) used for automatic steering. Automatic steering is possible to selected compasses when a gyrocompass is under a statically determinate operation.
	HAND Steering mode(FU)	<ul style="list-style-type: none"> HAND steering by the steering wheel; accurate response to the ordered rudder angle.
	REMOTE control mode(FU)	<ul style="list-style-type: none"> REMOTE control in a place away from the bridge by means of a lightweight, compact, easy-to handle knobbed remote controller.
	LEVER Steering mode(NFU)	<ul style="list-style-type: none"> LEVER steering by direct control of the power unit or solenoid valve without using the control circuit.
	EMERGENCY steering ※TOKYO KEIKI's T type of power unit only	<ul style="list-style-type: none"> Emergency steering at the steering stand can operate, in case of electric power failure.
Steering stand	Repeater compass Open-scale repeater compass (option)	<ul style="list-style-type: none"> Synchro type or step motor type repeater compass are built in the steering stand for automatic steering using the gyrocompass, magnetic compass or GPS compass.
	Rudder angle indicator	<ul style="list-style-type: none"> Synchro type rudder angle indicator built in the steering stand for automatic steering using the magnetic compass or for manual steering only.
	Off-course alarm (option)	<ul style="list-style-type: none"> Off course alarm is an optional function for the monitoring of the difference between the heading information of magnetic compass and the set heading in automatic steering mode, and activated if a certain amount of difference generates. This is possible to prevent course deviation resulting from any failure in the steering system or gyrocompass. (In case of stand type or GYLOT® type, it will be attach stand side)
	Gyrocompass (option)	<ul style="list-style-type: none"> TG-8000 gyrocompass (For more than 500G/T vessel by rule requirement) <ul style="list-style-type: none"> High performance satisfies all major international standard including IMO standard. Repeater compass(Max. 10 circuits, Max.8A) by DC24V power supply is available with repeater back up function. ES-110 gyrocompass <ul style="list-style-type: none"> ES-110 can be operated with DC24V power supply. However, repeater compass doesn't work in this case. Repeater compass can be connected with 6 circuits except for the steering stand.
	GPS compass (option)	<ul style="list-style-type: none"> When GPS compass is connected <ul style="list-style-type: none"> Input the serial signal, and output 3 circuits of DC24V step signal. GPS compass works on AC100V.
	Tracking pilot (option)	<ul style="list-style-type: none"> It enable the automatic navigation by the route planning of the electronic chart system.

Functions	Performance Explanations
Aux. steering stand U1,UC type (option)	<ul style="list-style-type: none"> AUTO, MANUAL, REMOTE steering mode is possible. Repeater compass can be built in. Rudder angle indicator of synchro type can be built in. Water-proof construction (U1 type only)

■ Pilot Alarm • Indication

Functions	Alarm	Display
Running indicator	—	○ (E type only)
Port/Starboard	—	○
Loss of power	○	○
Loss of power for repeater unit	○	—
	(only repeater built-in type)	
GPS compass abnormal	○*1	○*1
Pilot watch	○	—

※1 : Only when connected to a GPS compass

■ Steering Gear Alarm • Indication

Functions	Alarm	Display
Running	—	○
Loss of power	○	○
Over load	○	○
Oil low level	○*2	○*2
Open phase	○*2	○*2

※2 : SS, TS type are optional functions.

■ Autopilot

Item	Type	PR-2□□□-E	
	Remark		
Power consumption	AC100/110/ 220/440V 1φ 50/60Hz (SG power supply)	Pilot system	200 VA
	DC24V	For alarm	0.5A

■ Gyrocompass

Item	TG-8000	ES-110	
Power consumption	AC100/110V 1φ 50/60Hz	—	100 VA (ordinary)
	AC100/220V 1φ 50/60Hz	70 VA (ordinary)	—
	Emergency battery DC24V	3A	4A
Settle point error	±0.3°	±1.0°	
Repeater compass	DC24V Step motor type	90X Synchro type	
Number of External Repeater Compass	9 ports *3	6 ports *4	
Serial output (Heading)	5	—	

※3 If the 11 circuits necessary or more are required expansion kit (option)

※4 If the 7 circuits necessary or more are required synchro amplifier (option)

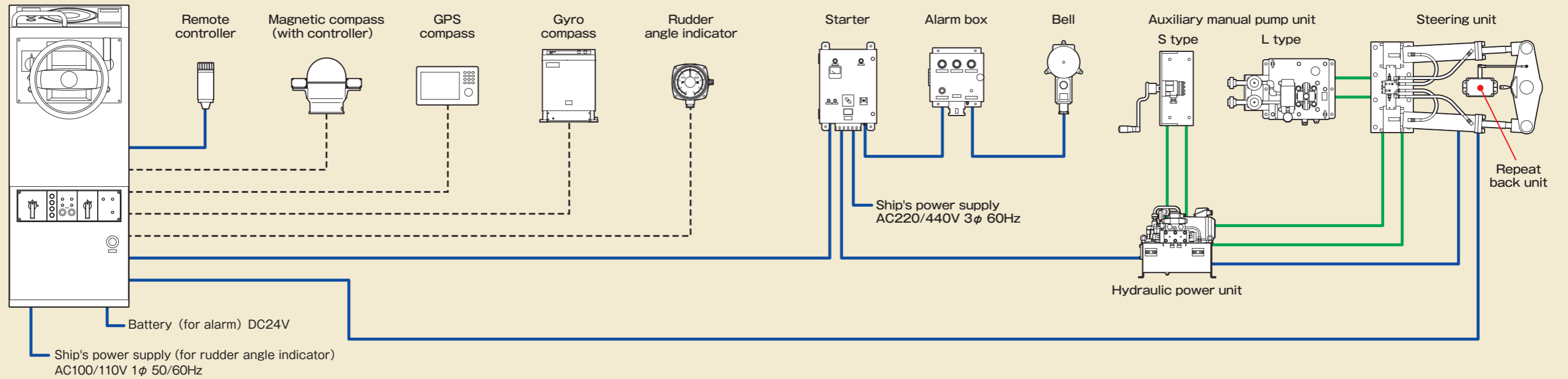
CONFIGURATION

※Blue : Elec. Line
 Green : Hyd. Line
 Dotted Line : Option
 Differs depending on the specifications.

Power unit SS/SL type PR-2□□□□-□SS/SL/SP

■ Stand type

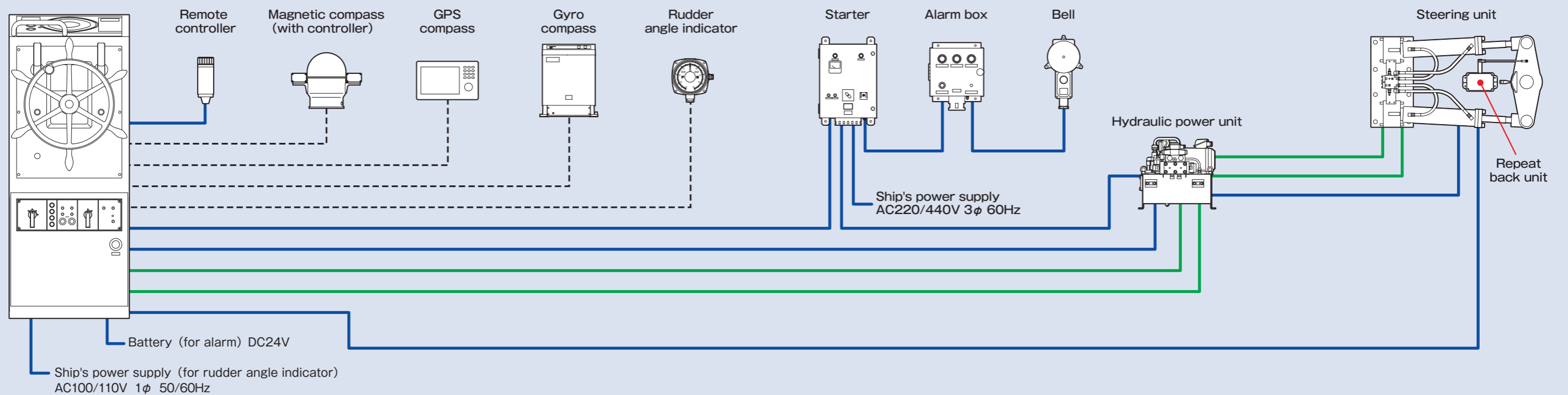
■ SS/SL type



Power unit TS/TL形 PR-2□□□□-□TS/TL

■ Stand type

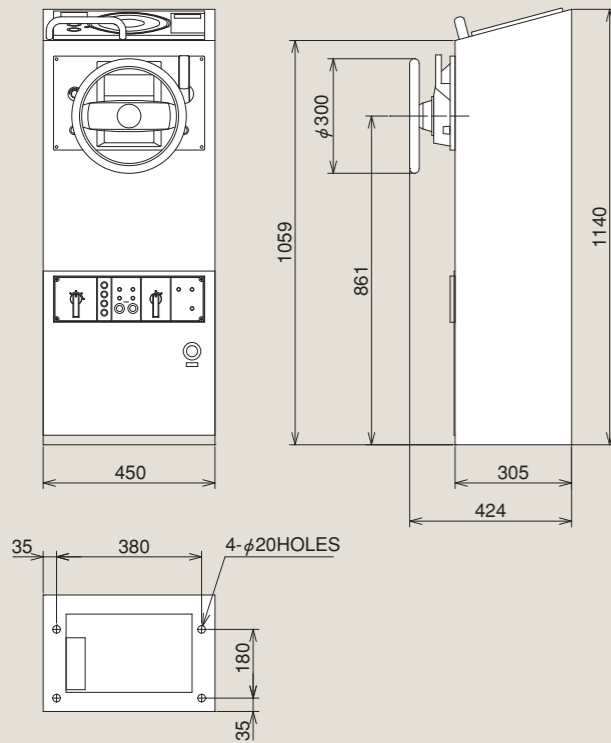
■ TS type



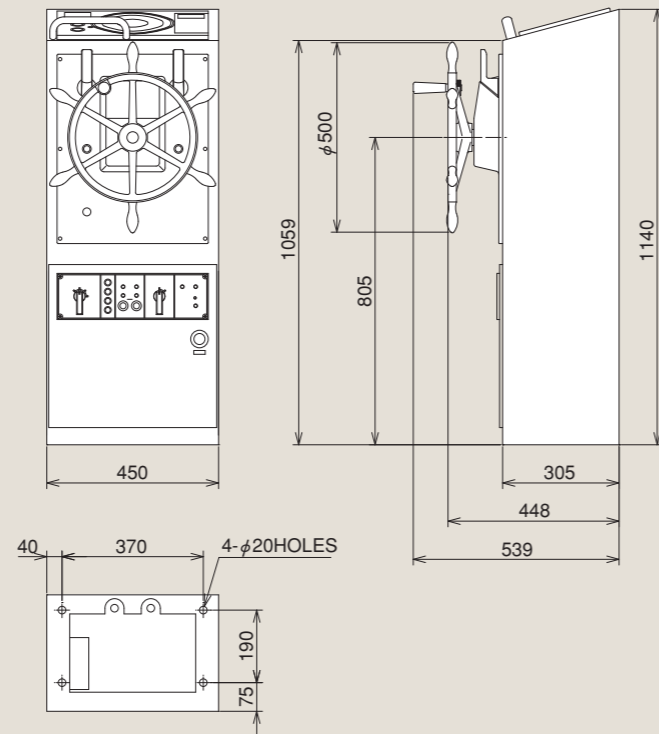
DIMENSIONS

Steering stand

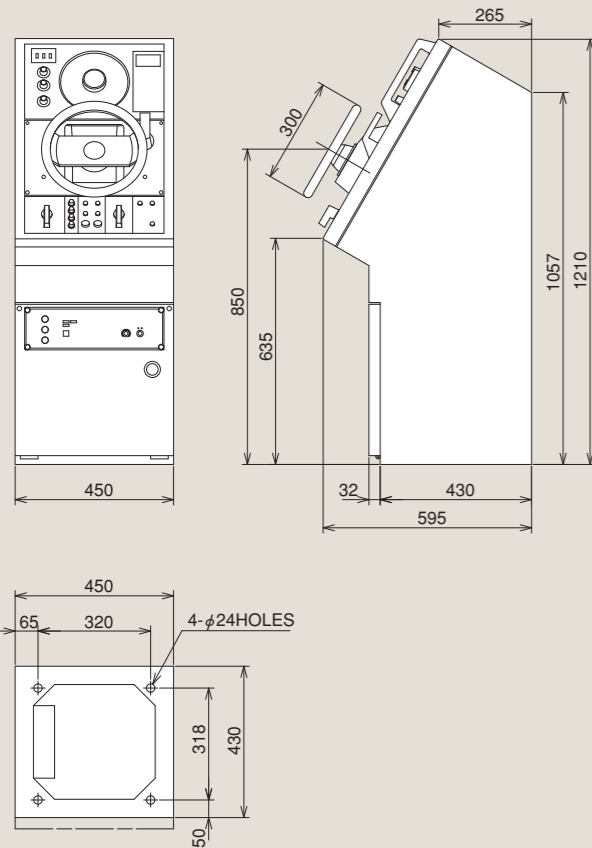
Stand type (S□, E) Mass=50kg



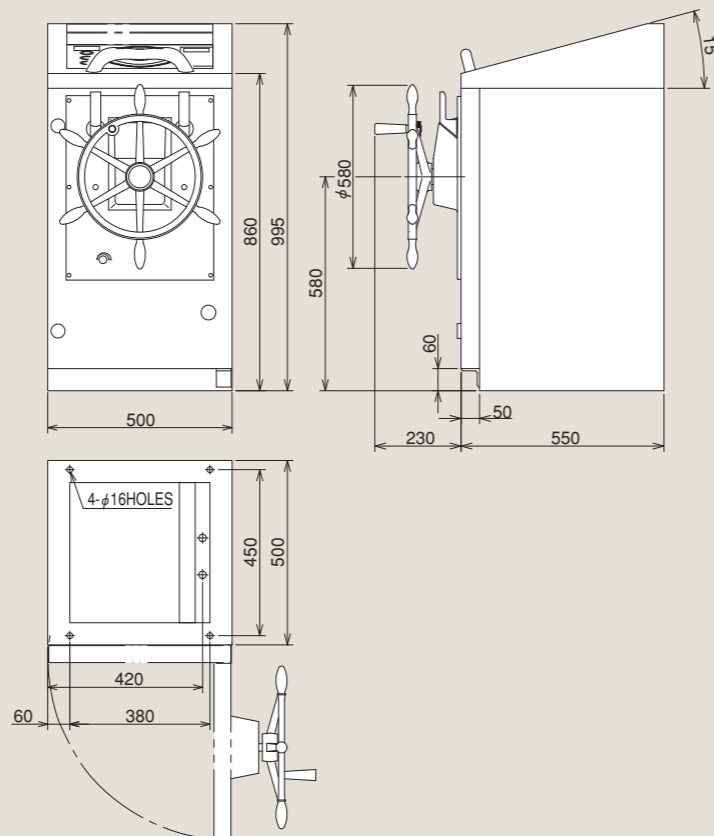
Stand type (T□) Mass=70kg



GYLOT® type (S□, E)
Mass=150kg (GYRO in steering stand)

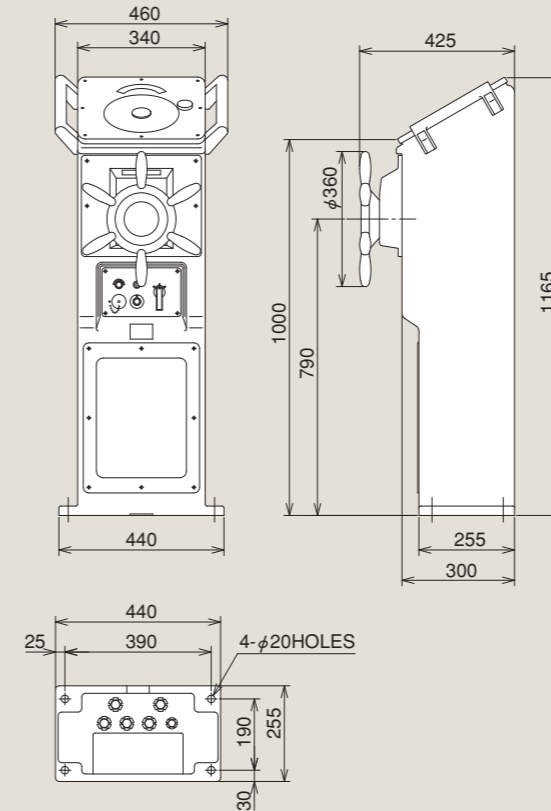


Console type
T□ type Mass=95kg
S□ type Mass=75kg

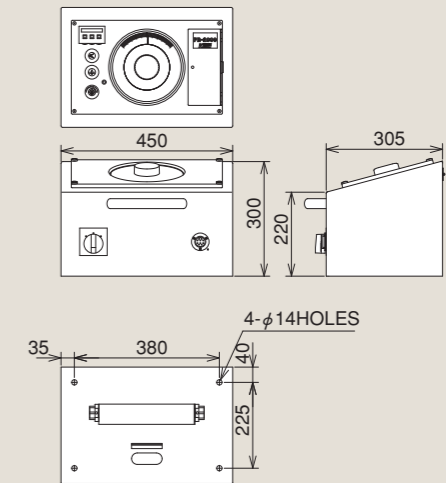


Aux. steering stand (option)

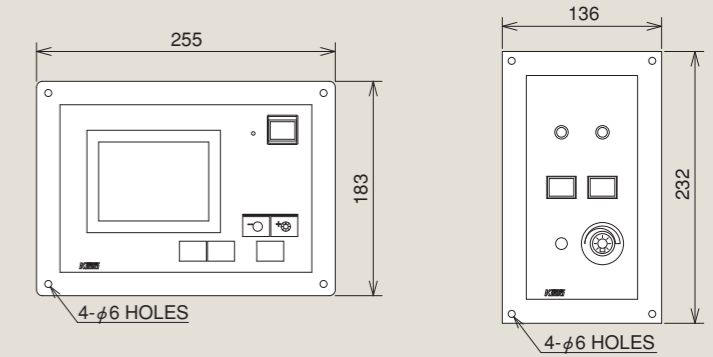
U1 type Mass=30kg



UC type Mass=17kg

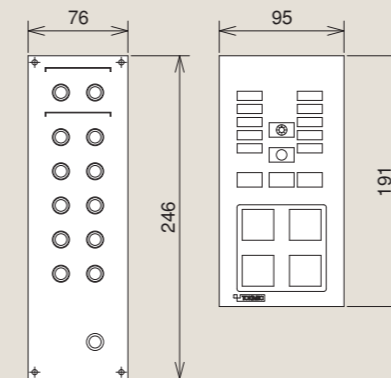


Tracking interface TIF (option)

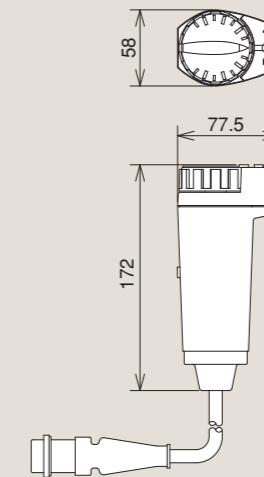


Steering gear alarm panel

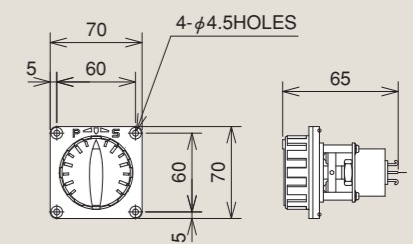
SP type SG type (option)



Remote controller

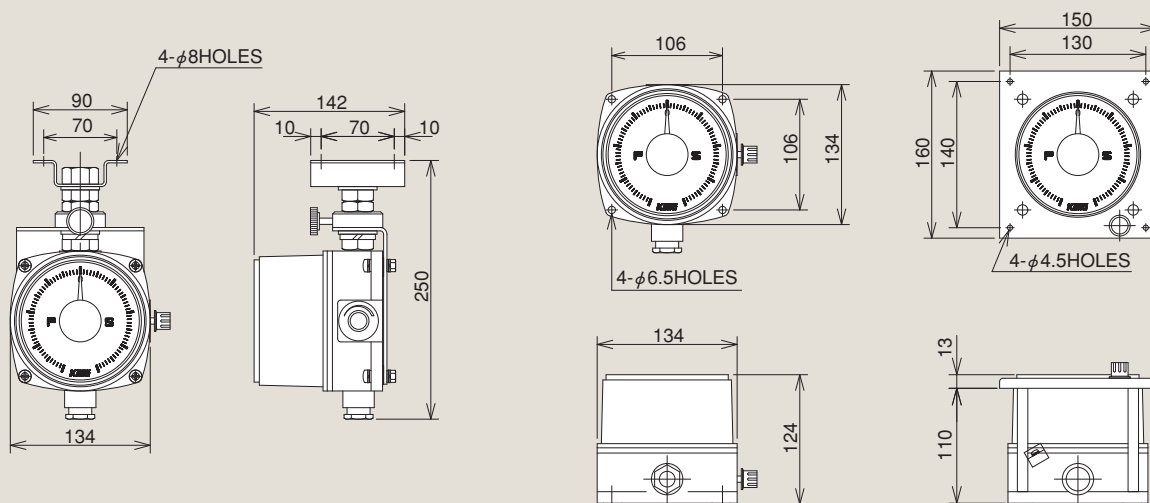


Pilot dial (option)



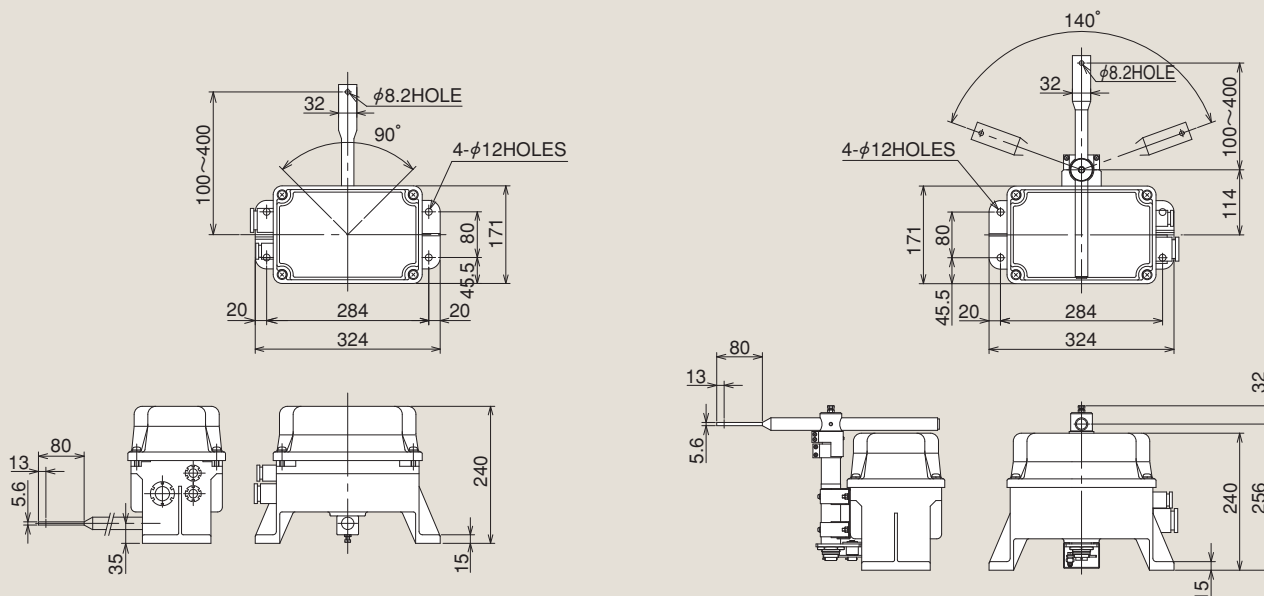
DIMENSIONS

■ Rudder angle indicator (for JG ships)



■ Repeat back unit (for 35~45°)

■ Repeat back unit (for 60~70°)



Design and specifications are subject to change without prior notice, and without any obligation on the part of the manufacturer.



CAUTION

Before operating this equipment, you should first thoroughly read the operator's manual.

TOKYO KEIKI

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