MESSRS: GUANGZHOU HUANGPU SHIPBUILDING CO.,LTD.

SHIP NO. HPS3002

6EY18AL × 560kW

MAIN DIESEL GENERATOR ENGINE

FINAL DRAWINGS

DATE : 13 JUL. 2009

YANMAR CO.,LTD.

LARGE POWER PRODUCTS OPERATIONS DIVISION

DEVELOPMENT DEPT. ENGINEERING DEPT.

RULE : CCS-AUT-0

QUANTITY: 3 SETS / VESSEL

WORK NO.: R8-B08101

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FOR CONFERENCE		SALES DEPT	1		DESIGNER	K. Sato
FOR SPECIFICATION	~~9~~	COPY	1		CHECKED	S. Inada
FOR INSTALLATION	~~4~~	TOTAL	7		SPECIALIST	
FINAL DRAWINGS	5	SPARE PART(IZE)			MANAGER	

SPECIFICATIONS FOR DIESEL GENERATOR ENGINE

SHIP OWNER	COSCO (H.K.) SHIPPING CO.,LTD.
SHIP YARD	GUANGZHOU HUANGPU SHIPBUILDING CO.,LTD.
SHIP NUMBER	HPS3001/3002/3003/3004
A KIND OF SHIP	BULK CARRIER (76,000DWT)
NAVIGATION OF AREA	OCEAN GOING
USE	MAIN GENERATOR DIESEL ENGINE
RULE	CCS-AUT-0
QUANTITY	3 SETS / VESSEL

1. PRINCIPAL DATA OF DIESEL ENGINE

Type	Vertical,Single Action,4-Cycle,Direct Injection, Water Cooled Diesel Engine with Turbo-charger and Air Cooler
Model	6EY18AL
Rated Output/Revolution	615 kW (836 PS)／ 900 min^{-1}(rpm)
No. of Cylinder	6 (In-Line)
Cylinder Bore / Stroke	180 mm / 280 mm
Mean Effective Press.	1.918 MPa (19.56 kgf/cm^2)
Mean Piston Speed	8.40 m／s
Max. Combustion Press.	19.0 MPa (194 kgf/cm^2)
Over Load	10% Over Load : 60min. (Every 12 hours)
Direction of Rotation	Counter clock wise (as viewed from Flywheel Side)
Firing Order	1-4-2-6-3-5-1 (Interval : 120°) ⑥⑤④③②① Flywheel Side
Starting & Stopping System	・Remote(Auto)Starting/Stopping with Manual Starting/Stopping ・Start. Method : Air Motor Starting with Press. Reducing Valve at Inlet Port of Air Motor Max. Start. Press. 2.94 MPa(30kgf/cm^2) ・Stop. Method : Control Air of 0.69～0.98MPa(7～10 kgf/cm^2) and Electric (DC24V)Operation
Fuel Oil	・Heavy Fuel Oil (700 cSt at 50℃) The Viscosity must be kept in range 11～14 cSt at Eng. inlet continuous running with Gen.load< 20% is to be within 3 hours ・Marine Diesel Oil at Emergency & Low load
Lubricating Oil System	・System Oil ・Oil Sump : Built in Common Bed of D/G set ・Forced Lubrication by the Engine driven Gear Pump ・Kind of Lub. oil : A.P.I. Service Grade CD Viscosity : SAE No. 30 or 40 T.B.N. : 30～42 ・Turbo-Charger Oil : Branch Supply from System Oil ・Rocker Arm Oil : Branch Supply from System Oil ・Governor Hydraulic Oil : Same to System Oil
Cooling System	・Forced Cooling Cylinder & Cylinder head : Fresh Water(High Temp.) Lub.Oil Cooler & Air Cooler : Fresh Water(Low Temp.) Piston : Lub. Oil
Turning System	Bar type

Specific Fuel Oil consumption	192 +5%g/kW·h(141 +5% g/PS·h) with Eng. driven LO Pump and C.W. Pump (1 set) 188 +5%g/kW·h(138 +5%g/PS·h) without Engine driven Pump. ·At Eng. Rated Output 615 kW (836 PS)／ 900 min^{-1} Marine Diesel Oil used and Low Calorific Value of 42.7 MJ/kg (10,200 kcal/kg). ·Based on the Standard Reference Conditions of ISO 3046/1. ·NOx Level to meet IMO Exhaust Gas Regulation Tier 1 (D2 Mode) (Max 11.5 g/kW·h)
Specific Lub. Oil consumption	0.3～1.1 g/kW·h At eng. full load (0.2～0.8 g/PS·h)
Governor Characteristics At Load Variation of 100%→0%→40%→80%→100%	Speed Variation: Momentary ≦ 10% ,Permanent ≦ 5% Time of Stability within 1% of Final steady speed ≦ 5 sec.
Usage Condition Note:In case engine room temp. is lower than 5℃, the preheating system etc. before starting the engine is necessary to raise jacket water temp. higher than 5℃.	·Ambient Temperature ; 0～45℃ ·Relative Humidity ; ～85% ·LT F.W. Temp. at cooler inlet ; ～36℃ (Low Temp.) ·HT F.W. Temp. at Eng. jacket outlet ; 85℃ (High Temp.) ·HT F.W. Press. at Eng. jacket inlet ; 0.15～0.50MPa (at HT F.W. Pump outlet) (1.5～5.0kgf/cm^2) ·Exh. Gas Back Press. at Full Load ; below 3.43 kPa (below 350mmH_2O) Exhaust Gas Volume : 3480 Nm^3/h at Full Load Exhaust Gas Temp. of T/C Outlet: 345 ℃ at Full Load ·Combustion Air Volume(25℃); 3700 m^3/h at Full Load ·Eng. Room Ventilation Air Volume ; 0.27～0.41m^3/min.·kW/ΔT abt.10℃
Capacity of Lub. oil & Water	Fresh Water(Eng.jacket & piping): 145 liters System Oil (Eng.+Common bed tank) : 35 + 1000 liters Governor Hydraulic Oil : 2.0 liters

2. PRINCIPAL DATA OF A.C. GENERATOR

Rated Output / Revolution	560 kW / 900 min^{-1}
Rated Voltage / Current	AC450V /898 A
No. of Phase / Frequency	3 ϕ / 60 Hz
Power Factor	0.8
Insulation	Class F
Enclosure / Cooling	Drip-Proof / Self-ventilating
Type of Bearing / Lubrication	Double / Self-Lubrication
Coupling of Eng. and Gen.	Rigid
Manufacture	TAIYO ELECTRIC CO., LTD.
Remark : 1. This AC Generator is supplied by YANMAR. 2. Please refer to document of gen. maker.	

3. MATERIAL & STRUCTURE OF ENGINE

Parts Name	Material	Structure
Cylinder Block	Cast iron	Monoblock casting and having underslung main bearing cap. The air duct, cooling water and lub. oil passages are integrated in block.
Cylinder Liner	Special cast iron	Wet type
Cylinder Head	Cast iron	Fuel injection valve in center, indicator valve on head cover. 4-valve type consisting of 2 suction valves and 2 exh.valves Exh. valve seat rings and nozzle sleeve are cooled by F.W. Exhaust valves are made of Nimonic
Piston	Special cast iron	Monoblock casting and forced oil cooling. Top and second ring grooves are treated with laser hardening. Ring's arrangement is two compression rings and one oil ring.
Piston Pin	Special steel	Floating type

Connecting Rod	Forged steel	Die-forgied,with piston pin metal made of leaded bronze with steel back metal at small end and processed with serration at matching faces of large end.
Main Metal & Crankpin Metal	Aluminum Alloy	Bearing by aluminum alloy with steel back metal
Crankshaft	Forged steel	Monoblock forging and bearing parts are treated with induction hardening and polishing finish.
Camshaft	Forged steel	2 split type, monoblock forging of cam and shaft.
Common bed	Carbon steel	Welding structure. and making use of lub. oil sump.

4. ACCESSORIES OF ENGINE

Marks in column
Supply M : Maker(YANMAR) S : Shipyard O : Owner
Location E : Engine side H : Hull side

4-1. Lub. Oil System

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
Lub. Oil Pump	1	M	E	Type : Gear Pump with Safety Valve (0.8MPa) Capacity : 21.4 m^3/h
Lub. Oil Strainer for Pump inlet	1	M	E	Type: Punch Holes Plate
Lub. Oil Strainer for Engine inlet	1	M	E	Type: Automatic Back Washing (B&K) Filtration Limit : E.F. 30 μ m
Lub. Oil Cooler	1	M	E	Type:Finned Multitubular, Cooling Area : 8.70 m^2
Lub. Oil Auto-Temp. Control Valve	1	M	E	Type:Wax Element, Direct Acting Setting Temp. : 50～65℃ at Eng. inlet
Lub. Oil Press. Regulating Valve	1	M	E	Type : Spring Loading Setting : 0.40～0.45MPa (4.0～4.5kgf/cm^2)
Lub. Oil Press. Regulating Valve for T/C inlet	1	M	E	Type : Non-regulating Spring type Setting : 0.1～0.2MPa (1.0～2.0kgf/cm^2)
Pipe Connections of Sump Tank	each 1	M	E	Lub. Oil Inlet:40A, Lub. Oil Outlet:40A Over Flow for continuous cleaning : 65A
Lub. Oil Priming Motor Pump	1	M	E	Capacity : 4.0 m^3/h x 0.15MPa (1.5kgf/cm^2) 4³/₁₀ Electric Motor 1.5kW,3 ϕ -AC440V,60Hz
・Lub. oil priming pump is to be run at all times durning engine stop for protection of main bearing				
Starter Panel for L.O. Priming Pump	1/ Ship	M	H	Priming pump start & stop is controlled by eng. running signal from engine control circuit or manual

4-2. Cooling Water System

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
H.Temp. F.W. Pump for Jacket Water	1	M	E	Type : Centrifugal Pump Capacity : 27 m^3/h x 20 m
L.Temp. F.W. Pump for Cooler		S	H	Capacity : 32.3 m^3/h Refer to Heat Balance Note; Inlet press. to be less than 0.3MPa
Fresh Water Cooler		S	H	
H.Temp.F.W. Auto-Temp.Control Valve	1Set	M	E	Type : Wax Element, Direct Acting Setting Temp. : 85±4℃ at Eng. outlet
L.Temp. F.W. Auto-Temp. Control Valve		S	H	Setting Temp. : 36℃ at Eng. inlet

Orifice Plate for Jacket Water	1	M	E	For Adjusting Press. of Jacket Cooling Water Press.
Air Escape Outlet for Jacket Water	1	M	E	JIS 5k-15 with orifice plate
Hot Water Inlet & Outlet for Pre-heating	1	M	E	JIS 5k-15 with orifice plate
Pre-heating Unit	1/ Ship	M	H	

4-3. Fuel Oil System

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
M.D.O. Motor Pump		S	H	Capacity : 0.62 m^3/h per one eng.
Final F.O. Filter	1	M	E	Double Throw Notch Wire,Manual Back Washing Filtration Limit : E.F. 35 μ m
F.O. Injection Pump	6	M	E	
F.O.Injection Valve	6	M	E	
F.O. High Press. Pipe	6	M	E	With Fuel Leakage line
Leak Detector for High Press. Pipe	1	M	E	Abnormal OFF at High Level of Leak Tank
F.O. Drain Sump	1	M	E	
F.O. Pump Case Cover	1	M	E	
Press. Regulating Valve for F.O. Return	1	M	E	Type: Spring Loading & Differential press. Control Press. Set. at Running : 0.55～0.60MPa (Diff. Press. : 0.15～0.2MPa+Back Press.)
H.F.O. Booster Pump & Press. Regulating Valve		S	H	Capacity : abt. 0.52 m3/h for 3 engines running Press. Regulating : 0.40～0.45MPa
H.F.O. Circurating Pump		S	H	Capacity : abt. 1.29 m3/h for 3 engines running
H.F.O. Filter for Circurating Line		S	H	Recommended : Automatic Back Washing Filter Filtration Limit : 10 μ m
H.F.O. Heater		S	H	
Press. Regulat. Valve for H.F.O. Circulating Line		S	H	Press. Regulating : 0.65～0.70MPa
Changeover Valve of M.D.O. & H.F.O.		S	H	
Press. Regulating Valve for M.D.O. Return Line		S	H	Press. Regulating : 0.40～0.45MPa
M.D.O. Backup Pump		S	H	Air Driven Type with Control Air Unit

4-4. Suction & Exhaust System

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
Exhaust Gas Turbo-charger	1	M	E	MHI-Model : MET18 Air Cooled Type (Anti-Flywheel Side)
Air Cooler	1	M	E	Type: Finned Multitubular Cooling Area : 12.3 m^2 x 2
Expansion Joint of Exhaust Gas Outlet	1	M	E	Bellow Type for Turbo-charger Outlet Size : 250A
Water Washing of Blower for T/C	1/ Ship	M	H	Provided as a tool

4-5. Governing Device

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
Governor	1	M	E	Woodword Model : PSG Hydraulic Governor
Governor Motor	1	M	E	DC24V,0.1A
Ajust. Voltage Converter For Governor Motor	1	M	Main S.B.	Input : AC220V, 1 ϕ ,Output : DC 0～24V Cycle Variation Time : 8～12 sec.

4-6. Starting Air System

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
Air starter	1	M	E	
Starting Air Press. Regulating Device	1	M	E	Regulating Press.: 2.94MPa(max.) → 0.98MPa
Air Reservoir		S	H	Working Press. 2.94 MPa (30kgf/cm^2)

4-7. Setting & Coupling Parts

Parts Name	Q'ty /Eng.	Supply	Location	Specifications
Common Bed	1	M	E	Incorporated L.O. Sump Tank With Jack Bolts
Platform	1	M	E	Fuel Injection Pump side
Elastic Mount Unit	1	M	H	With Elastic Rubbers
Flexible Tube	1 Set	M	H	

4-8. Engine Control & Monitoring Equipments for Remote(Auto)Starting/Stopping

4-8-1. Engine Control

Parts Name	Q'ty /Eng.	Supply	Loca-tion	Specifications
Control System				PB: Push Button
•Local Start is done by Elect. PB on Eng. following to "Local.-Remote"change-over Switch beside PB (Eng. can be started by Mechanical PB on Air Motor at No electricity condition, only Dead Ship situation) •Local Stop is done by Mechanical Handle on Eng. with Start. Interlock Switch combined Alarm Reset Switch. Mechanical Handle has Two Position of "Stop - Run" (It takes priority over all Electrical system) •Elect. Emergency Stop can be operated by Local Panel or Remote control Panel				
Control Source	1	M	E	Control Air of 0.69~0.98MPa(7~10kgf/cm²) And Electric (DC24V)Operation
Eng. Speed Sensor	1	M	E	Magnetic Pickup
Speed Detector (Speed Relay)	1	M	Control Panel	•Low speed(14) :Set.:125min^{-1} for Air Motor MV cancel. •Middle speed(13) :Set.:200min^{-1} for Secondary Air Motor MV cancel, Starting circuit cancel, FO limitation & Blocking alarm •Over speed "12" Set.:112~115% of rated speed for signal of Safety Stop
Magnetic Valve for Fuel Limitation at the Engine Starting	1	M	E	Open & Eng. Fuel Limitation at Energizing DC24V,0.38A,Rating : Continuous
Magnetic Valve for Engine Start	1	M	E	Open & Eng. Starting Function at Energizing DC24V±10%, 0.4A, Rating : 1Min.
Mag. Valve of Eng. Stop for Safety & Control	2	M	E	Open & Eng. Stopping Function at Energizing DC24V,0.38A,Rating : Continuous
Switch for Stop Handle of Engine	1	M	E	Switch ON at Run position for Stand-by and Reset of Safety Stop
Switch for Cont. Position	1	M	E	Select for Remote/Auto-Engine Side
Switch for Turning Bar	1	M	E	Switch ON at Turning cover close for Stand-by
Control Panel	1/ Ship	M	H	Auto Start/Stop & Safety Stop Sequntial circuit Electric Source : DC24V & AC220V

4-8-2. Engine Safety Stop

Over Speed	1	M	Control Panel	Operated at 112~115% of rated speed by Over Speed Signal(12) of above Speed Relay
Lub. Oil Press. Low	1	M	E	Press. switch Abnormal ON≦0.30MPa
Jacket Water High Temp.	1	M	E	Temp. switch Abnormal ON≧ 100 ℃

	Parts Name		Gauges fitted on Eng. Q'ty/Eng.	Gauges fitted on Eng. Specifications	Alarm or Remote display Q'ty/Eng.	Alarm or Remote display Specifications
	Tachometer		1	Electric(0-1200min^{-1}): 4-20mA		
PRESSURE	Kind of Press. Gauge			Bourdon tube, Size: ϕ 60 Glycerin filled Type		
	Lub. Oil at Eng. inlet		1	Scale : 0～1.0 MPa Normal: 0.40～0.45MPa	1	Sensor4-20mA(0～1.0MPa) Alarm≦0.35MPa
	Prim. LO at Eng. inlet		-	Above Press. Gauge is available Normal:0.02～0.25MPa	1	Press. switch for Alarm Abnormal OFF≦0.02MPa
	Fuel Oil at Eng. inlet		1	Scale : 0～2.0 MPa Normal:0.55～0.60MPa		
	Fresh Water (H.T.) at Eng. inlet		1	Scale : 0～0.6 MPa Normal:0.15～0.50MPa	1	Sensor 4-20mA(0～0.6MPa) Alarm≦0.13MPa
	Fresh Water (L.T.) at Eng. inlet		1	Scale : 0～0.6 MPa Normal:0.15～0.50MPa		
	Boost Air at Eng. inlet		1	Scale : 0～0.4 MPa Normal: Depend on load		
	Start. Air at Eng. inlet		1	Scale : 0～2.5 MPa Normal:1.0MPa	1	Sensor4-20mA(0～1.6MPa) Alarm≦0.80MPa
	Control Air at Eng. inlet		-	Normal:0.7～1.0MPa	1	Press. switch for Alarm Abnormal OFF≦0.60MPa
TEMPERATURE	Kind of Thermometer			Bar type Thermometer with Protective case		
	Lub. Oil	Cooler inlet	1	Scale : 0～100 ℃ Normal : 65～ 85 ℃		
		Engine inlet	1	Scale : 0～100 ℃ Normal : 50～ 70 ℃	1	Sensor Pt 100 ohm(0～200℃) Alarm≧ 75 ℃
	Fuel Oil	Engine inlet	1	Scale : 0～200 ℃ Normal : 140～150 ℃ Note. Viscosity control takes precedence.		Note. High Viscosity Alarm≧ 17cSt.
	Fresh Water (H.T.)	A/C inlet	1	Scale : 0～100 ℃ Normal : 70～ 85 ℃		
		Engine inlet	1	Scale : 0～100 ℃ Normal : 75～ 85 ℃		
		Engine outlet	1	Scale : 0～120 ℃ Normal : 80～ 90 ℃	1	Sensor Pt 100 ohm(0～200℃) Alarm≧ 95 ℃
	Fresh Water (L.T.)	A/C inlet	1	Scale : 0～100 ℃ Normal : ～ 36 ℃		
		A/C outlet	1	Scale : 0～100 ℃		
		L/C outlet	1	Scale : 0～100 ℃		
	Exh. Gas	Cyl. outlet	6	Scale : 0～500 ℃ Normal: Depend on load		
		T/C inlet	2	Scale : 100～620 ℃ Normal: Depend on load	2	Sensor Pt 100ohm(0～700℃) Alarm≧580 ℃
		T/C outlet	1	Scale : 0～500 ℃		
	Boost Air	Engine inlet	1	Scale : 0～100 ℃ Normal: Depend on load		
		A/C inlet	1	Scale : 0～300 ℃		

Parts Name		Gauges fitted on Eng.		Alarm or Remote display	
		Q'ty/ Eng.	Specifications	Q'ty/E ng.	Specifications
OTHERS	F.O. Leakage Tank of High Press. Pipes	–		1	Abnormal OFF at High Level
	Lub. Oil Sump Tank	1	Sounding Stick	1	Abnormal OFF at Low Level
	Differential Press. of Lub. Oil Strainer	1	Differential Press. Indicator	1	Abnormal OFF≧0.09MPa

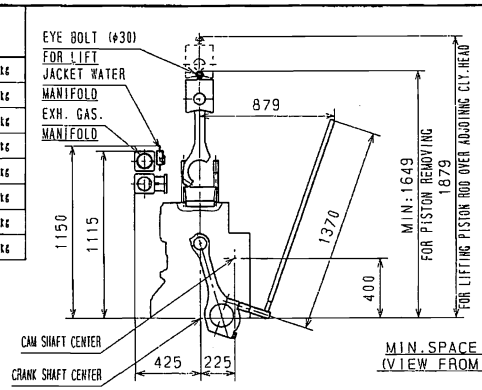
5. MISCELLANEOUS

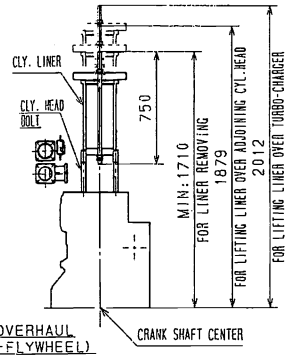
Item	
Spare Parts and Tools	1set/1 ship: as per requirement of Classification of society. Please see the attached list of spare parts and tools. Material of box : Steel Box
Paint Color	Exterior surface of DG set and others : Munsell No. : 2.5G8/2 4 10/17
Units and Language	Units : SI Documents and Name Plates : English Caution Plates : English & Chinese
Shop Test	Please refer to another sheet for Test and Inspection plan
Number of copies of Documents	For Conference : _____ For Approval : _____ For Installation : _____ For Final : _____

Lubrication Oil Brand Name Table for EY18(A)L Engine

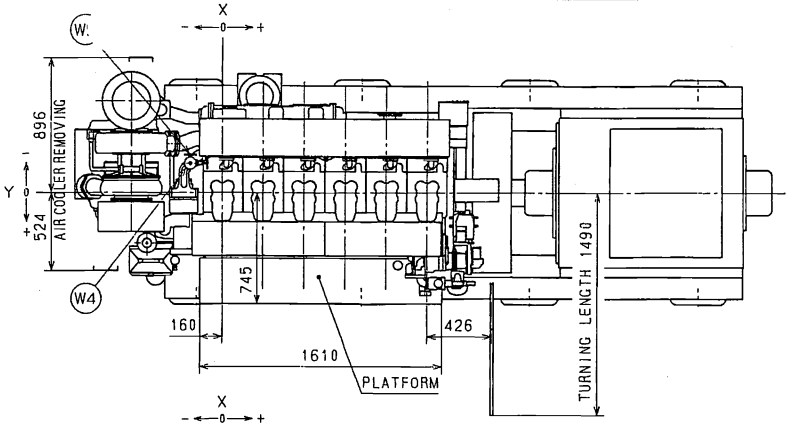
Classification	System oil		
Applied Fuel oil	M.D.O	30cSt/50℃ H.F.O.	180,380,700,cSt/50℃ H.F.O.
Total Base Number(T.B.N)	9～15	16～25	30～42
Supplier			
YANMAR	YANMARMARINE SUPER OIL 40	-----	-----
IDEMITSU KOSAN	DAPHNE MARINE OIL SX30, 40	DAPHNE MARINE OIL MV30, 40 SW30. 40	DAPHNE MARINE OIL SA30, 40 SH40
CASTROL	CASTROL MHP153, 154 SEAMAX EXTRA 30, 40 MCL 30, 40	CASTROL TLX 203, 204	CASTROL TLX 303. 304 CASTROL TLX 403, 404
BRITISH PETROLEUM	BP ENERGOL DS3-153, 154	BP ENERGOL IC-HFX203, 204	B.P. ENERGOL IC-HFX303, 304
CHEVRON TEXACO (FAMM,CALTEX)	DELO 1000 MARINE SAE 30, 40 TARO 12 XD 30, 40 TARO 16 XD 30, 40	DELO 2000 MARINE SAE 30, 40 TARO 20 DP 30, 40	DELO 3000 MARINE SAE 30, 40 DELO 3400 MARINE SAE 30, 40 TARO 30 DP 30, 40
COSMO OIL	COSMO MARINE SUPER 30, 40	COSMO MARINE 3025, 4025	COSMO MARINE 3040, 4040
FUJI KOSAN	FUKKOL MARINE 312,412	FUKKOL MARINE 320,420	FUKKOL MARINE 330,430
EXXON MOBIL	MOBIL GARD 312,412 EXXMAR 12TP 30, 40	MOBIL GARD 312, 412 MOBIL GARD 330, 430	MOBIL GARD 330, 430 MOBIL GARD 340, 440 EXXMAR 30 TP30, 40 EXXMAR 40 TP30, 40
KYGNUS OIL	KYGNUS MARINE DXO 30, 40	KYGNUS MARINE DX 330, 340	-----
JAPAN ENERGY/ELF	DISOLA M4015	AURELIA XL4030	AURELIA XL4040
NIPPON OIL CORPORATION	MARINE T103, T104	MARINE T203, T204	MARINE T303, T304
SHELL	GADINIA OIL 30, 40	ARGINA S OIL 30, 40 RIMULA FB OIL 30, 40	ARGINA T OIL 30, 40 ARGINA X OIL 30, 40
NOTE	Turbine oil : Same System Oil (branched system oil to turbine) Governor oil : Same System Oil (different sump) Generator bearing oil : According to generator maker recommended oil. (Same system oil in case of forced lubrication from engine.) Generator bearing oil :		

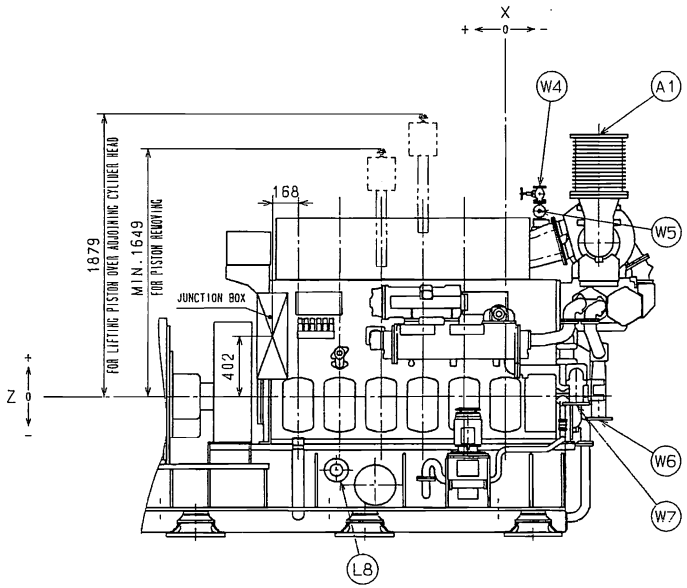
MASS OF PARTS FOR HOISTING	
CYLINDER HEAD	: 105kg
PISTON WITH ROD	: 42kg
TURBO CHARGER	: 140kg
AIR COOLER WITH DUCT	: 210kg
LUB.OIL PUMP	: 25kg
C.W.PUMP	: 35kg
CAM SHAFT	: 84kg
LUB.OIL COOLER WITH FILTER & THERMOSTAT	: 184kg

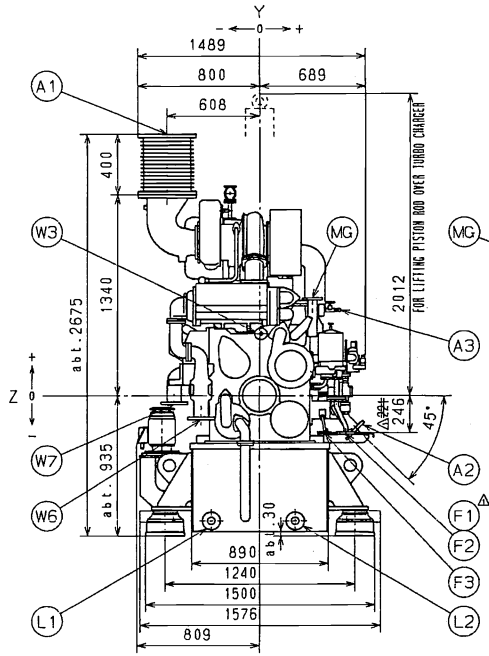


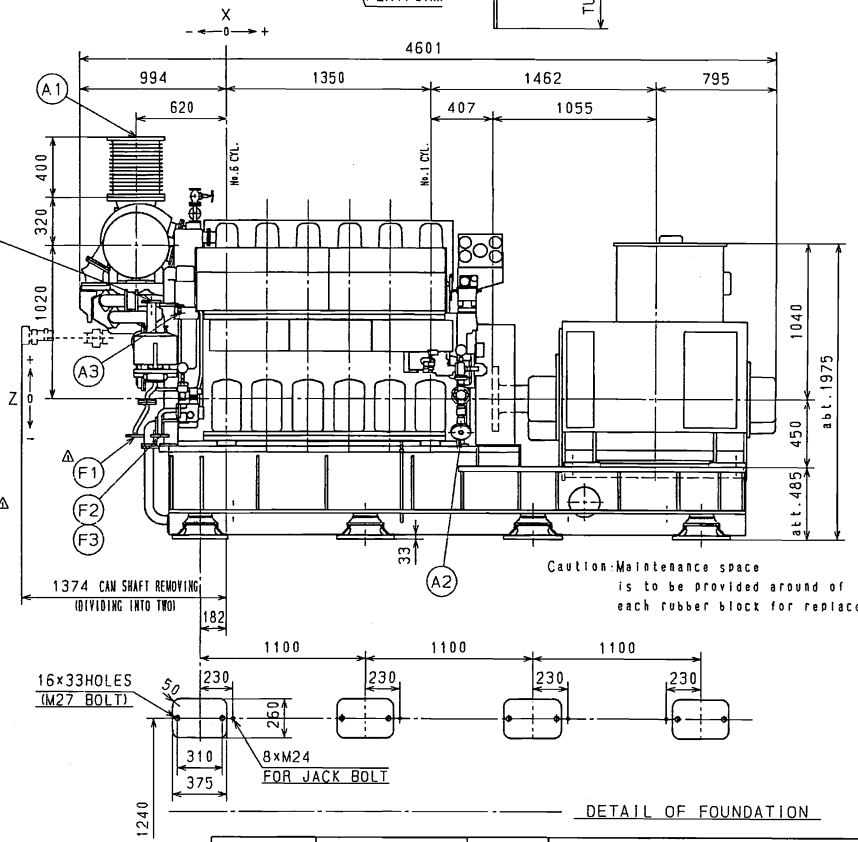


MIN.SPACE FOR OVERHAUL
(VIEW FROM ANTI-FLYWHEEL)









Caution:Maintenance space is to be provided around of each rubber block for replace.

DETAIL OF FOUNDATION

SIZE AND DIMENSIONS OF PIPE CONNECTIONS (FLANGES MARKED ※ ARE SUPPLIED BY US)

SYMBOL	PIPE CONNECTIONS	SIZE	PIPE	X	Y	Z	FLANGE
W1							
W2							
W3	HOT WATER INLET FOR PREHEATING	5'-15	15A	-585	7	412	※
W4	F.W. AIR VENT	5'-15	15A	-225	-195	1399	※
W5	HOT WATER OUTLET FOR PREHEATING	5'-15	15A	-225	-255	1234	※
W6	COOLER COOLING WATER INLET	5'-80	80A	-622	-382	-160	※
W7	COOLER COOLING WATER OUTLET	5'-80	80A	-470	-560	-60	※
L1	L.O. INLET	5'-40	40A	-407	-315	-833	※
L2	L.O. OUTLET	5'-40	40A	-407	230	-833	※
L3							
L4							
L5							
L6							

SYMBOL	PIPE CONNECTIONS	SIZE	PIPE	X	Y	Z	FLANGE
L8	L.O. OVER FLOW	5'-65	65A	1100	-573	-489	※
L9							
L10							
F1	FUEL OIL INLET	16'-25	25A	△-645 -625	△-589 560	△-284 -255	※
F2	FUEL OIL OUTLET	16'-25	25A	-459	560	-255	※
F3	FUEL OIL DRAIN	5'-25	25A	-459	420	-251	※
F4							
F5							
F6							
F7							
MG	MIST GAS OUTLET	5'-50	50A	-517	340	650	※
A1	EXHAUST OUTLET	5'-250	250A	-620	-608	1512	※
A2	STARTING AIR INLET	40'-25	25A	1552	638	-224	※
A3	CONTROL AIR INLET	.....	0.0.10	-329	522	569	※

PRINCIPAL DATA

DIESEL ENGINE		AC. GENERATOR	
MODEL	6EY18AL	MODEL	FE 547A-8
OUTPUT	615 kW	OUTPUT	560 kW
SPEED	900 min⁻¹	VOLTS	450 V
NO.OF CYL.	6	AMPS	898 A
BORE	180 mm	SPEED	900 min⁻¹
STROKE	280 mm	NO.OF POLES	8
DIRECTION OF ROTATION	ANTI-CLOCK WISE VIEW FROM FLYWHEEL SIDE	FREQUENCY	60 Hz
		P.F.	0.8
		INSULATION	F
MASS (APPROX.)	6600 kg	MASS (APPROX.)	3100 kg
MAKER	YANMAR	MAKER	TAIYO
TOTAL MASS	(APPROX.) DRY		11800 kg

製図 DRAWN		納入先 CUSTOMER	GUANGZHOU HUANGPU SHIPBUILDING CO.,LTD.
設計 DESIGNED	Y.MATSUI	WORK No.	R8-B08001/101/201/301 S.No. HPS3001/2/3/4
検図 CHECKED		名称 NAME	6EY18AL X 560kW
グループリーダー MANAGER			外形図 OUTLINE
ヤンマー株式会社 開発部 システム開発部 YANMAR CO., LTD. DEVELOPMENT DEPT. ENGINEERING DEPT.		SCALE	1:25
		DATE	'08.06.10
		第三角法 3rd ANGLE PROJECTION	コード DRAW No. B3-46623-145D △

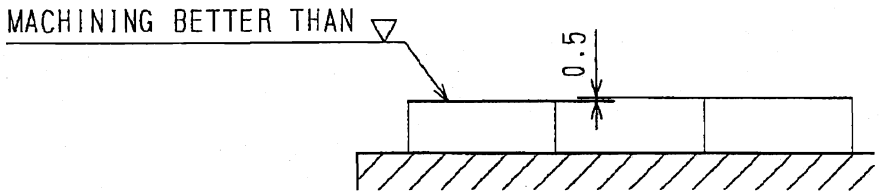
INSTALLATION PROCEDURE FOR A GENERATOR ENGINE EQUIPPED WITH VIBRATION ISOLATOR

ESSENTIAL POINTS ON INSTALLATION PROCEDURE OF A VIBRATION ISOLATOR FOR COMMON BED PLATE OF A DIESEL GENERATOR ENGINE ARE SET FORTH AS FOLLOWS:

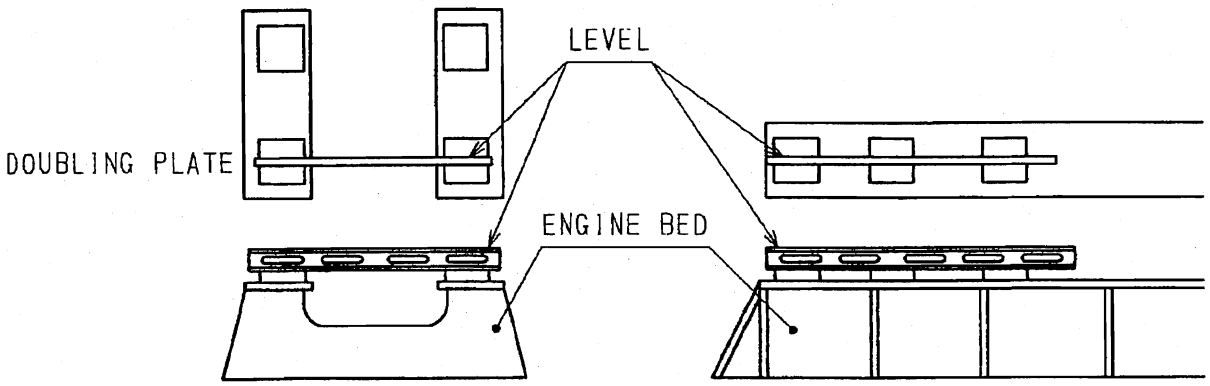
1. CHECK THE ENGINE BED.
   CHECK FOR FLATNESS OF ENGINE BED TOP.

FLATNESS OF RUBBER VIBRATION INSULATOR MOUNTING FACE (TARGET VALUE)	LESS THAN 1.5 mm (LESS THAN 0.5mm FOR THE DIFFERENCE BETWEEN ADJACENT HEIGHTS)

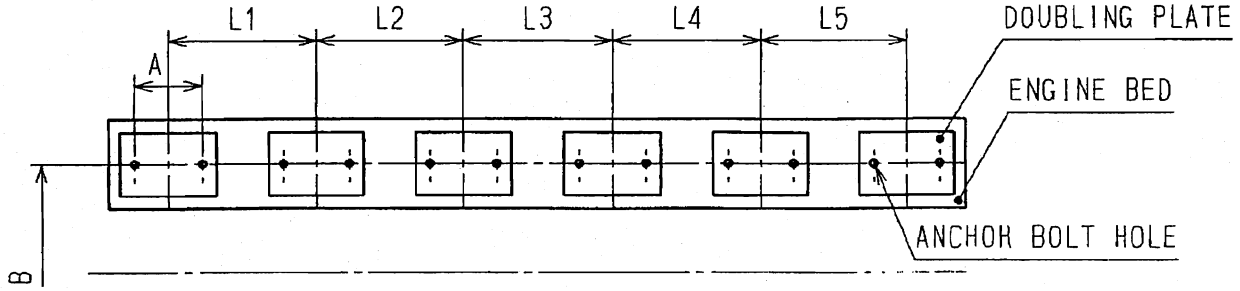
1) DOUBLE THE TOP OF ENGINE BED WITH TOP MACHINED DOUBLING PLATES, AND ADJUST THE FLATNESS OF RUBBER VIBRATION INSULATOR MOUNTING FACE TO THE TARGET VALUE BY MEANS OF SHIMS.



2) BESIDES, IT IS SUGGESTED TO HAVE SHIMS MADE OF STAINLESS STEEL PREPARED IN DIFFERENT THICKNESS OF 0.5, 0.3 & 0.1mm.
NUMBER OF SHIMS USED AT EACH SEAT IS ONE TO TWO.



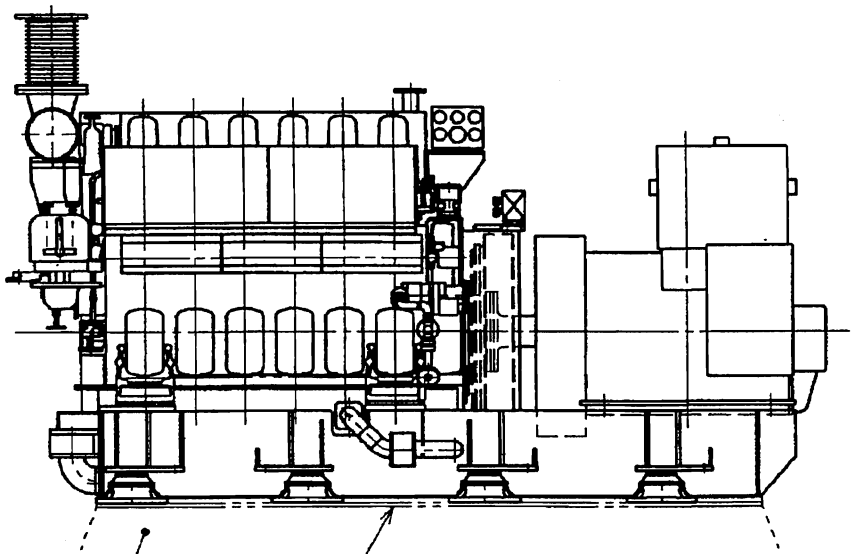
2. MACHINE ANCHOR BOLT HOLES.



NOTE: MACHINE HOLES BY DIMENSIONS INDICATED IN PERTINENT DIESEL GENERATOR ENGINE OUTLINE DRAWING.

3. INSTALL THE DIESEL GENERATING SET (GENERATOR & ENGINE) ON THE ENGINE BED.

1) PLACE A RUBBER VIBRATION INSULATOR AT EACH ANCHOR BOLT HOLE AREA.
2) WHILE PUTTING THE DIESEL GENERATING SET ON THE ENGINE BED, ALIGN RUBBER VIBRATION INSULATOR MOUNTING BOLT HOLES, AND FIT RUBBER VIBRATION INSULATOR MOUNTING BOLTS OF THE COMMON BED PLATE SIDE AND THE ENGINE BED SIDE.

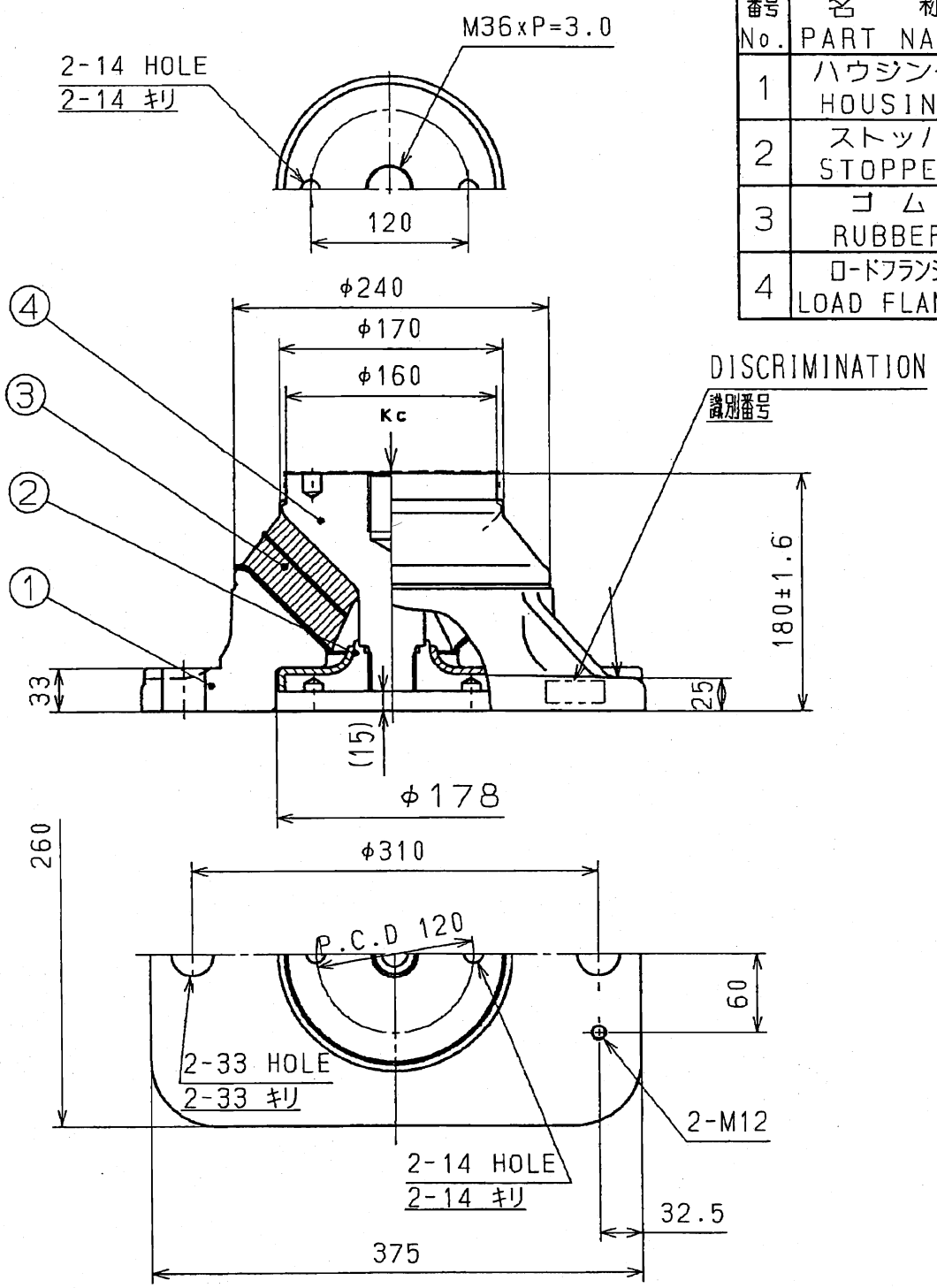


4. MEASURE AND CONFIRM THE CRANKSHAFT DEFLECTION.

1) IF RESULTS OF CRANKSHAFT DEFLECTION MEASUREMENT ARE FOUND NOT WITHIN REFERENCE VALUES, ADJUST FOR CRANKSHAFT DEFLECTION BY ALTERING THE THICKNESS OF SHIMS PLACED BETWEEN THE GENERATOR AND THE COMMON BED.
(SINCE CENTERING WORK IS DONE UNDER THE CONDITION OF RUBBER VIBRATION INSULATORS SET OVER A STOOL AT THE ENGINE MANUFACTURER'S SHOP, INBOARD ADJUSTMENT IS THOUGHT TO BE UNNECESSARY. HOWEVER, SHOULD SUCH ADJUSTMENT ARISE, EXECUTE THIS ADJUSTMENT.)

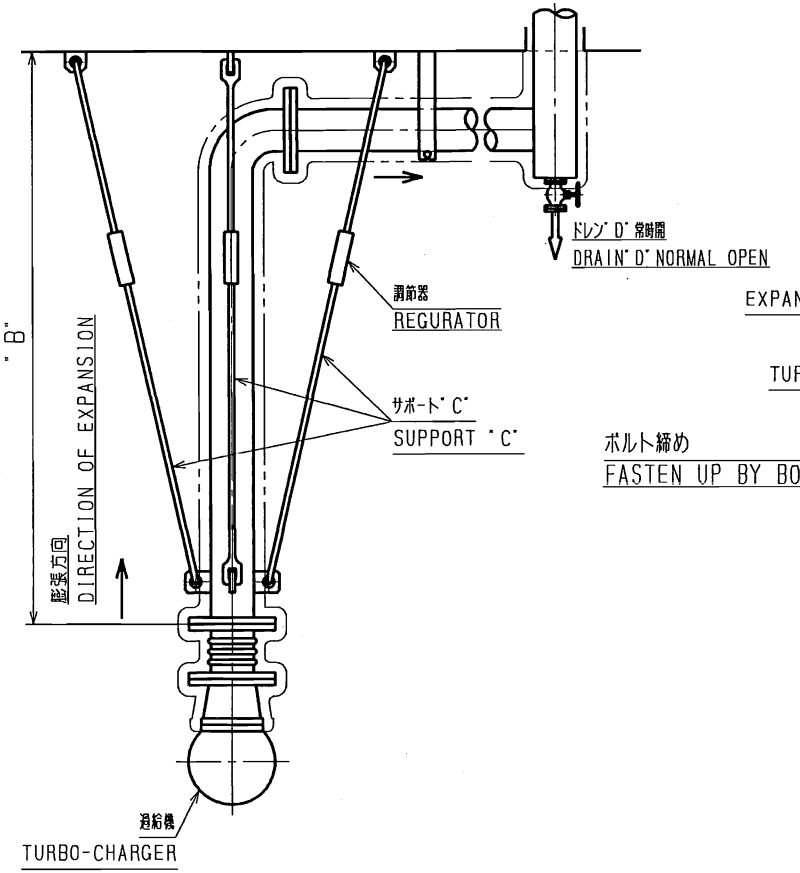
5. ATTACH RUBBER VIBRATION INSULATOR COVERS.

番号 No.	名称 PART NAME	材質 MATERIAL
1	ハウジング HOUSING	FCD400
2	ストッパ STOPPER	S45C
3	ゴム RUBBER	JIS K 6386 A10
4	ロードフランジ LOAD FLANGE	SF50 又ハ55

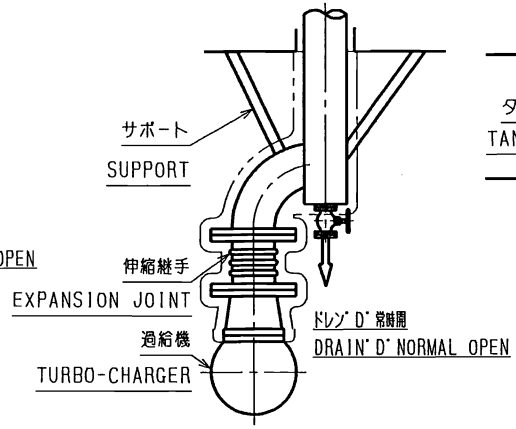


C方向バネ定数 STIFFNESS ("C" DIRECTION) Kc (N/mm)	認識番号 DISCRIMINATION No.	部番 PART No.
2100	210	41400-022220
2800	280	41400-022260
4000	400	41400-022230
5800	580	41400-022240
7300	730	41400-022250

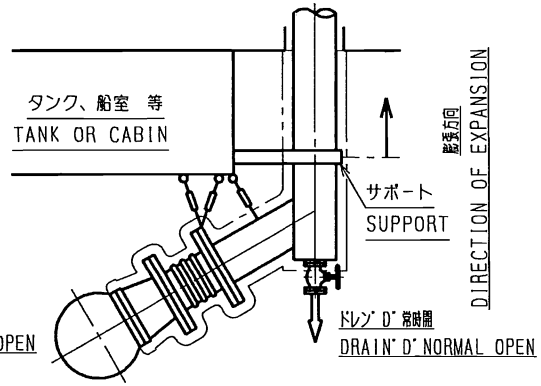
過給機出口排気管が縦に長い場合
SETTING T/C OUTLET LONG EXHAUST GAS PIPE VERTICALLY



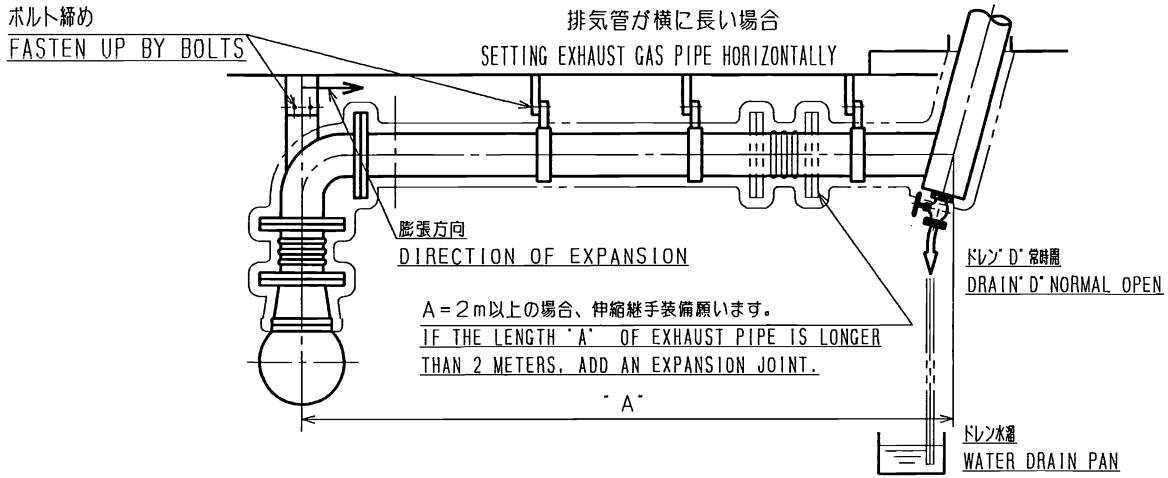
排気管が垂直の場合
SETTING EXHAUST GAS PIPE VERTICALLY



排気管が傾斜している場合
SETTING EXHAUST GAS PIPE OBRIQUELY



排気管が横に長い場合
SETTING EXHAUST GAS PIPE HORIZONTALLY



注記
雨水及び凝縮水が機関に逆流しない構造にしてください。
1) ドレン弁は常時開にしてください。
2) ドレン水はドレン水溜へ入れるか又はドレンアウトしてください。

CAUTION
MAKE IT THE STRUCTURE WHERE RAIN WATER AND CONDENSATION WATER DO NOT FLOW BACKWARDS TO ENGINE.
1) DRAIN VALVE IS TO BE NORMAL OPEN.
2) DRAIN WATER IS TO BE PUT TO WATER DRAIN PAN OR DRAIN OUT..

注 記

1. 排気管の熱膨張による荷重が過給機にかからないように配管願います。　寸法"B"が1.5m以上の場合はサポート"C"を天井より取り付けてください。
   又は、過給機側へ4mm以上圧縮されない様な構造として下さい。
2. 伸縮継手の許容伸縮量は：伸び（引張方向）5mm，縮み（圧縮方向）40mmです。
3. 運転中、一度伸縮継手を緩めて締直し、排気管の膨張変形の歪を除去願います。

CAUTIONS
1. TURBO-CHARGER OUTLET PIPING IS TO BE SET SO AS NOT TO BE AFFECTED BY THE LOAD CAUSED HEAT ELONGATION.
   SUPPORT "C" IS TO BE FIXED ON THE ROOF IF "B" IS OVER 1.5 m.
   OR VERTICAL PIPING IS TO BE A STRUCTURE SO AS NOT TO BE COMPRESSED MORE THAN 4.0 mm TO TURBO-CHARGER SIDE.
2. EXPANSION JOINT PERMISSIBLE LENGTH : EXTENSION 5 mm, CONTRACTION 40 mm.
3. AT THE TRIAL OPERATION, PLEASE LOOSE THE BOLTS OF THE EXPANSION JOINT AND
   FASTEN UP AGAIN BECAUSE OF THE ELIMINATION OF STRAIN FOR EXHAUST GAS PIPE.

排気伸縮継手取付要領図
SETTING OF THE EXPANSION JOINT

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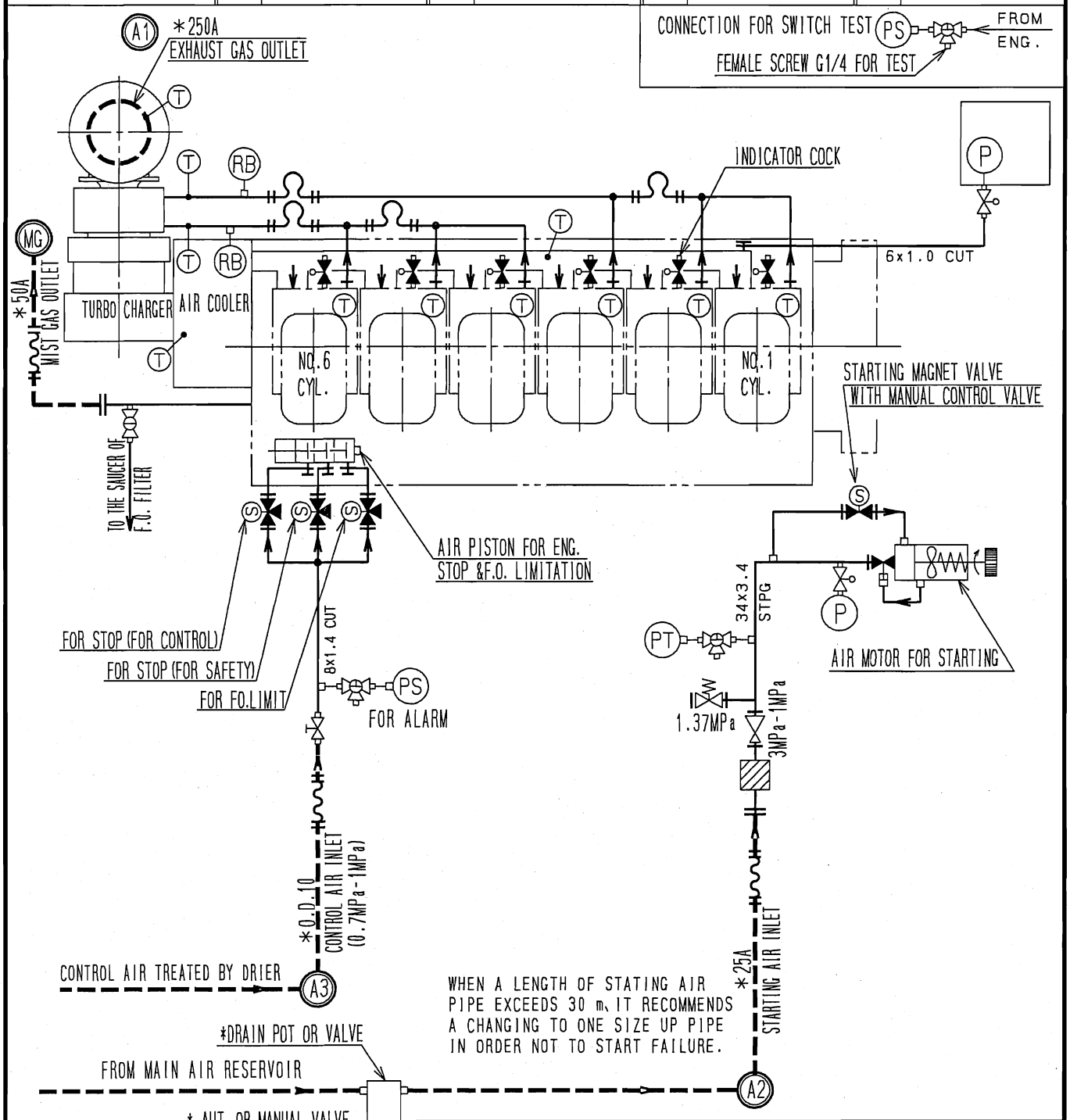
DWG. No. J4-00000-0054

HICAD

COCK	SOLENOID VALVE	LOOP SEAL		THERMOMETER		
BALL VALVE	FLANGE FITTING	O.D.	PIPE OUTSIDE DIAMETER	PRESSURE GAUGE		
GLOBE VALVE	SHUT-OFF VALVE	STPG	CARBON STEEL PIPE FOR PRESSURE TUBE	TEMPERATURE SWITCH		
NEEDLE VALVE	JOINT	CUT	COPPER PIPE	PRESSURE TRANSMITTER		
PRESS.REGULAT.VALVE	BALL TYPE JOINT	***	CAPILLARY TUBE	RESISTANCE TEMP. SENSOR		
SAFETY VALVE	BOSS			PRESSURE SWITCH		
BLOCKING VALVE	EXPANSION JOINT					
PRESSURE REDUCING VALVE	FLEXIBLE PIPE COUPLING					



REMARKS

1) PIPES AND FITTINGS MARKED * IN THIS DRAWING ARE NOT SUPPLIED BY YANMAR.
2) CHARACTERS IN ◎ ARE SAME AS ONES OF PIPE CONNECTION IN OUTLINE DRAWING.

MODEL: 6EY18 (A) L PIPING LAYOUT

EXH. GAS & SUCTION AIR SYSTEM

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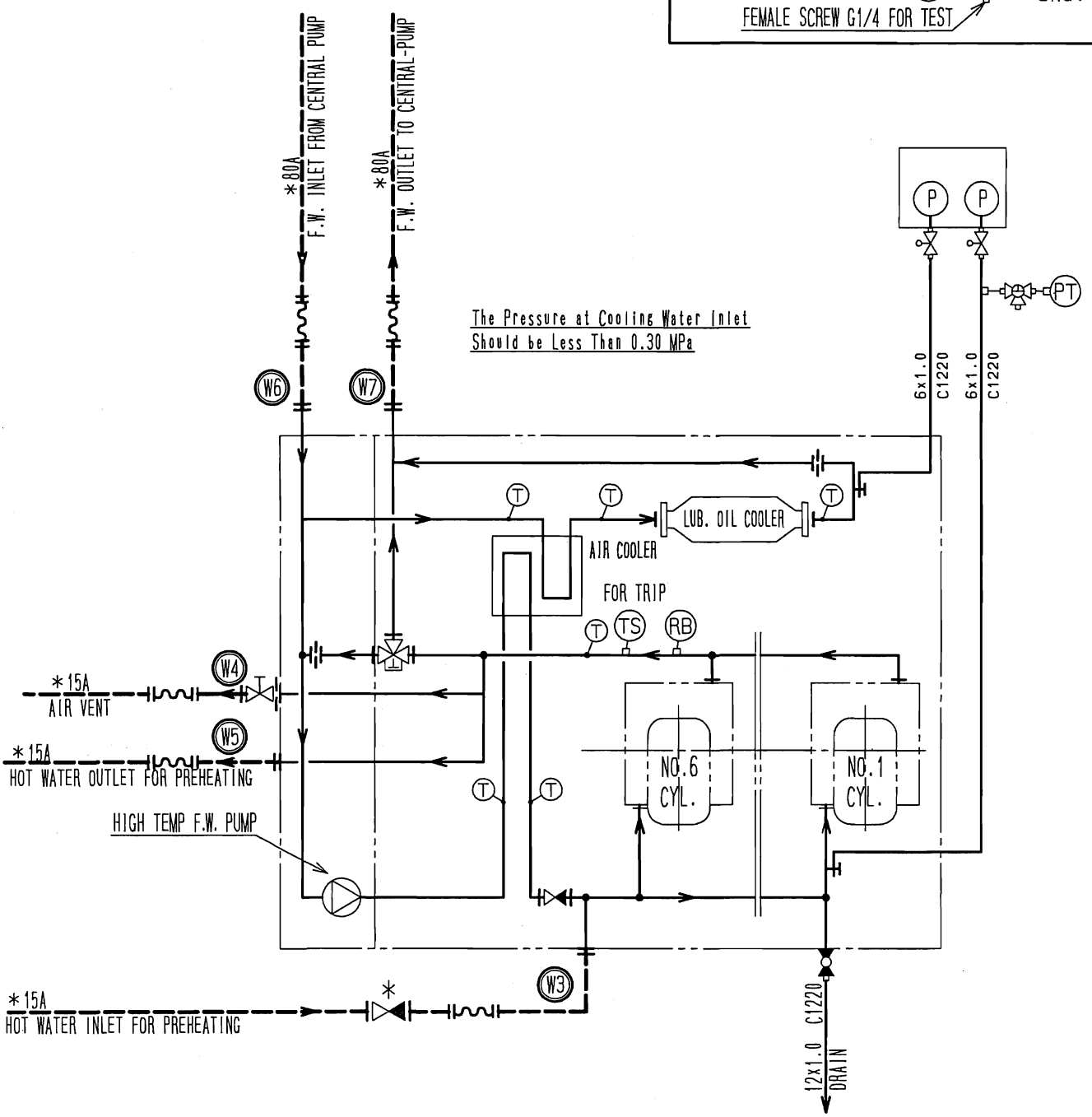
DWG. No. P3-46623-302D

	PUMP		GLOBE VALVE		FLANGE FITTING		FLEXIBLE PIPE COUPLING	T	THERMOMETER
M	MOTOR		NEEDLE VALVE		SHUT-OFF VALVE		LOOP SEAL	P	PRESSURE GAUGE
			SWING CHECK VALVE		SPECTACLE FLANGE	O.D.	PIPE OUTSIDE DIAMETER	C	COMPOUND GAUGE
	BUILT-IN CHECK VALVE		AUTOMATIC TAMP. REGULATING VALVE		JOINT	STPG	CARBON STEEL PIPE FOR PRESSURE TUBE	PS	PRESSURE SWITCH
	THREE-WAY COCK		SAFETY VALVE		BALL TYPE JOINT	CUT	COPPER PIPE	TS	TEMPERATURE SWITCH
	BUTTERFLY VALVE		PISTON VALVE		BOSS	***	CAPILLARY TUBE	FS	FLOAT SWITCH
	COCK		THREE-WAY PISTON VALVE		ORIFICE		GLAZED LEVEL GAUGE	PT	PRESSURE TRANSMITTER
	BALL VALVE		FLOW RATE REGULATING VALVE		FLEX-MASTER		REDUCER	RB	RESISTANCE TEMP. SENSOR

CONNECTION FOR SWITCH TEST (PS) ← FROM ENG.
FEMALE SCREW G1/4 FOR TEST



CAUTION
1) PIPE SIZE FOR COMMON LINE IS TO BE DECIDED BY TOTAL FLOW RATE AND PIPING LOSS.

REMARKS
1) PIPES AND FITTINGS MARKED * IN THIS DRAWING ARE NOT SUPPLIED BY YANMAR.
2) CHARACTERS IN ◎ ARE SAME AS ONES OF PIPE CONNECTION IN OUTLINE DRAWING.

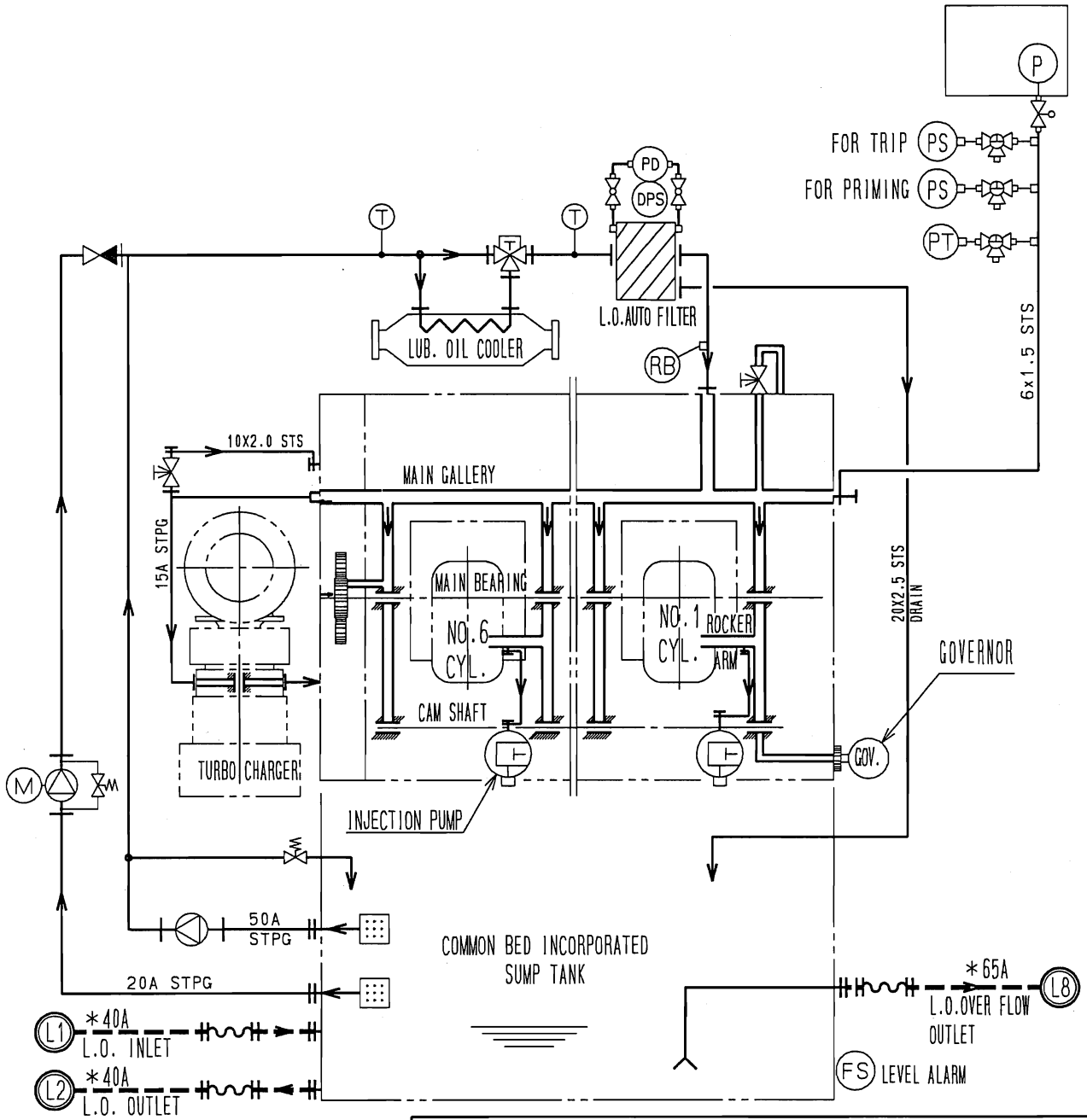
MODEL: 6EY18 (A) L PIPING LAYOUT

COOLING WATER SYSTEM

ヤンマー株式会社 YANMAR CO., LTD.		DWG. No.	P3-46623-303D

PUMP	GLOBE VALVE	FLANGED FITTING	LOOP SEAL	PD	DIFFERENTIAL PRESSURE GAUGE
HAND PUMP	NEEDLE VALVE	SHUT-OFF VALVE	O.D.	PIPE OUTSIDE DIAMETER	P	OIL SIGNAL
M MOTOR	SCREWED CHECK VALVE	SPECTACLE FLANGE	STPG	CARBON STEEL PIPE FOR PRESSURE TUBE	PS	PRESSURE SWITCH
FILTER	SWING CHECK VALVE	JOINT	STS	MACHINE STRUCTURAL CARBON STEEL PIPE	TS	TEMPERATURE SWITCH
CENTRIFUGAL FILTER	BUILT-IN CHECK VALVE	BALL TYPE JOINT	***	CAPILLARY TUBE	FS	FLOAT SWITCH
POROUS PLATE FILTER CYLINDER	PRESS.REGULAT.VALVE	BOSS			DPS	DIFFERENTIAL PRESSURE SW
BALL VALVE	AUTOMATIC TAMP. REGULATING VALVE	ORIFICE	T	THERMOMETER	PT	PRESSURE TRANSMITTER
THREE-WAY COCK	SAFETY VALVE	FLEXIBLE PIPE COUPLING	P	PRESSURE GAUGE	RB	RESISTANCE TEMP. SENSOR

CONNECTION FOR SWITCH TEST PS FROM ENG.
FEMALE SCREW G1/4 FOR TEST



MODEL:6EY18(A)L PIPING LAYOUT

LUBRICATING OIL SYSTEM

REMARKS
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DWG. No. P3-46623-013D

Lube oil Purification System

The lube oil purification system depends on the ship. Basic recommendations are given below.

1. General

When the engine is operated on Heavy Fuel Oil (H.F.O.), deterioration of lube oil is accelerated due to the entry of combustion residue in lube oil, which in turn accelerates the wear of major moving parts. Accordingly, it is important to select the appropriate type of lube oil and to purify lube oil appropriately to maintain its lubrication properties.

Basically, when using H.F.O. with the quality higher than 380 mm^2/s, we recommend a continuous purification by the centrifugal purifier as shown in item 2 & 3. When using H.F.O. with the quality lower than 380 mm^2/s or Marine Diesel Oil (M.D.O.), the intermittent purification system as shown in item 4 may be used.

2. Overflow Tank Purification System

In the case of parallel operation of multiple engines, we recommend the use of the continuous purification system with overflow tank as shown in Fig.1. When using this system, consider the following points:

(a) Plan the overflow tank capacity so that the total of the lube oil sump tank capacity and the overflow tank capacity becomes about 2.0liters/kW.

(b) Plan the lube oil purifier capacity so that the number of purification times for the full amount of lube oil inside the system becomes about 4 times per day.

(c) Plan that the flow velocity in the overflow pipe will not exceed 0.25m/s. In addition, use a bend to the overflow joint flange of the lube oil sump tank for downward piping. (If the piping extends long horizontally, the oil level in the sump tank will be raised when the engine is inclined.)

3. Continuous Purification for Each Engine Unit (Direct Purification System)

In the case of conducting parallel operation of multiple engines just for a temporary period, each engine unit may be purified continuously as shown in Fig.2 instead of employing the overflow purification system. When using this direct purification system, consider the following points:

(a) Raise an appropriate caution plate or install a proper device so that lube oil will not be lost due to mis-operation of the sump tank outlet/inlet valve.

(b) Install the oil level alarm device (high, low) for detecting the mis-operation of the sump tank inlet/outlet valve at an early stage.

4. Batch Purification System

When using the fuel oils with the quality of 380 mm^2/s or lower or M.D.O., a batch purification system as shown in Fig.3 may be employed. When using this batch purification system, consider the following items:

(a) Watch the lube oil properties carefully and conduct purification on a periodic basis.

(b) The batch purification may be implemented during the ship's voyage when the standby unit is available, but we recommend to implement purification during anchorage for ensuring safety.

(c) The centrifugal lube oil filter is mounted to the engine. In order to maintain the lube oil proprieties appropriately, it is recommended to install the fine filter for purifying the by-pass flow.

Fig.1 Overflow Purification System

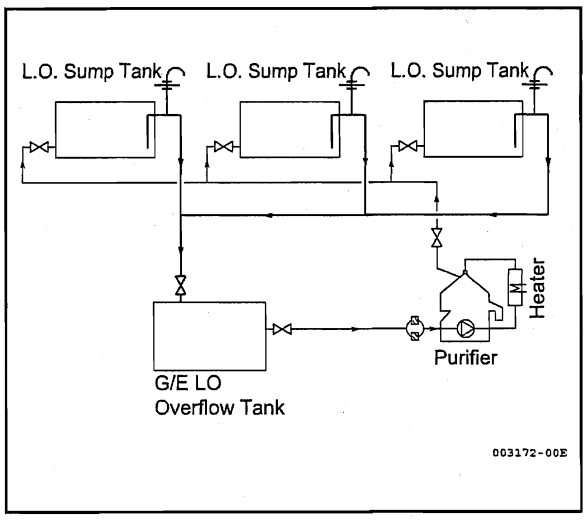


Fig.2 Direct Purification System

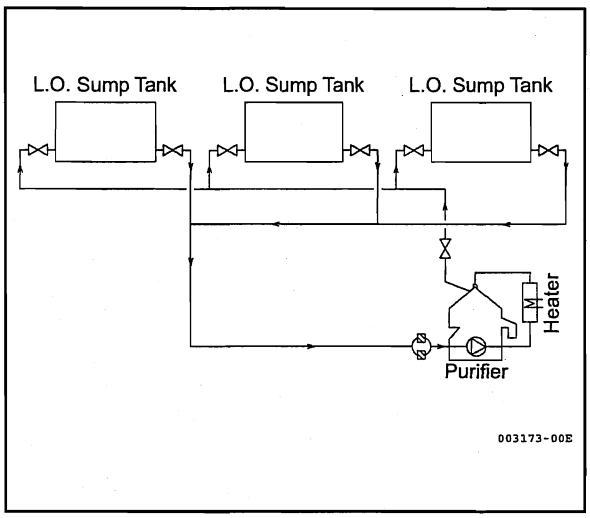
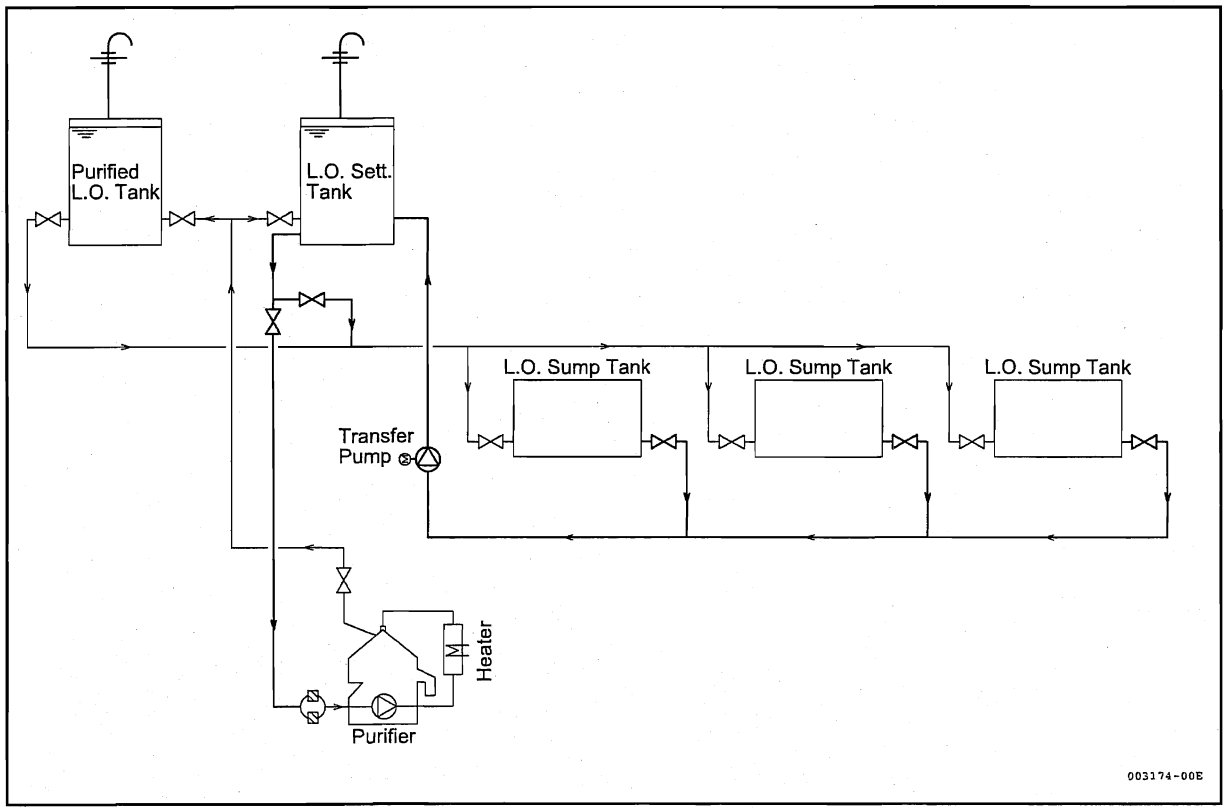
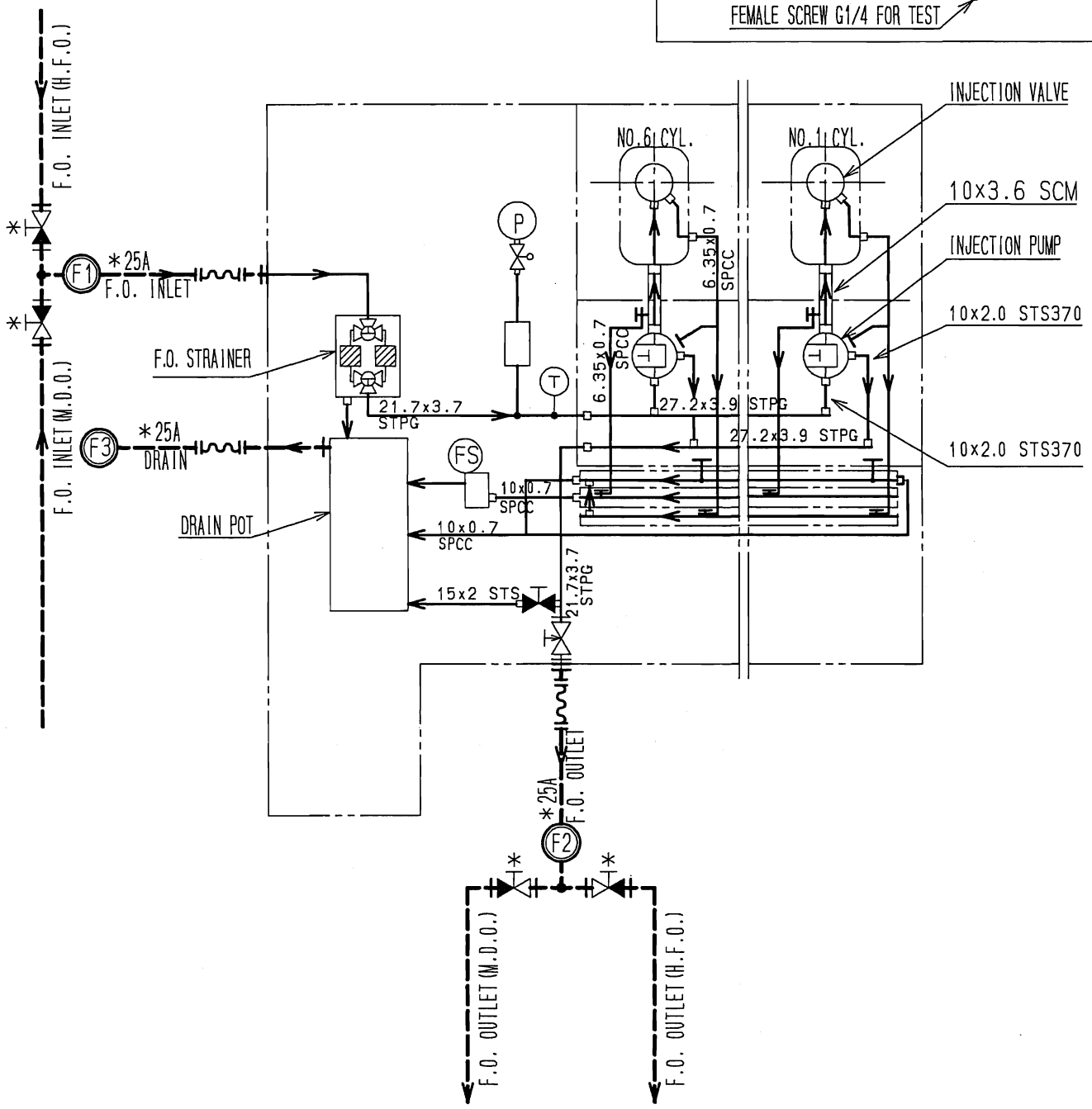


Fig.3 Batch Purification System



PUMP	GLOBE VALVE	FLANGE FITTING	SEAL POT	P	PRESSURE GAUGE
	NEEDLE VALVE	SHUT-OFF VALVE	LOOP SEAL	PD	DIFFERENTIAL PRESSURE GAUGE
	SCREWED CHECK VALVE	SPECTACLE FLANGE	O.D. PIPE OUTSIDE DIAMETER	PS	PRESSURE SWITCH
FILTER	PRESS.REGULAT.VALVE	JOINT	STPG CARBON STEEL PIPE FOR PRESSURE TUBE	TS	TEMPERATURE SWITCH
	AUTOMATIC TAMP. REGULATING VALVE	BALL TYPE JOINT	STS MACHINE STRUCTURAL CARBON STEEL PIPE	FS	FLOAT SWITCH
	SAFETY VALVE	BOSS	*** CAPILLARY TUBE	DPS	DIFFERENTIAL PRESSURE SW
COCK	THREE-WAY PISTON VALVE	ORIFICE		PT	PRESSURE TRANSMITTER
BALL VALVE	THREE WAY VALVE	FLEXIBLE PIPE COUPLING	T THERMOMETER	RB	RESISTANCE TEMP. SENSOR

CONNECTION FOR SWITCH TEST (PS) FROM ENG.
FEMALE SCREW G1/4 FOR TEST



CAUTION

1) PIPE SIZE FOR COMMON LINE IS TO BE DECIDED BY TOTAL FLOW RATE AND PIPING LOSS.

REMARKS

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2) CHARACTERS IN ◎ ARE SAME AS ONES OF PIPE CONNECTION IN OUTLINE DRAWING.

MODEL: 6EY18 (A) L PIPING LAYOUT

FUEL OIL SYSTEM

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	P3-46623-085D

Fuel Oil Supplying System

1. Fuel Supply System

The fuel supply system will vary depending on each ship, but we enumerate several basic recommendations as follows:

(1) General

When the engine is operated on Heavy Fuel Oil (H.F.O.), we recommend the use of the pressurized circulation system for fuel supply as shown in the system diagram of 2-(a) of the following page.

In the case of using H.F.O., it is necessary to heat fuel oil by fuel oil heater to make the fuel viscosity at the engine inlet comply with the recommended value. However, depending on heating temperature, the volatile content in the fuel oil will evaporate. Accordingly, the fuel supply system is pressurized to a larger extent than the evaporating pressure of the volatile content.

However, in the case of using Marine Diesel Oil (M.D.O.) the open tank system as shown in the diagram 5-(d) may be used.

(2) H.F.O. Supply Pump

The capacity of the fuel supply pump must be larger than the expected max. fuel consumption. (max. consumption of the generator engine + fuel oil quantity discharged outside the system through fuel filter, etc.) Recommended capacity of the fuel oil supply pump is shown in Table 1 just for your reference.

(3) Fuel Oil Heater

Design the heat capacity so that the recommended fuel oil viscosity at engine inlet can be maintained even during the max. fuel consumption. Include the heat radiation of the system between the heater and the engine.

(4) H.F.O Circulating Pump

Design the fuel oil circulating pump capacity at 3 times or above the max. fuel consumption in order to prevent pressure drop in the circulating system at the time of sudden load change. In addition, when installing the self back-wash filter in the circulating system, add the filter's back wash capacity to the pump capacity. Recommended pump capacity is shown in Table 2 for your reference.

(5) H.F.O. Back-wash Filter

Install the back-wash filter with the filtration performance of 10 μm (effective value) in the fuel oil circulating system (fuel oil heater outlet).

In the case of the unmanned ships, it is recommended to install the automatic back-wash filter.

(6) Fine Filter

In the case of using FCC fuel oil, it is recommended to install the fine filter with the filtration capacity of about 5 μm in order to remove alumina, silica and other catalytic particles. This filter does not need to be installed when the equivalent treatment system is provided.

(7) H.F.O. Final Filter

In order to protect the engine, install the duplex type filter with the filtration performance of 35 μm (effective value) at the engine inlet.

(8) Press. Control Valve

In order to maintain the fuel oil pressure in the fuel oil system and inside the engine, install the pressure control valve as shown in the respective diagram.

For the pressure setting and adjustment of the pressure control valve, refer to the pressure specified in each system diagram.

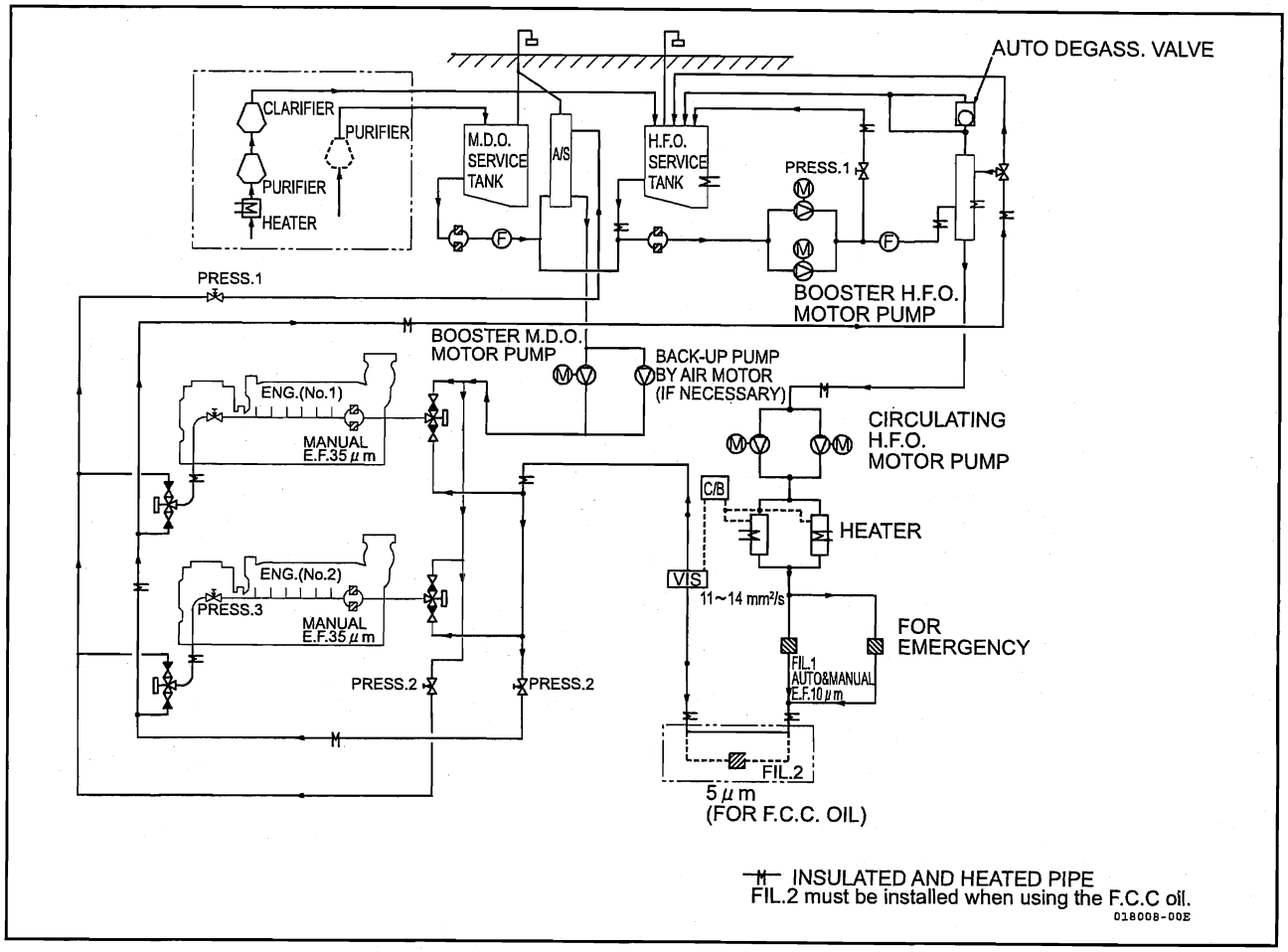
Table 1 Fuel Oil Supply Pump Capacity (Reference)

Model	1Eng.set	2Eng.sets	3Eng.sets
6EY18AL	0.25 m^3/h	0.45 m^3/h	0.65 m^3/h
6EY18L	0.20 m^3/h	0.35 m^3/h	0.55 m^3/h

Table 2 Fuel Oil Circulating Pump Capacity (Reference)

Model	1Eng.set	2Eng.sets	3Eng.sets
6EY18AL	0.6 m^3/h	1.2 m^3/h	1.8 m^3/h
6EY18L	0.5 m^3/h	1.0 m^3/h	1.5 m^3/h

3. Reference System Diagram (b) (Pressure Circulating System, w/o Engine-driven Fuel Oil pump)



Remarks:

1. Since the engine is not equipped with the M.D.O. supply pump, arrange the system as follows for facilitating the emergency starting at black-out condition:

(1) In case of starting and stopping with heavy fuel oil. Change the valves at the engine inlet and outlet to the M.D.O. side, and supply of M.D.O. by means of a backup pump driven by an air motor and establish a system for enabling pressurization.

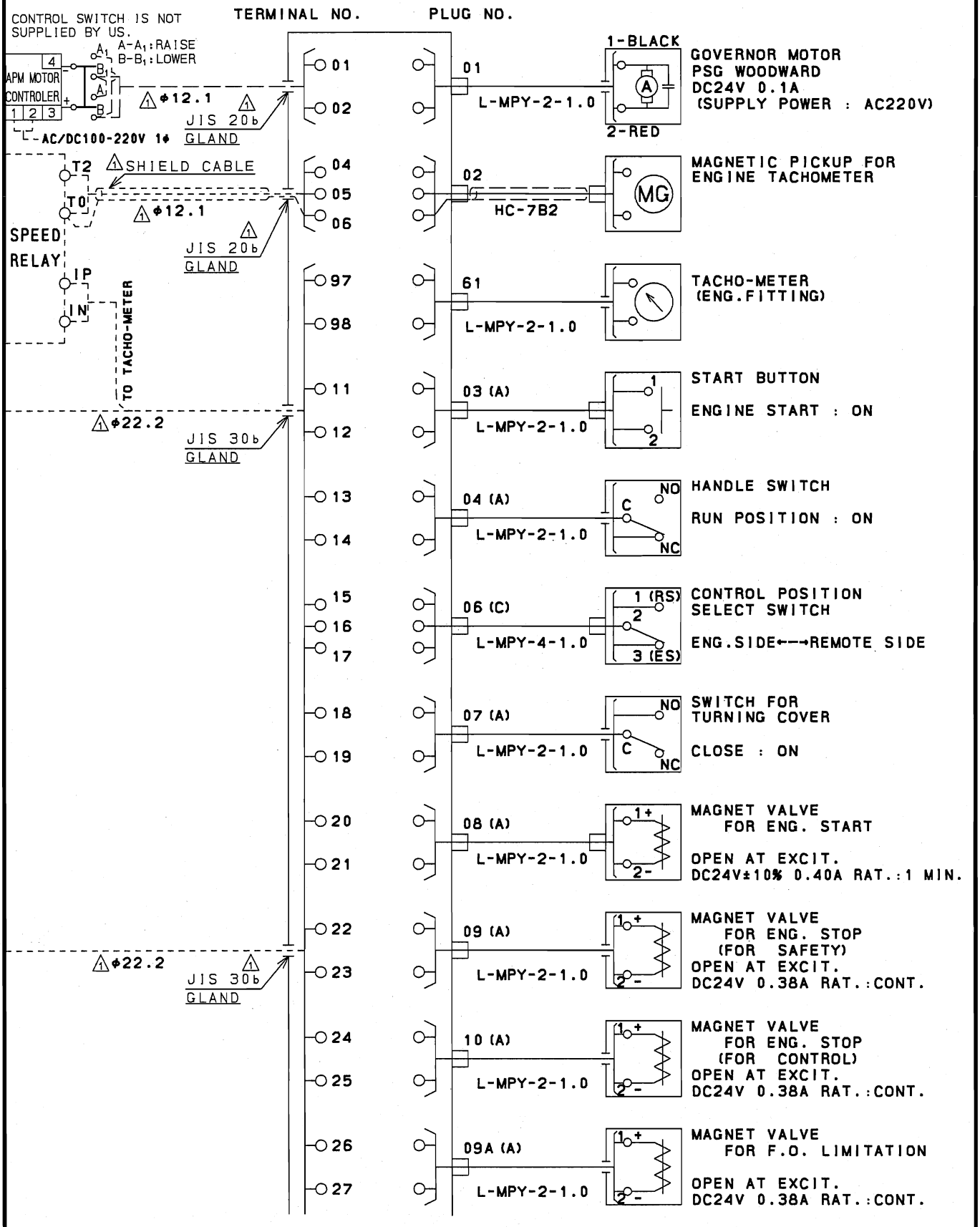
(2) In case of change to M.D.O. at start and stop. Adjust the height of the M.D.O. gravity tank so that fuel oil can be fed at the engine inlet more than 0.04 MPa. If this is not possible, install a backup pump driven by an air motor.

2. When the engine is of the H.F.O. starting/stopping specifications, keep heated fuel oil (11 ~ 14 mm^2/s) always circulated during the standby interval. Even when the circulation have to be stopped temporarily, the fuel oil temperature needs to be kept over the fluid point since it is very hard to re-circulate the fuel oil upon restarting. Note this point for designing the system.

3.Settings of Pressure Control Valves

	Press.1	Press.2	Press.3
700mm^2/s	0.40 ~ 0.45MPa	0.65 ~ 0.70MPa	0.55 ~ 0.60MPa
380mm^2/s	~~0.25 ~ 0.30MPa~~	~~0.45 ~ 0.50MPa~~	~~0.40 ~ 0.45MPa~~
180mm^2/s	—	~~0.35 ~ 0.40MPa~~	~~0.30 ~ 0.35MPa~~

1mm^2/s = 1cSt



CONTINUED ON THE NEXT PAGE

REMARK

·DOTTED LINES IN THIS CONNECTION DIAGRAM ARE NOT SUPPLIED BY OUR MANUFUCTORY.

6EY18(A)L

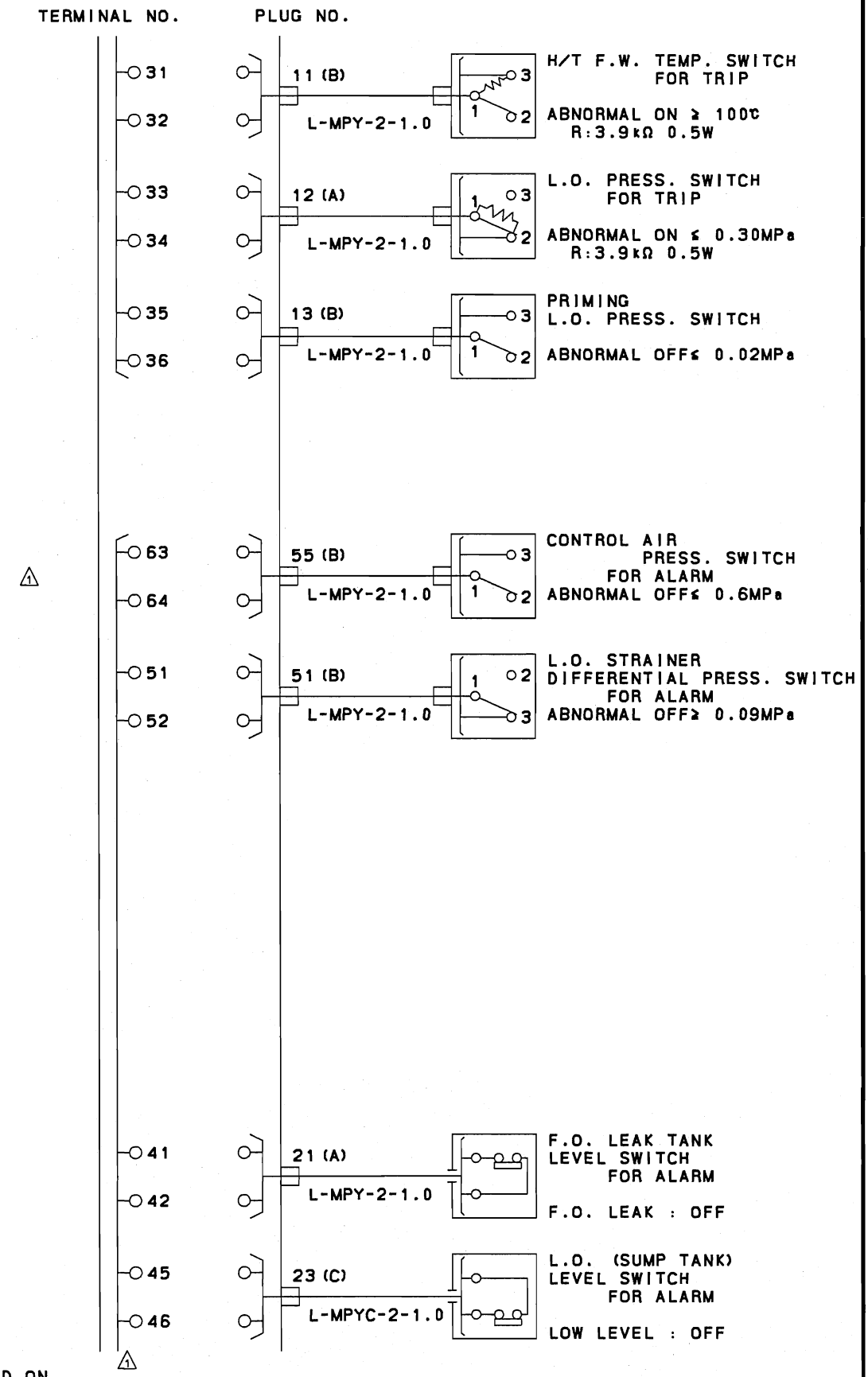
電装品結線図 (B)

CONNECTION DIAGRAM

ヤンマー株式会社

YANMAR CO., LTD.

DWG. No. E3-46623-093D △ (1/3)



CONTINUED ON
THE NEXT PAGE

REMARK

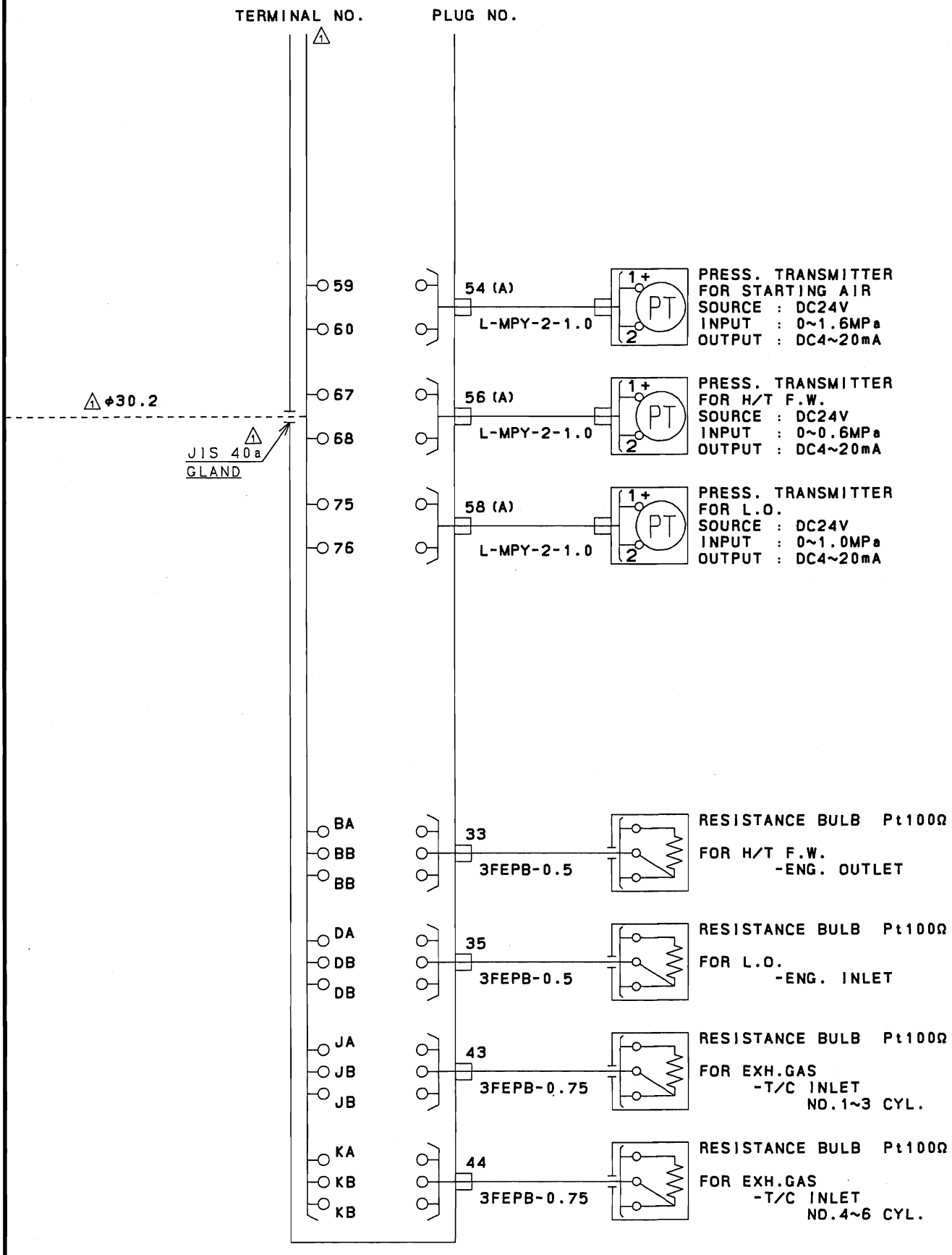
·DOTTED LINES IN THIS CONNECTION DIAGRAM ARE NOT SUPPLIED BY OUR MANUFUCTORY.

6EY18 (A) L

電 装 品 結 線 図 (B)

CONNECTION DIAGRAM

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	E3-46623-093D ⚠	(2/3)



REMARK

·DOTTED LINES IN THIS CONNECTION DIAGRAM ARE NOT SUPPLIED BY OUR MANUFUCTORY.

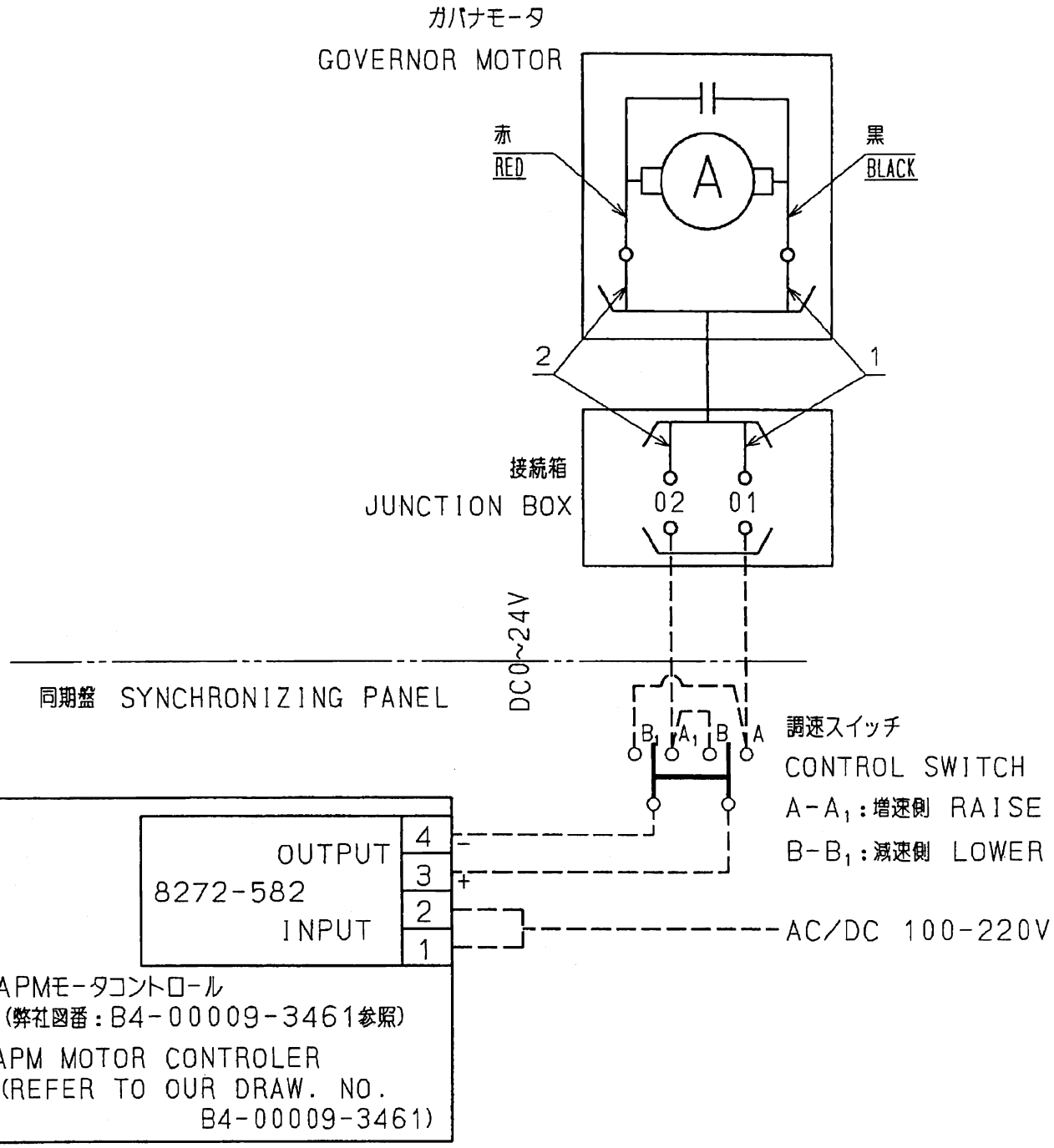
6EY18 (A) L

電 装 品 結 線 図 (B)

CONNECTION DIAGRAM

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	E3-46623-093D △1 (3/3)

M633

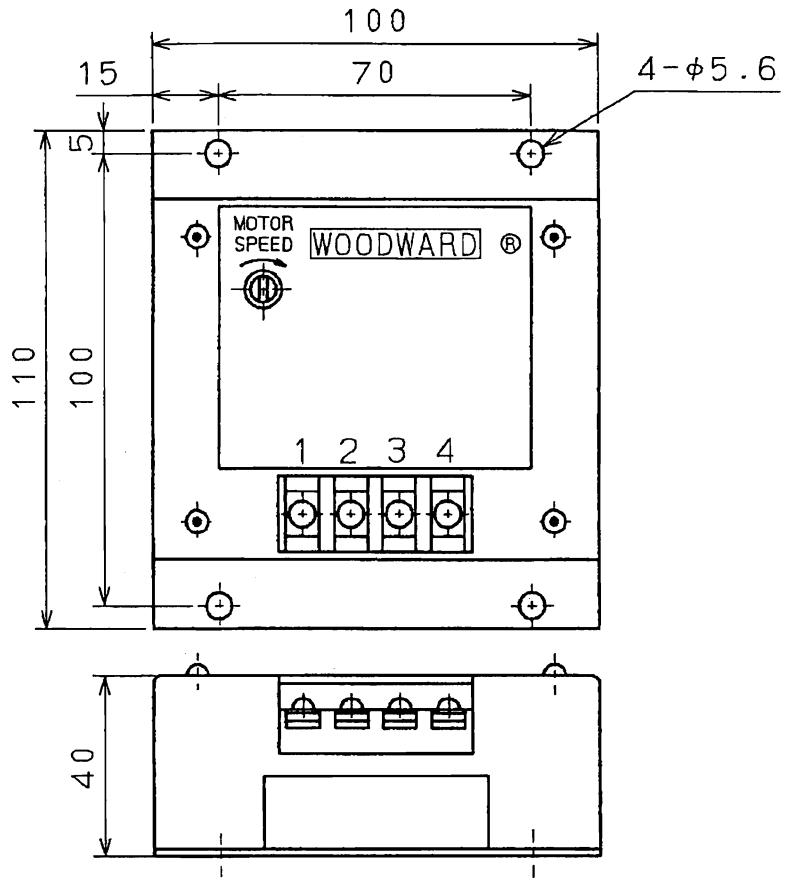


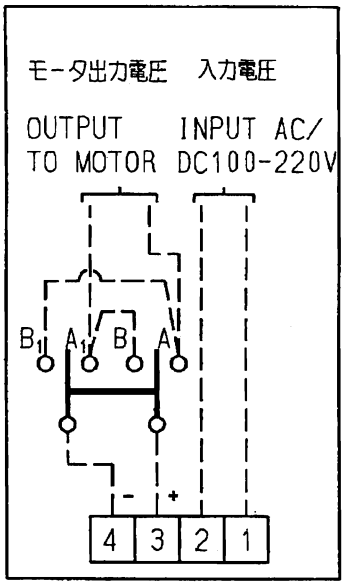
備　　考：点線デ示ス配線及ビ調速スイッチハ、弊社所掌外デス。

REMARK: DOTTED LINES AND CONTROL SWITCH IN THIS CONNECTION DIAGRAM ARE NOT SUPPLIED BY OUR MANUFACTORY.

ガバナモータ結線図 (MODEL: SG, PSG AC/DC100-220V) CONNECTION DIAGRAM FOR GOVERNOR MOTOR		
ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	E3-00000-7200

M607





配 線 図

WIRING DIAGRAM

備考

1．調整可能範囲
　　周波数1サイクル変動秒時：4～12秒／Hz
　　但シ　並列運転ノ場合ハ　8～12秒／Hz　ニ設定願イマス。
2．取付場所：同期盤
3．結線方法ハ、ガバナモータ結線図ヲ参照願イマス。

~~UG8~~	~~B-B$_1$：増速側 RAISE~~
	~~A-A$_1$：減速側 LOWER~~
PSG ~~SG~~	A-A$_1$：増速側 RAISE
	B-B$_1$：減速側 LOWER

REMARKS

1. ADJUSTABLE RANGE
   FLUCTUATION PER ONE CYCLE :4~12sec/Hz
   IN CASE OF PARALLEL RUNNING, ADJUST TO
   8~12sec/Hz.
2. FITTING PLACE:SYNCHRONIZING PANEL
3. REFER TO ANOTHER DRAWING CONCERNING WIRING.
   [CONNECTION DIAGRAM FOR GOVERNOR MOTOR]

PART No.
YANMAR CODE:41903-110111
WOODWARD CODE:8272-582

ガバナモータ用APMモータコントローラ(AC/DC 100-220V)

APM MOTOR CONTROLLER FOR GOVERNOR MOTOR CONTROL

ヤンマー株式会社
YANMAR CO., LTD.

DWG. No. B4-00009-3461

YANMAR DRW.NO : Y4-00008-2190

The request and consideration for main switchboard or monitor side about diesel generator control (6EY18(A)L, 6N18(A)L-V, 6(8)N21(A)L-V)

1) Engine control circuit is to be designed by the time schedule figure (F3-00000-8481) for engine start and stop from YANMAR, if it is prepared by the buyer side. (In case of models other than 6EY18(A)L, refer to the sequence diagram E3-46671-6668.)
2) In order to make a good engine starting at the time of blackout situation, please carry out a mutual warming among engines (at start/stop by MDO), or the forced warming by heater unit (at direct start/stop by HFO)
   Electric loading is to be carried after no load running for 5～10 minutes at the time of a cold starting including an initial starting on board.
3) The first electric loading of the sequential start for necessary devices on board after black out is to be carried out after 5 seconds of voltage establishment of AVR. If this duration is less than 5 seconds, the engine speed might not reach the rated speed or the speed of turbine is still increasing, hence an engine stall may happen in case of maximum allowable load is input.
4) The electric loading in sequential start should be carried out less than permissible loads of applied engine type (it is shown in approval drawing) and please give an interval as every 5 seconds. A momentary variation of engine is within 10%, permanent variation is within 5% and a time of stability is within 5 seconds. These are regulated by each classification society and it is necessary for 5 seconds in order that speed variation is steadied.
5) When electric loading amount becomes bigger than estimation and the momentary variation is over 10% at the first test of sequential start on board, please modify the loading setting timer of each starter and distribute the amount of load and lower the load of per step.
6) If an electric loading by three or more steps becomes necessary for a higher power generator engine, the shipping classification application of the sequential start after the blackout satisfying the electric loading plan is necessary.
   (In case of LR, since the formula of the amount of three-step loading is shown, please follow it.)
7) In addition to a over speed contact (12), a regular speed contact (13), and a low speed contact (14), the speed relay of YANMAR is equipped with the (SC) contact as an object for speed detector abnormal. The function of this SC contact is to send out an OFF signal when disconnection of the magnetic pickup for speed detection, the non-voltage of a speed relay, or burning of a speed relay is occurred.
   Therefore, please add this SC contact to the interlock at the time of starting of main generator engine. Ring gear breakage of air motor due to speed relay damage can be prevented.
   (In case of models other than 6EY18(A)L, only an OFF signal is sent out by the SC contact when disconnection of the magnetic pickup.)
8) There are ① engine start/stop circuit including the twice starting function circuit of air motor which prevents the starting failure by engagement failure of a ring gear at the blackout situation, ② a two-step temperature change control circuit which lowers jacket cooling-water temperature at the time of high load,(only high power engine of 6EY18(A)L series) ③ an boost air temperature heating change circuit for low load continuous running (option) , and ④ Lubricating oil priming pump automatic start/stop control circuit for engine control.
   Since the engine control panel which unified the newest circuit of each control system for option is standardized, please consider an adoption of these panels.
9) Air motor for engine starting is operated by the solenoid valve. The operation voltage is DC24V ±10%. Please select the wire with proper diameter and length in considering that the voltage is not less than DC21.6V (DC9V except 6EY18(A)L) due to wire loss.
10) The pressure, temperature, & level switch for each alarm and the pressure transmitter & resistance bulb for a remote indication are equipped on the engine. When occurring an alarm by the monitor, the suitable pause interval for an applied engine is required. These recommendation values are shown in a table of protection circuit, please refer it.

図面来歴 Bibliography

No.	Date	Description	Drawn
	08/06/12	SPECIFICATIONS FOR SUPPLY	K.M
⚠1	08/10/17	REVISION DRAWING	K.M

ORDERER

YANMAR CO., LTD.

CUSTOMER

GUANGZHOU HUANGPU
SHIPBUILDING CO., LTD.

SHIP NO.

HPS3001 /02 /03 /04

SERVICE

GENERATOR ENGINE CONTROL
&
LO PRIMING PUMP PANEL

6EY18ALx560KW

HANSHIN ELECTRIC
MFG. CO., LTD.

TEL. 06(6473)0861
FAX. 06(6473)0959
E-mail:design@hdk-mfg.co.jp

4-7 2-CHOME HIMESATO
NISHIYODOGAWA-KU
OSAKA JAPAN 555-0025

Approved	A. MATSUNAGA	Rule	CCS-AUT-0
Checked	M. OKAMOTO	Paint.Color	2.5G8/2
Drawn	K. MAEHARA	Date	2008/06/12

DRAWING NO.	0806-014

APPLIED RULES & REGULATIONS	CCS-AUT-0 , IEC , JIS , JEM	AMBIENT TEMPERATURE	45℃
DRAWING & DOCUMENT	WRITTEN IN ENGLISH	PROTECTION DEGREE OF THE ENCLOSURE	IP44
PAINTING COLOR	OUT : MUNSELL NO. 2.5G8/2 WITH LUSTER IN : MUNSELL NO. 2.5G8/2		
WIRE CAP COLOR	R-(U) : GREEN P : RED S-(V) : YELLOW N : BLUE T-(W) : BROWN SEEING FROM PANEL FRONT [LEFT / TOP / FRONT] TO [RIGHT / BOTTOM / REAR]		
NAME PLATE	MATERIAL : ACRYLITE LETTERS : ENGLISH (BLACK GROUND WITH ENGRAVED WHITE LETTERS)		
CAUTION PLATE	MATERIAL : ACRYLITE LETTERS : ENGLISH (RED GROUND WITH ENGRAVED WHITE LETTERS)		
CONNECTION DIAGRAM PLATE	PRINTED PAPER ENCLOSED IN PLASTIC CARD CASE		
UNIT	METRIC (mm, Kg and ℃) / SI (MPa, min^{-1})		
TERMINAL	SOLDERLESS TYPE : AMP		
SPARE PARTS	CCS RULE REQUIREMENT & MAKER STANDARD or ORDER SPECIFICATIONS BOX : MADE OF STEEL (PAINT COLOR : 2.5G8/2)		

	GENERATOR ENGINE CONTROL PANEL	LO PRIMING PUMP STARTER
SOURCE	AC220V 60HZ 1Φ DC24V (RIPPLE : $2V_{P-P}$ LESS)	AC440V 60HZ 3Φ
CONTROL VOLT	DC24V	AC220V 60HZ 1Φ / DC24V
INDICATION LAMP	LED DC2.8V FOR ECSU LED DC24V LAPD-2 (AL6G-P4PW) FOR AC/DC POWER	BA9S/13 30V 1W
FUSE	UTSUNOMIYA ELECTRIC TYPE:NC0 RATED BREAK CURRENT AC500V 20KA	UTSUNOMIYA ELECTRIC TYPE:UC1 RATED BREAK CURRENT AC500V 50KA
INNER WIRING	SOURCE : SYP-0.6/1KV UL1015-600V (AWG16) CONTROL : UL1015-600V (AWG18) UL1007-300V (AWG20)	MAIN : SYP-0.6/1KV CONTROL : UL1015-600V (AWG18)
REMARKS		

④	⑤	⑥			FILE NO. 001-ESP
① 2008/10/17	②	③			
株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE SPECIFICATIONS		DWG. NO. 0806-014-01		GS

NOTICE / CONSTRUCTION MANUAL

1. Please do not perform MEGGER TEST of ECSU-AM1, SPEED RELAY and AC/DC convertor.

   ECSU-AM1、スピードリレー 及び AC/DC コンバーターのメガーテストは行わないで下さい。

2. Confirm that all wires are adequate voltage and polarity for each terminal before ture the power source.

   最初の電源投入時は規定された端子にその電圧の線が接続されているか、又極性が正常であるか確認してから電源スイッチを ON にして下さい。

3. Don't touch DIP switchs (SW 1-1～4 、SW 2-1～8) on ECSU to avoid malfunction. If turn them by mistake, turn back according to connection diagram.

   デップスイッチ (SW 1-1～4 , SW 2-1～8) は誤動作を避ける為、触らないで下さい。
   誤まって触った時は、接続図を見て元に戻してください。

4. Although the CPU has reset function itself for CPU abnormal condition, turn OFF the power switch in case it does not recover by itself for a long time. That may recover the CPU.

   CPU の異常発生時、CPU 内部にリセット機能が装備されておりますが長時間自己復帰しない場合は電源スイッチを OFF にしてリセットして下さい。
   正常復帰する場合があります。

5. Use a contact signal that is output from a ECSU to both MAIN SWITCH BOARD and ALARM MONITORING SYSTEM, only in the DC24V circuit irrespective of its current value.

   Resister load : DC30V 1A
   Induction load : DC30V 0.2A (use with surge absorber is required)

   ECSU より主配電盤及びアラームモニタリングシステムに出力している接点信号は電流値に係わらず DC24V の回路でご使用願います。

   抵抗負荷 : DC30V 1A
   誘導負荷 : DC30V 0.2A (サージキラーを装備の事)

   A contact signal for use in an AC100 ～ 220V circuit is arranged to be connected to a relay provided outside a ECSU-AM1.

   AC100 ～ 220V の回路で使用する接点信号は ECSU-AM1 外にリレーを設けて接続致します。

6. Please insulate the shield wire of MAGNETIC PICK-UP with vinyl tape not to do ground. When a shield wire contacts it, a ground of N phase is detected by the monitor device side.

   マグネテックピックアップのシールド線は地絡しない様にビニールテープ等で絶縁して下さい。
   シールド線が地絡すると N 相のアースが監視器側に検出されます。

7. The connection diagram is given only for one unit of engine because the circuit is identical each engine.

   接続図は各機関に於いて回路が同じである為、1台分を記載致します。

CONTROL & MONITORING OF GENERATOR ENGINE

SUBSECTION	ITEM	ENG SIDE OPERATION	GEN ENGINE CONT PANEL (BY YANMAR) OPERATION	GEN ENGINE CONT PANEL (BY YANMAR) CONTROL	GEN ENGINE CONT PANEL (BY YANMAR) INDICATION	ENG CONT CONSOLE (BY DOCK) OPERATION	ENG CONT CONSOLE (BY DOCK) INDICATION	ENG CONT CONSOLE (BY DOCK) ALARM(VISU, & AUDI,)	MAIN SWITCH BOARD (BY DOCK) OPERATION	MAIN SWITCH BOARD (BY DOCK) CONTROL	MAIN SWITCH BOARD (BY DOCK) INDICATION	MAIN SWITCH BOARD (BY DOCK) ALARM(VISU, & AUDI,)	REMARKS
CONTROL & SAFETY	ELECTRIC POWER		○		○								
	ENGINE START (AUTO/MANU)	○		○					○	◎			◎ AUTOMATIC
	ENGINE STOP (MANU)	○		○					○				Ⓐ ENG SIDE ⟷ REMOTE & AUTO
	CONTROL POSITION & MODE	Ⓐ			Ⓐ				Ⓑ		○		Ⓑ AUTO ⟷ MANU
	READY TO START				○						Ⓒ		Ⓒ WITH AUTO ST/BY
	ENGINE RUN				○		○				○		
	START FUEL LIMITATION			○									
	SAFETY S/DOWN: OVER SPEED			○	○			○					
	SAFETY S/DOWN: LO LOW PRESSURE			○	○			○				○	
	SAFETY S/DOWN: H/T FW HIGH TEMPERATURE			○	○			○					
	MANUAL EMERGENCY STOP		○	○	○	(○)		○					
	START FAILURE			○	○			○				○	
	START FAILURE & SHUTDOWN RESET	▣											▣ FO HANDLE TO STOP POSITION
	ALARM REPOSE						○						
PRESSURE	LO ENGINE INLET (LOW)						○	○					
	H/T FW ENGINE INLET (LOW)						○	○					
	STARTING AIR ENGINE INLET (LOW)						○	○					
	CONTROL AIR ENGINE INLET (LOW)							○					
	LO STRAINER DIFF PRESSURE (HIGH)							○					
TEMPERATURE	LO ENGINE INLET (HIGH)						○	○					
	H/T FW ENGINE OUTLET (HIGH)						○	○					
	EXH GAS T/C INLET (HIGH)						②	②					② 2POINT/ENGINE
LEVEL	FO HIGH PRESSURE PIPE LEAK (LEAK)							○					
	LO SUMP TANK (LOW)							○					
	FW EXPANSION TANK (LOW)							Ⓓ					Ⓓ DOCK SUPPLY
OTHER	ELECTRIC POWER FAILURE							○					
	CONTROL/SAFETY CPU FAULT							○					
	LO PRIMING PUMP START/STOP		○	○									
	LO PRIMING PUMP RUN				○		○						
	LO PRIMING FAILURE				○			○					
	LO PRIMING PUMP EMERGENCY STOP									○			
	ENGINE STOP MV FAULT				○			Ⓕ					Ⓕ SHUTDOWN SYSTEM FAILURE (ONE COMMON ALARM IND)
	SPEED DETECTOR ABNORMAL				○			Ⓕ					
	LO L/P S/DOWN SENSOR FAULT				○			Ⓕ					
	FW H/T S/DOWN SENSOR FAULT				○			Ⓕ					
	FO VISCOSITY (HIGH/LOW)						Ⓓ	Ⓓ					

GS

DWG. NO. 0806-014-03

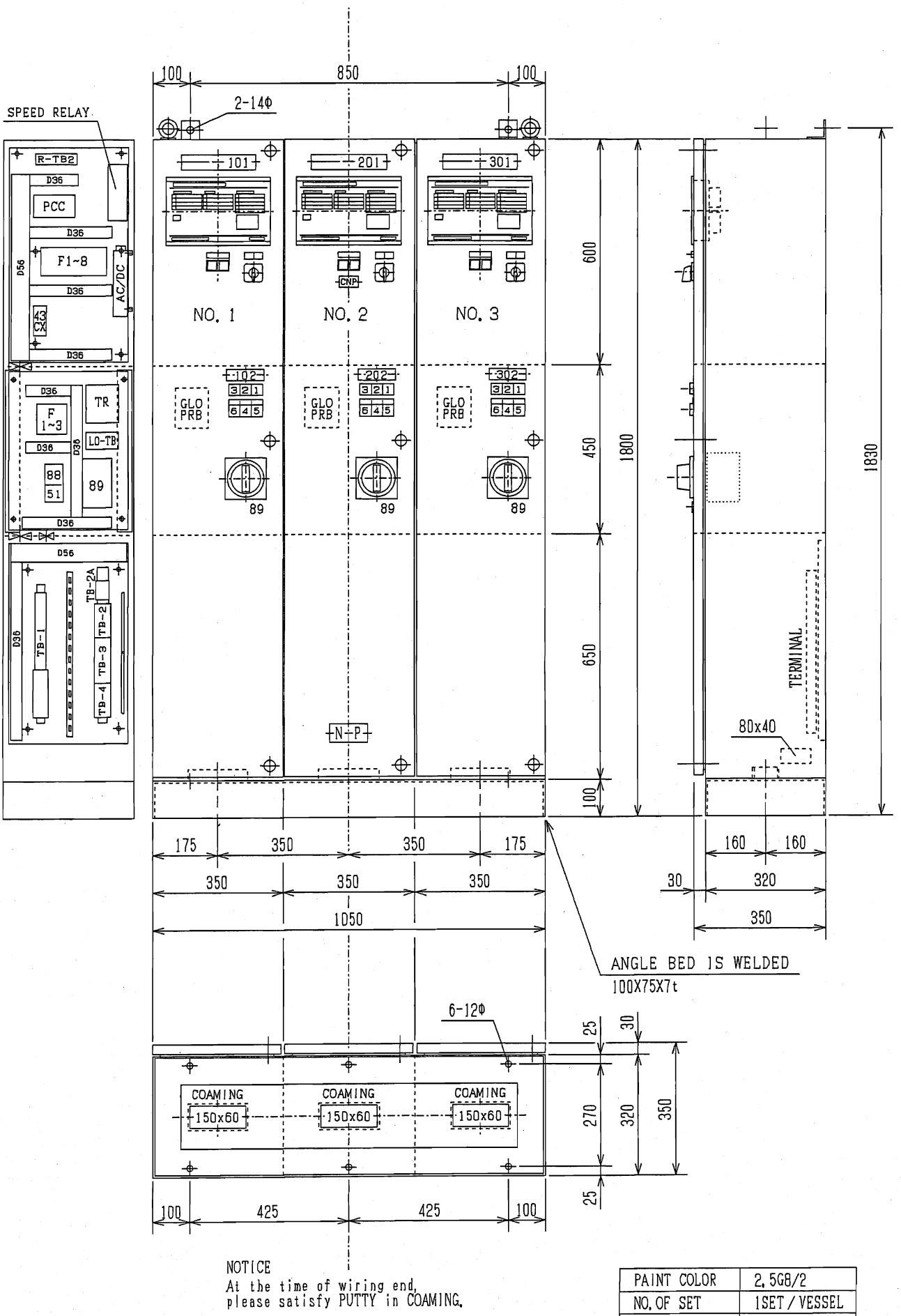
TITLE DISPLAY TABLE

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG.CO.,LTD.

FILE NO. 003-EDI

6EY18L(AL)

SHEET NO. (3)



NOTICE
At the time of wiring end,
please satisfy PUTTY in COAMING.

PAINT COLOR	2.5G8/2
NO. OF SET	1SET / VESSEL
TOTAL MASS	ABOUT 258Kg
PROTECTION	IP44

DWG. NO.	0806-014-04
	OV
TITLE	GENERATOR ENGINE CONTROL PANEL
	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.
FILE NO.	004-EPO
	6EY18L(AL)
2008/10/17	

ENGINE CONTROL / SAFETY UNIT

POWER & LOCATION	
WL	CONTROL / SAFETY POWER
WL	REMOTE / AUTO
WL	ENGINE SIDE
WL	

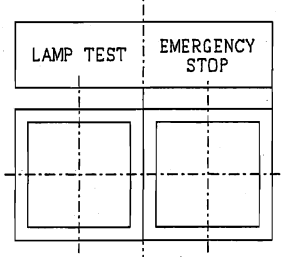
OPERATION	
BL	READY TO START
GL	ENGINE RUN
RL	START FAILURE
RL	MANUAL EMERGENCY STOP

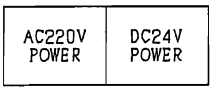
SAFETY SHUTDOWN	
RL	OVER SPEED
RL	LO LOW PRESSURE
RL	H/T FW HIGH TEMPERATURE
RL	
RL	

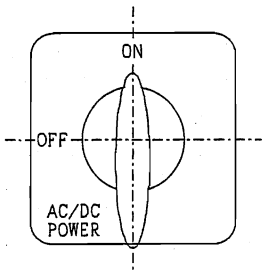
CPU RUN
- ○ CONTROL
- ○ SAFETY

SHUTDOWN SYSTEM FAILURE
- ○ ENG STOP MAGNETIC VALVE
- ○ SPEED DETECTOR
- ○ LO PRESSURE SENSOR
- ○ H/T FW TEMPERATURE SENSOR
- ○
- ○
- ○

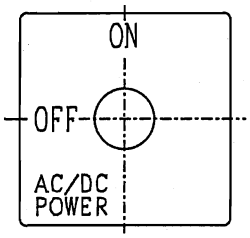
HANSHIN ELECTRIC MFG. CO., LTD. TYPE:ECSU-AM1







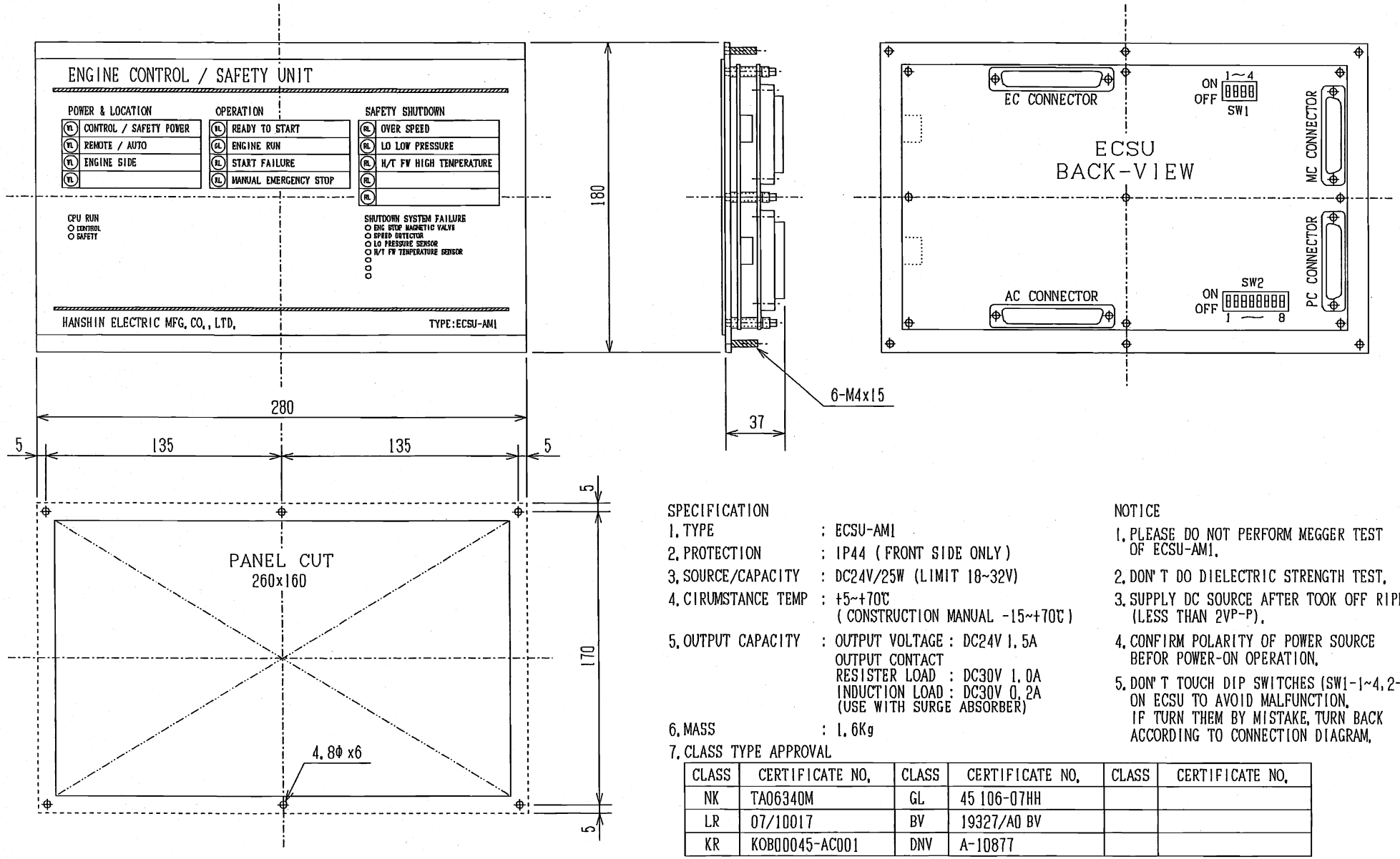
DWG. NO.	0806-014-05
	0V
TITLE	PARTS ARRANGEMENT OF ENGINE CONTROL PANEL
	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.
FILE NO.	005-EPA
	6EY18L(AL)

NO.	SYMBOL	NAME PLATE (LETTER)		NOTICE	SIZE	Q'TY
101		NO.1 GENERATOR ENGINE	CONTROL PANEL		200x40	1
201		NO.2 GENERATOR ENGINE	CONTROL PANEL			
301		NO.3 GENERATOR ENGINE	CONTROL PANEL			
CNP		CAUTION SHUTDOWN CONDITION RESET IS DONE BY FO HANDLE MOVING TO THE STOP POSITION.			50x30	1
	PB-E	LAMP TEST (PB-LT)	EMERGENCY STOP (PB-E)		60x15	3
	PB-LT					
	WL-A	AC220V	POWER		19.8x13.8	
	WL-D	DC24V	POWER			
	SW				48x48	3

NO.	SYMBOL	NAME PLATE (LETTER)		NOTICE	SIZE	Q'TY
102		NO.1 G/E LO PRIMING PUMP			100x25	1
202		NO.2 G/E LO PRIMING PUMP				
302		NO.3 G/E LO PRIMING PUMP				
1	WL-L	AC440V	POWER		20.8x20.8	3
2	GL-L	RUN				
3	RL-L	PRIMING	FAILURE			
4	03LC	L/P RESET (PB-LR)	START (03LC)	STOP (03LT)	90x15	3
5	03LT					
6	PB-LR					

④	⑤	⑥			FILE NO. 006-NPT
①	②	③			

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE NAME PLATE TABLE	DWG. NO. 0806-014-06	NP



SPECIFICATION

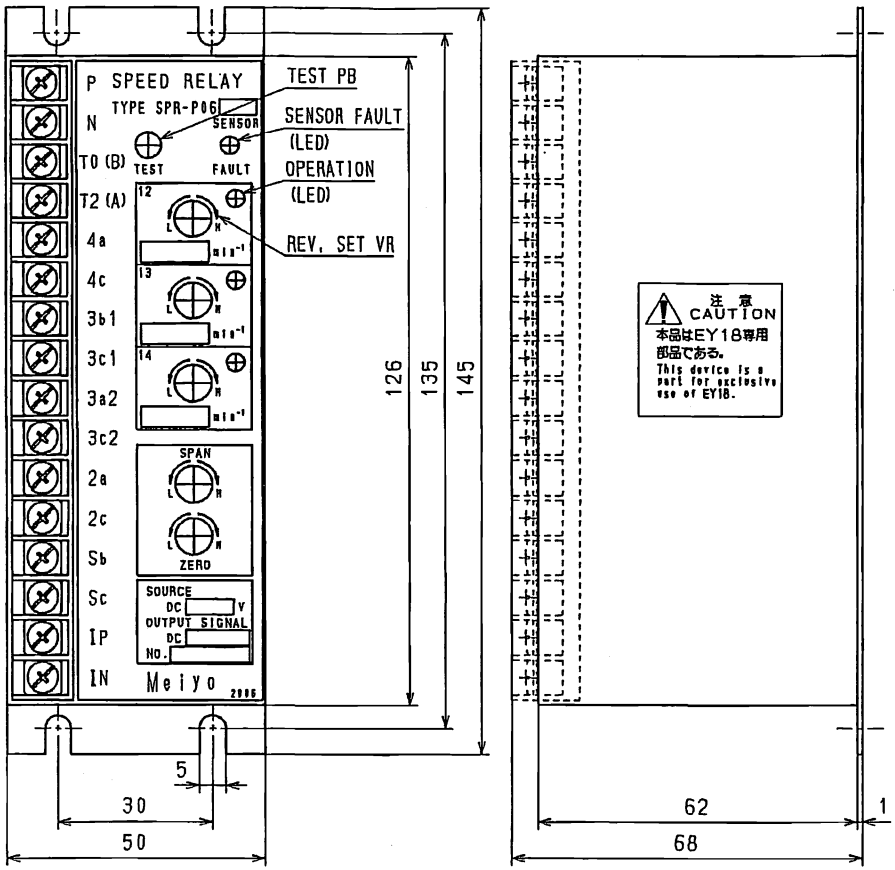
1. TYPE : ECSU-AM1
2. PROTECTION : IP44 (FRONT SIDE ONLY)
3. SOURCE/CAPACITY : DC24V/25W (LIMIT 18~32V)
4. CIRUMSTANCE TEMP : +5~+70℃
   (CONSTRUCTION MANUAL -15~+70℃)
5. OUTPUT CAPACITY : OUTPUT VOLTAGE : DC24V 1.5A
   OUTPUT CONTACT
   RESISTER LOAD : DC30V 1.0A
   INDUCTION LOAD : DC30V 0.2A
   (USE WITH SURGE ABSORBER)
6. MASS : 1.6Kg
7. CLASS TYPE APPROVAL

CLASS	CERTIFICATE NO.	CLASS	CERTIFICATE NO.	CLASS	CERTIFICATE NO.
NK	TA06340M	GL	45106-07HH		
LR	07/10017	BV	19327/A0 BV		
KR	KOB00045-AC001	DNV	A-10877		

NOTICE

1. PLEASE DO NOT PERFORM MEGGER TEST OF ECSU-AM1.
2. DON'T DO DIELECTRIC STRENGTH TEST.
3. SUPPLY DC SOURCE AFTER TOOK OFF RIPPLE (LESS THAN 2VP-P).
4. CONFIRM POLARITY OF POWER SOURCE BEFOR POWER-ON OPERATION.
5. DON'T TOUCH DIP SWITCHES (SW1-1~4, 2-1~8) ON ECSU TO AVOID MALFUNCTION. IF TURN THEM BY MISTAKE, TURN BACK ACCORDING TO CONNECTION DIAGRAM.

△4	△5	△6		6EY18L(AL)	FILE NO. 007-ECS	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE ENGINE CONTROL/SAFETY UNIT	DWG. NO. 0806-014-07	0V
△1 2008/10/17	△2	△3							



SPECIFICATIONS

1.CONSTRUCTION: ALL OF THE PARTS ARE ON THE PRINTED CIRCUIT BOARD IN THE STEEL CASE. THE PRINTED CIRCUIT BOARD IS CONSTRUCTED WITH ELECTRIC PARTS ETC. AND HAS HIGHT RELIANCE.

2.CONTACT OUTPUT: CONTACT ITEM(14:START REV. DETECTION, 13:CONSTANT REV. DETECTION 12:OVER SPEED DETECTION, SC:DETECTOR FAULT)
CONTACT CAPACITY(AC100V/DC24V 0.5A)

3.SOURCE: DC24V, 2.2W(OPERATION LIMIT DC18~32V)

4.MEASURING TOLERANCE:±1.0% at F.S.

5.CIRCUMSTANCE TEMP.: -15~70℃

6.CASE SURFACE: BC PLATE

TYPE : SPR-P06I

OPERATION MANUAL

1.GENERAL

ONE SPEED RELAY DETECTS 3 POSITIONS OF REVOLUTION AND DETECTOR FAULT. AND, IT ALLOWS CONNECTING REVOLUTION INDICATOR.

2.OPERATION

(a) SPEED DETECTION:INPUT SIGNAL IS NUMBER OF FREQUENCY PULSE FROM THE MAGNETIC REVOLUTION DETECTOR SET ON THE ENGINE.

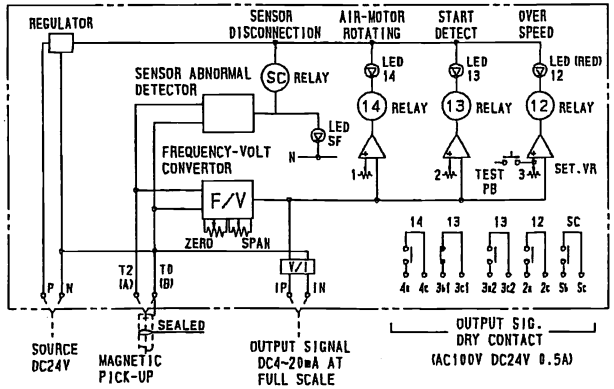
(b) SIGNAL CONVERTING, AMPLIFICATION:TO DETECT FREQUENCY WHICH IS IN PROPORTION TO REVOLUTION AND CONVERT TO DC VOLTAGE WHICH IS IN PROPORTION TO FREQUENCY BY FREQUENCY-VOLTAGE CONVERTER. TO AMPLIFY THIS DC VOLTAGE, AND OUTPUT AS VOLTAGE SIGNAL.

(c) COMPARISON WITH BASIC VOLTAGE:THE OUTPUT RELAY WORKS AND LED LIGHTS ON AT INPUT SIGNAL BECOMES HIGHER THAN BASIC VOLTAGE.

3.ADJUSTMENT

(a) TO TURN THE ADJUSTMENT VOLUME TO CCW, OPERATING POINT DOWN. TO TURN THE ADJUSTMENT VOLUME TO CW, OPERATING POINT UP.

(b) KEEP AN ENGINE REVOLUTION AT OPERATING POINT. TURN THE ADJUSTMENT VOLUME SLOWLY FROM HIGH POSITION TO LOW POSITION AND STOP AT LED LIGHTS ON AND FIX IT.



OPERATION OF SC DRY CONTACT
1) NORMAL :ON
ABNORMAL:OFF
2) DETECTOR FAULT :OFF
3) NO VOLTAGE :OFF
4) CIRCUIT BOARD BLOKEN :OFF

NOTES

1.FIX THIS DEVICE IN A PANEL. CONNECT WIRES OF ELECTRIC SOURCE AFTER CONFIRM THE POLE.
2.SUPPLY DC SOURCE AFTER TOOK OFF RIPPLE(LESS THAN $2V_{P-P}$).
3.SHORT ALL OF THE TERMINALS BEFORE DO INSULATION TEST. DON'T PUT OVER DC500V.
4.DON'T DO DIELECTRIC STRENGTH TEST.
5.DO THE TEST BY TEST PUSH BUTTON AT CONSTANT ENGINE REVOLUTION.
6.OPEN THE TERMINALS, WHICH ARE NOT USED.
7.USE A SEALED WIRE CABLE FOR CONNECTING FROM REVOLUTION DETECTOR TO THIS DEVICE.OUTPUT SIGNAL LINE CONNECT SEALED LINE TO THE TERMINAL OF "TO(B)". UN-CONNECTION OR MISS-CONNECTION CAUSES MISS-FUNCTIONS.
8.DON'T CONNECT SEALED LINE TO THE EARTH OF THE HULL,JUNCTION BOXES,PANELS OR DEVICES AND KEEP ISOLATED FROM THEM BY ISOLATOR FOR EXAMPLE VINYL TAPE. LOOSING THIS MATTER,IT CAUSES DEVICE ERROR OR FIRE.
9.DON'T MOVE THE ZERO AND SPAN ADJUSTMENT VOLUME. THEY ARE PRE-ADJUSTED.
10."SC" DRY CONTACT CLOSE AT NORMAL CONDITION,AND OPEN AT NO VOLTAGE,DETECTOR FAULT, AND CIRCUIT BOARD BLOKEN.

CLASS TYPE APPROVAL

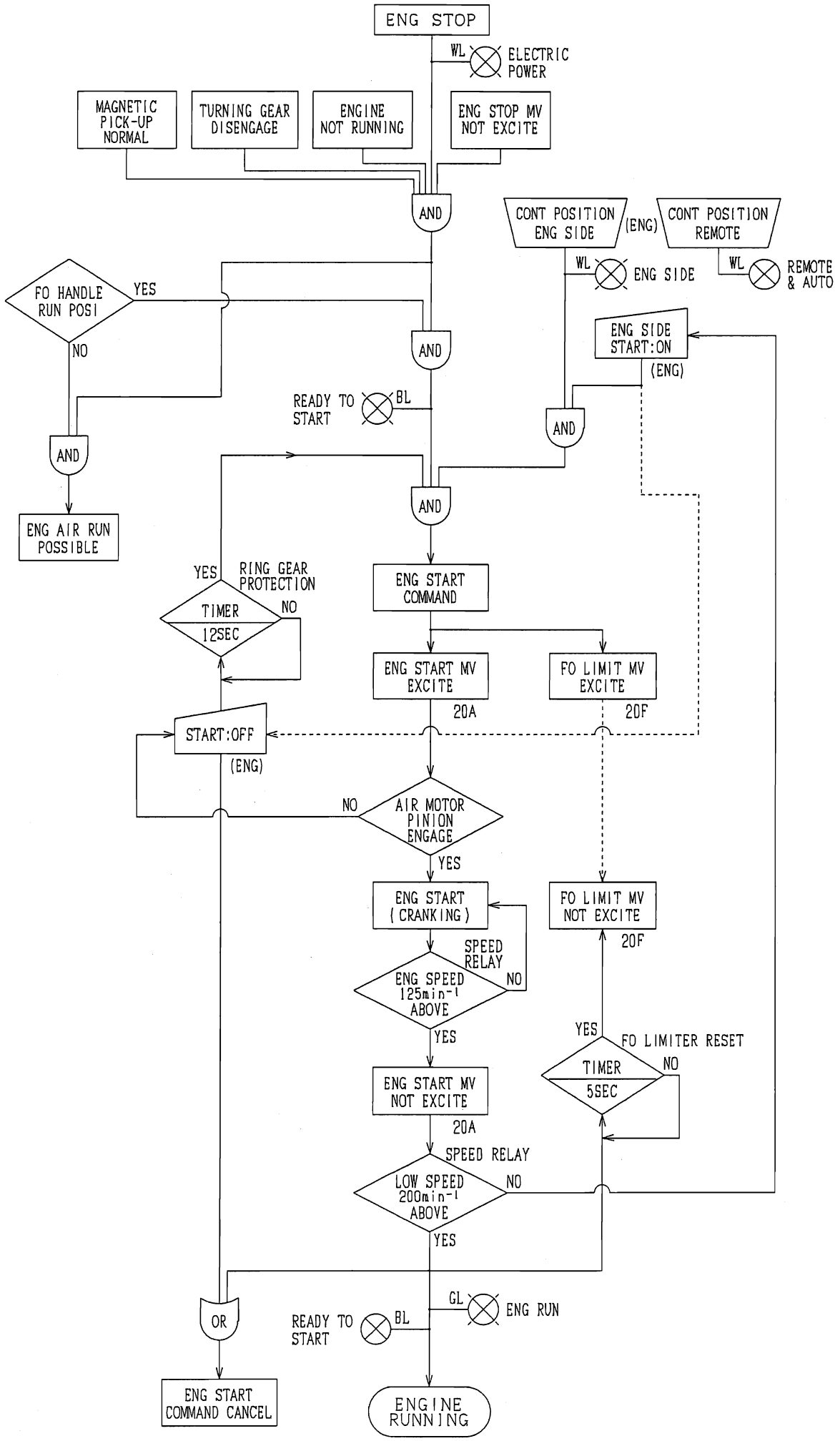
CLASS	TYPE	CERTIFICATE NO.	REMARKS
NK	SPR-P06V or SPR-P06I	A-483	
LR		99/10028	
CCS		DBA00230109	
GL		33 685-06HH	

SPEED RELAY FOR EY18 (FOR MAGNETIC PICK-UP)

ヤンマー株式会社
YANMAR CO., LTD.

DWG. No. B3-00009-524E

ENGINE SIDE START OPERATION



DWG. NO. 0806-014-09

TITLE OPERATION FLOW CHART

株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG.CO., LTD.

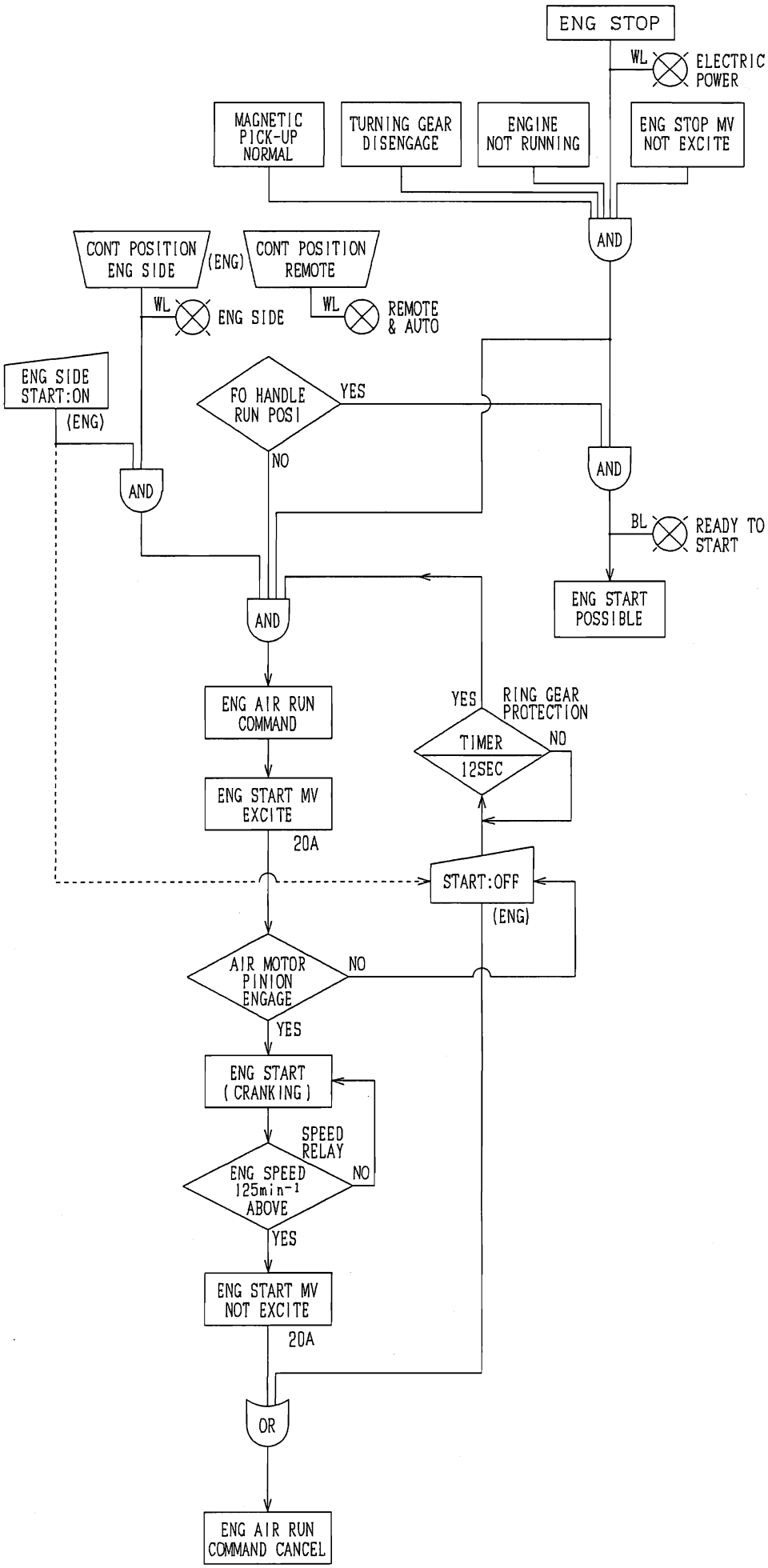
FILE NO. 009-EFI

6EY18L(AL)

FL

SHEET NO. (9)

ENGINE AIR RUN OPERATION (ENG SIDE)



DWG. NO. 0806-014-10 FL

TITLE OPERATION FLOW CHART

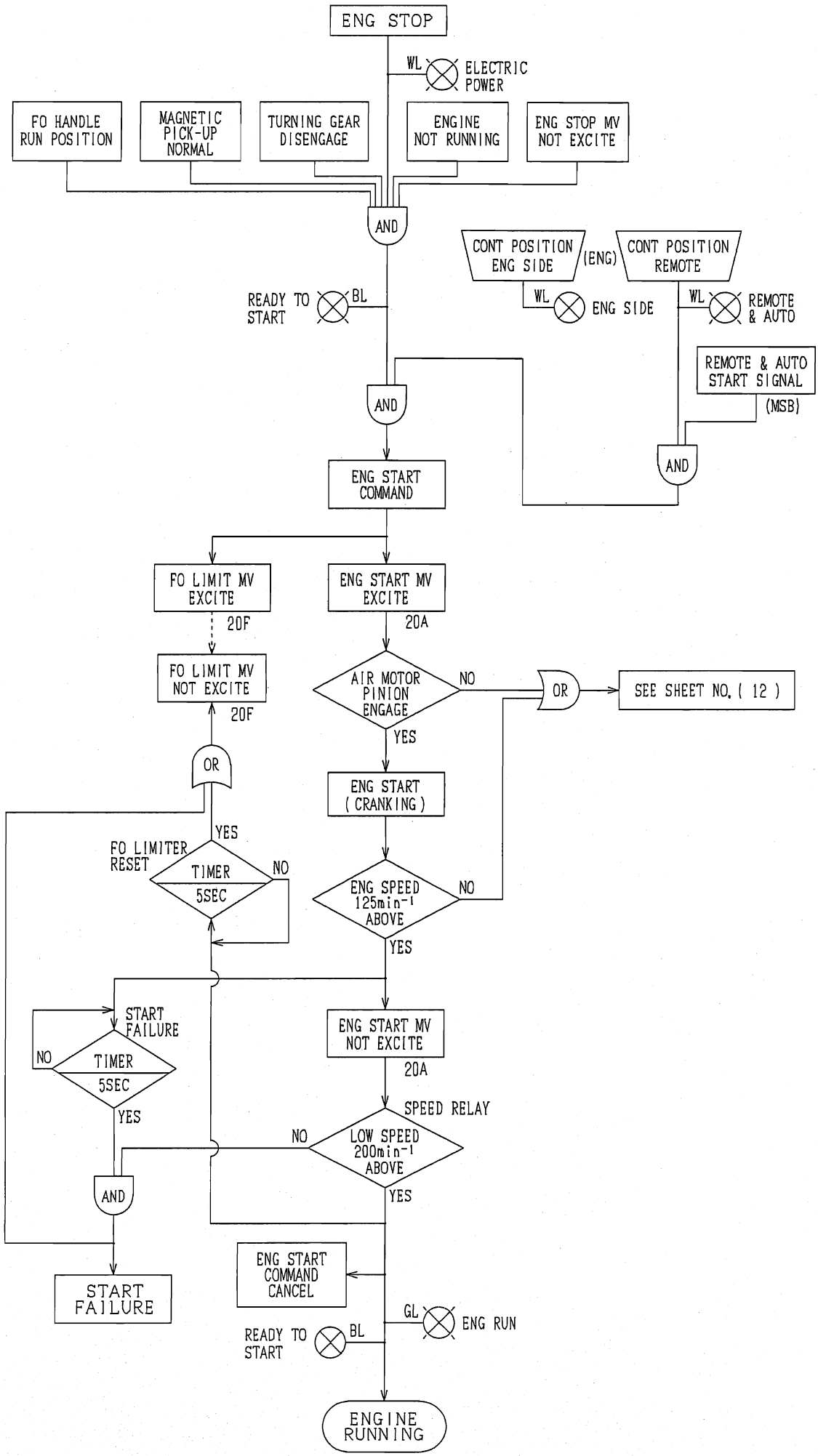
株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG.CO.,LTD.

FILE NO. 010-EF2

6EY18L(AL)

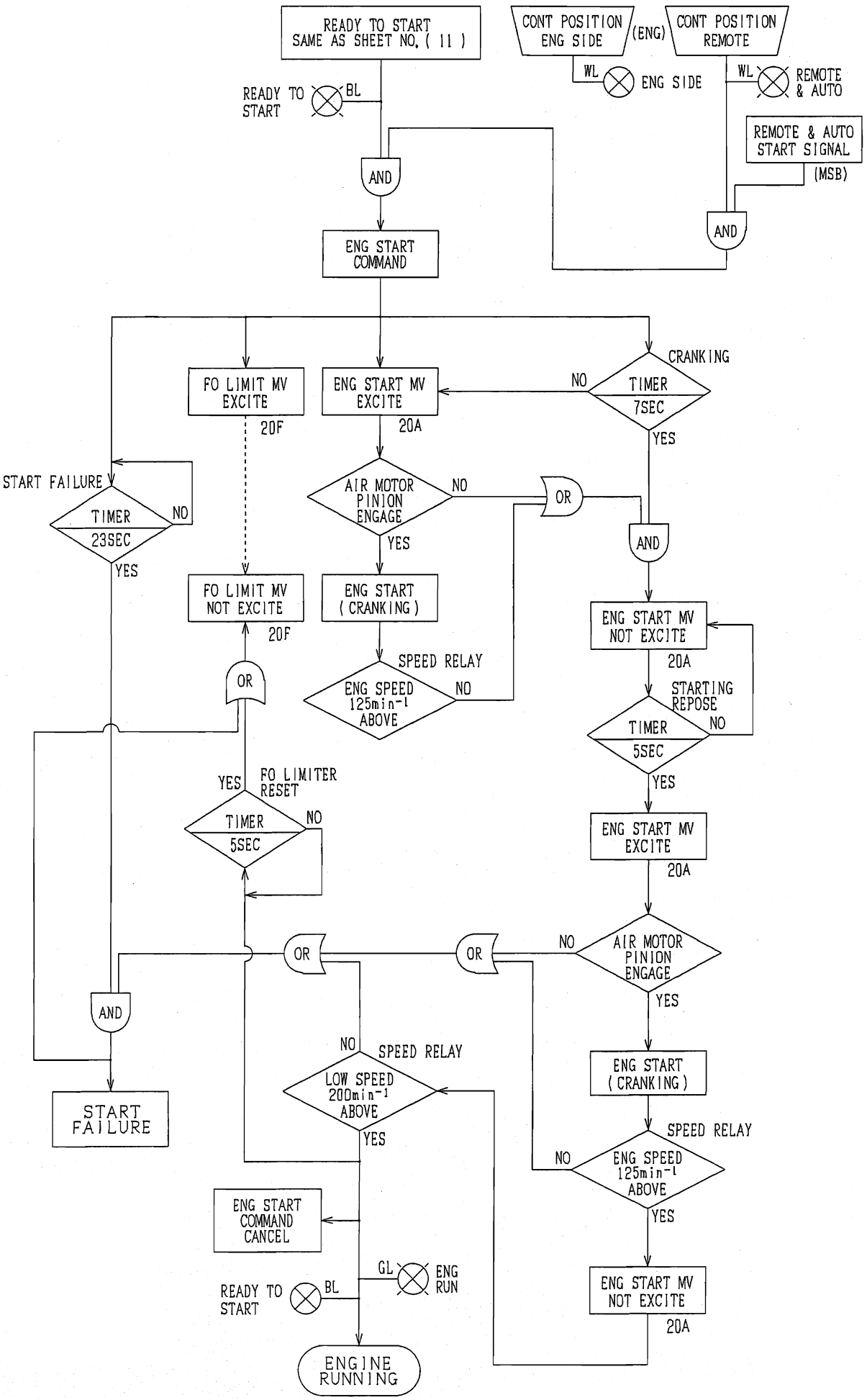
SHEET NO. (10)

REMOTE/AUTO START OPERATION
(1ST CRANKING SPEED 125min⁻¹ ABOVE)



DWG. NO. 0806-014-11
SHEET NO. (11)
FL
TITLE OPERATION FLOW CHART
株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG. CO., LTD.
FILE NO. 011-EF3
6EY18L(AL)

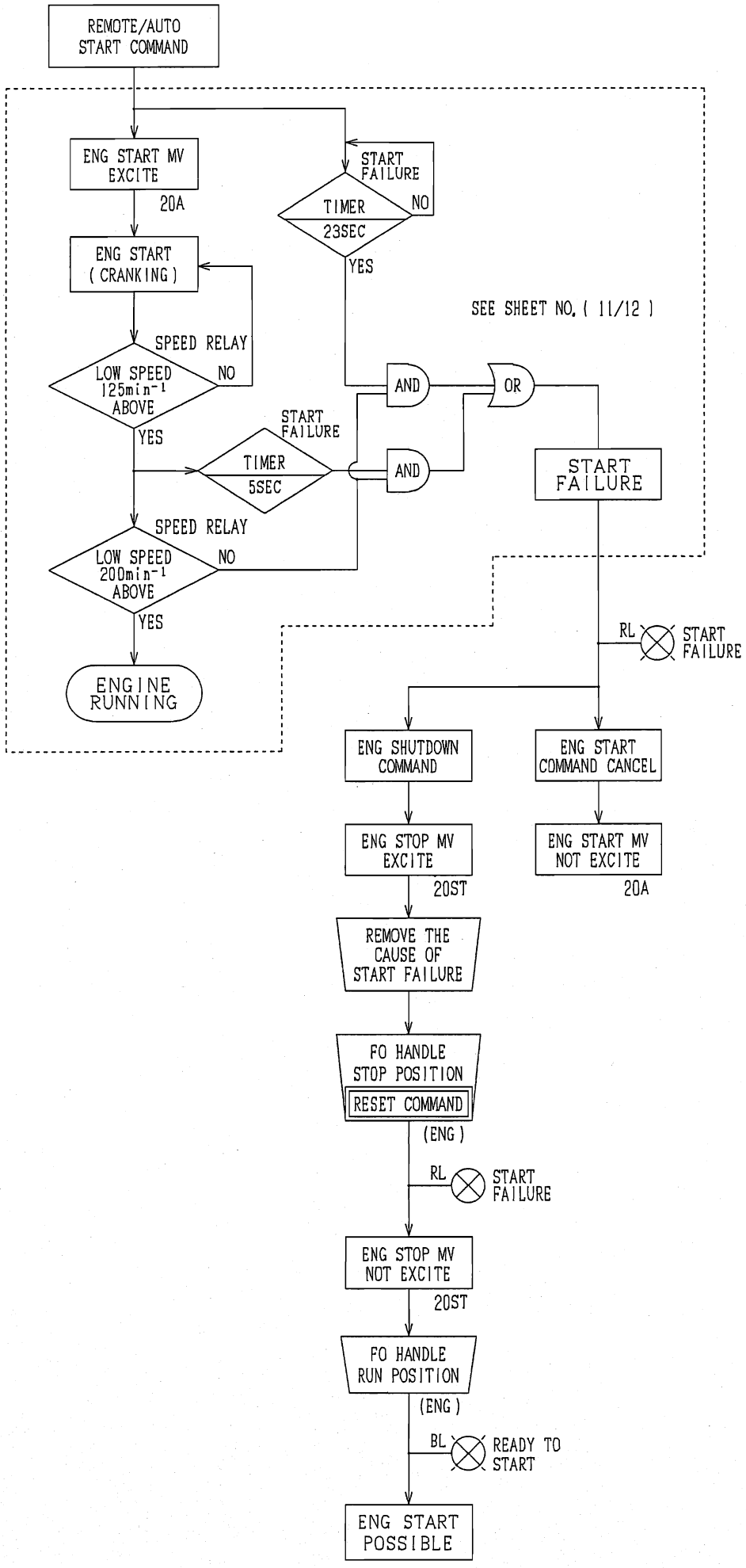
REMOTE/AUTO START OPERATION
(1ST CRANKING SPEED 125min-1 LESS)



DWG. NO.	0806-014-12
TITLE	OPERATION FLOW CHART
	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.
FILE NO.	012-EF4
	6EY18L(AL)
	FL

SHEET NO. (12)

START FAILURE OPERATION



DWG. NO. 0806-014-13 FL

TITLE OPERATION FLOW CHART

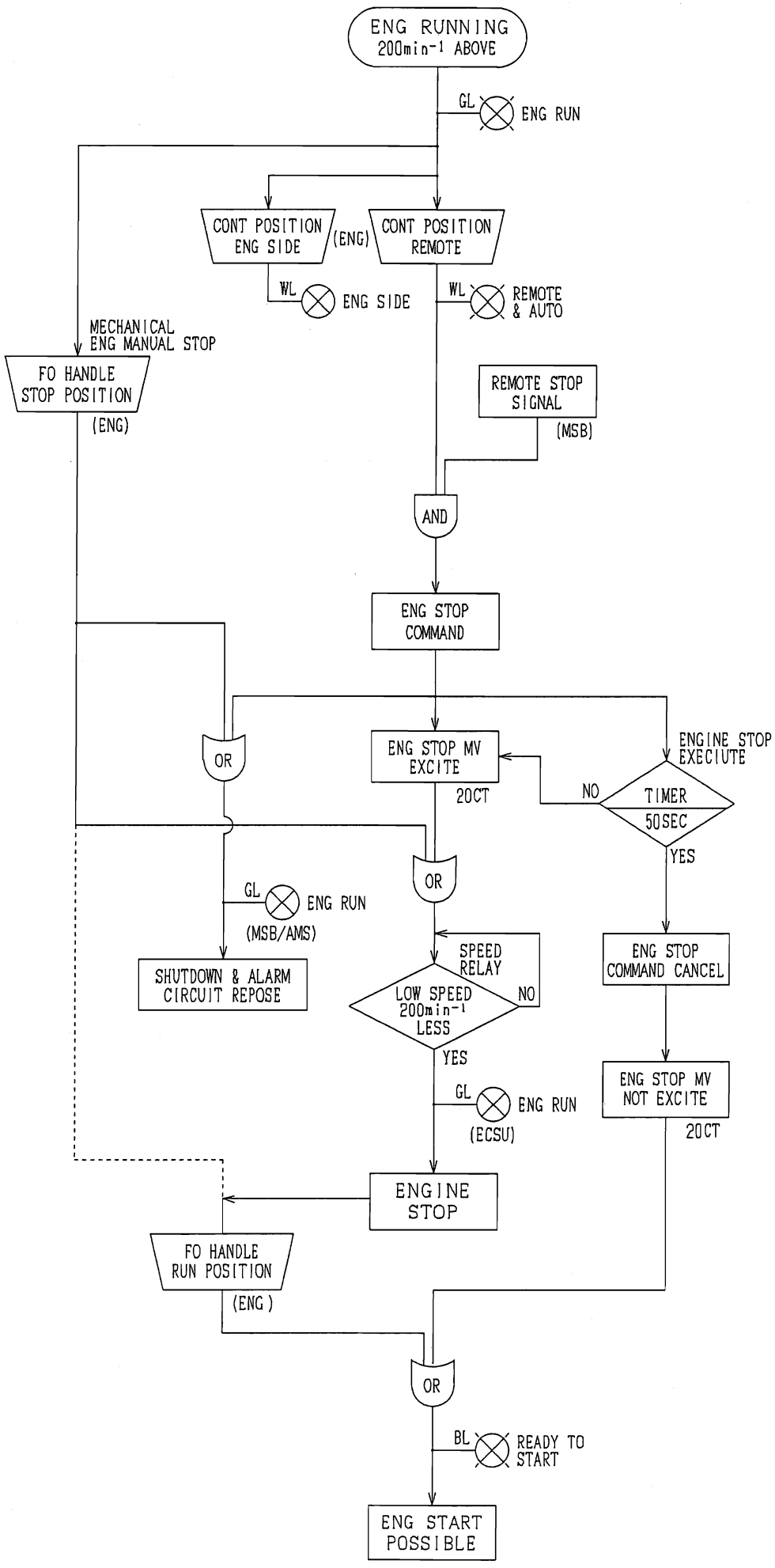
株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 013-EF5

6EY18L(AL)

SHEET NO. (13)

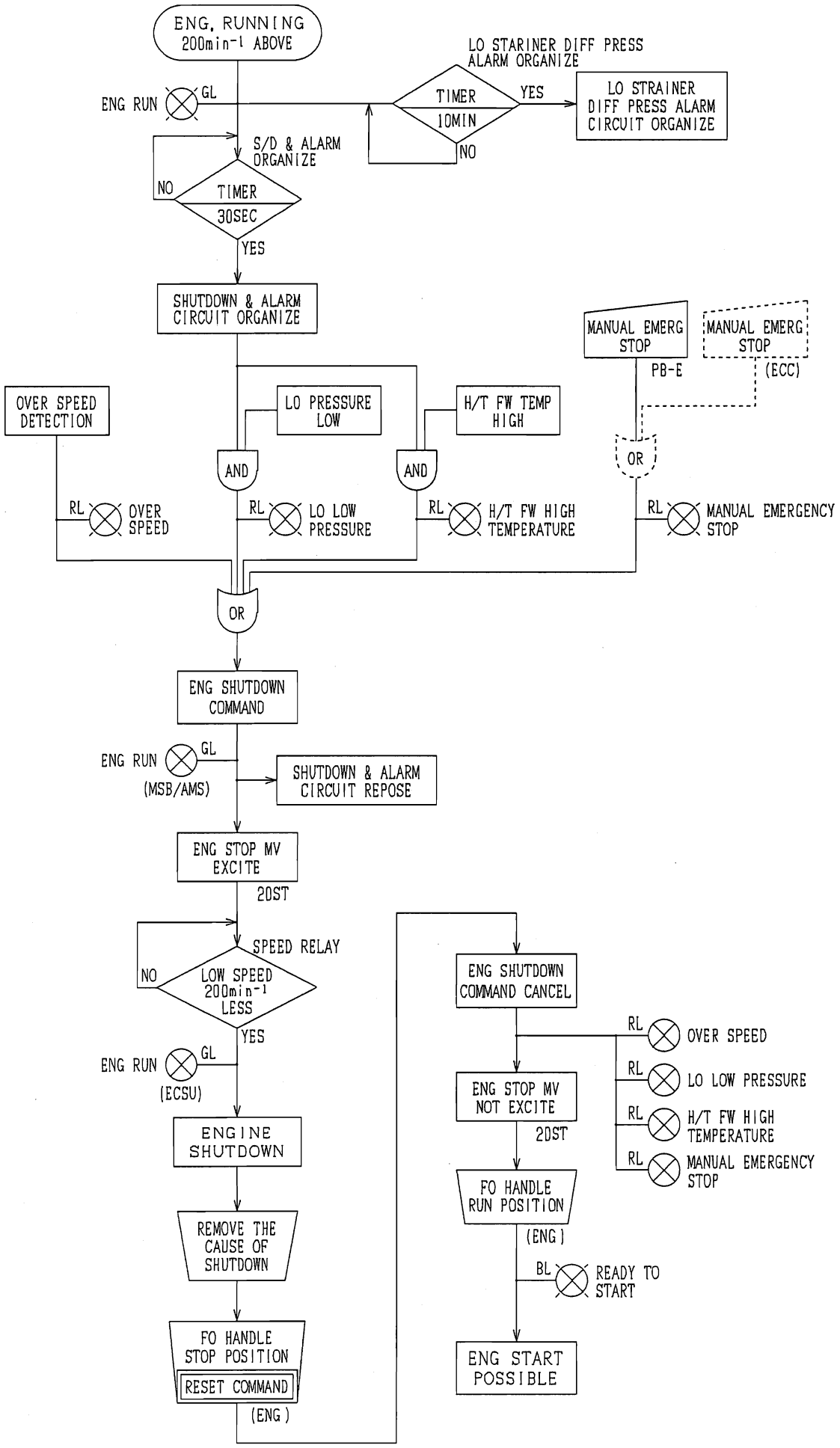
ENGINE MANUAL STOP OPERATION



DWG. NO.	0806-014-14
TITLE	OPERATION FLOW CHART
	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG, CO., LTD.
FILE NO.	014-EF6
	6EY18L(AL)

FL

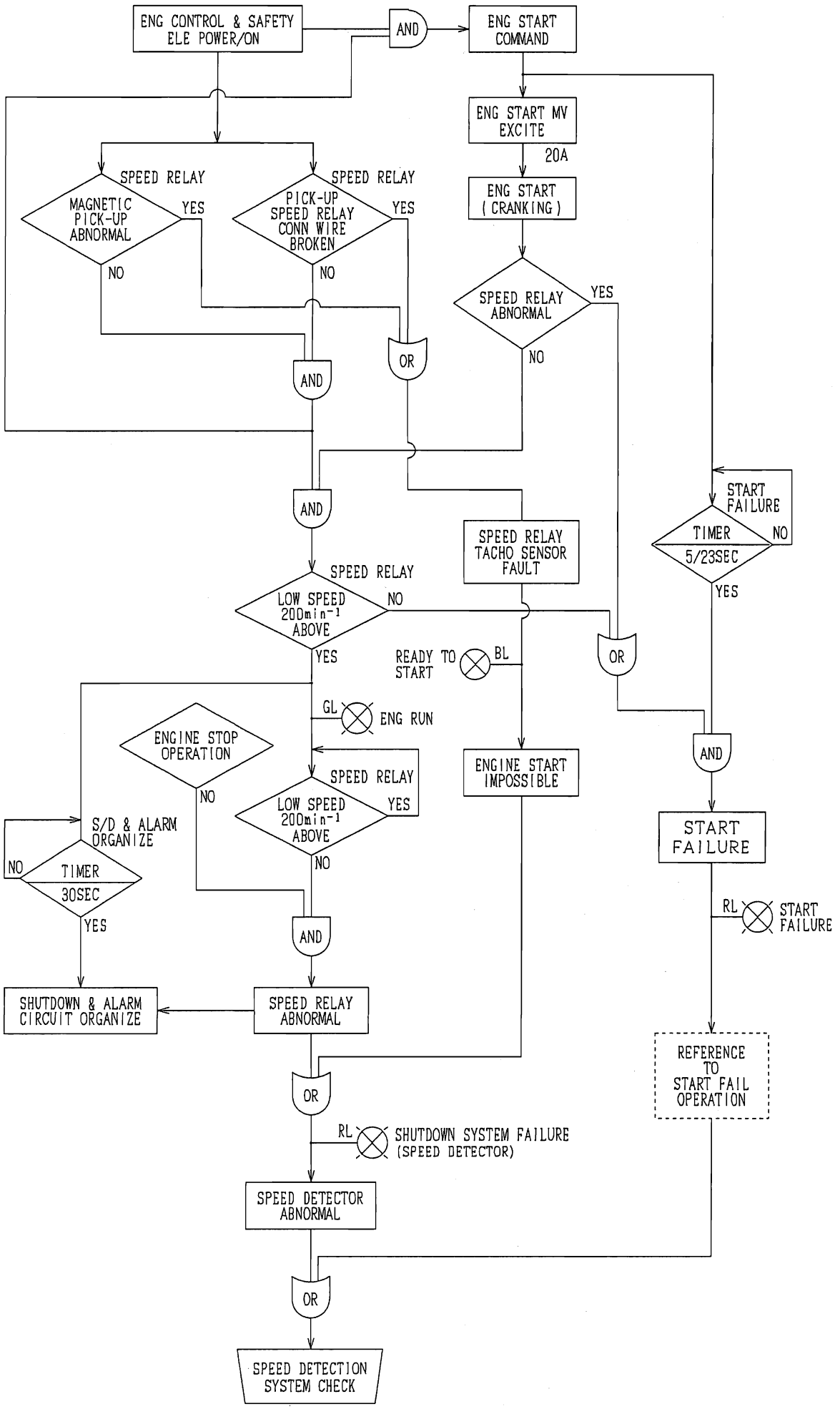
ENGINE SHUTDOWN (TRIP) & ALARM ORGANIZE OPERATION



DWG. NO.	0806-014-15
FL	
TITLE	OPERATION FLOW CHART
株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	
FILE NO.	015-EF7
6EY18L(AL)	

SHEET NO. (15)

SPEED DETECTOR ABNORMAL (TACHO FAILURE)



DWG. NO. 0806-014-16 FL

SHEET NO. (16)

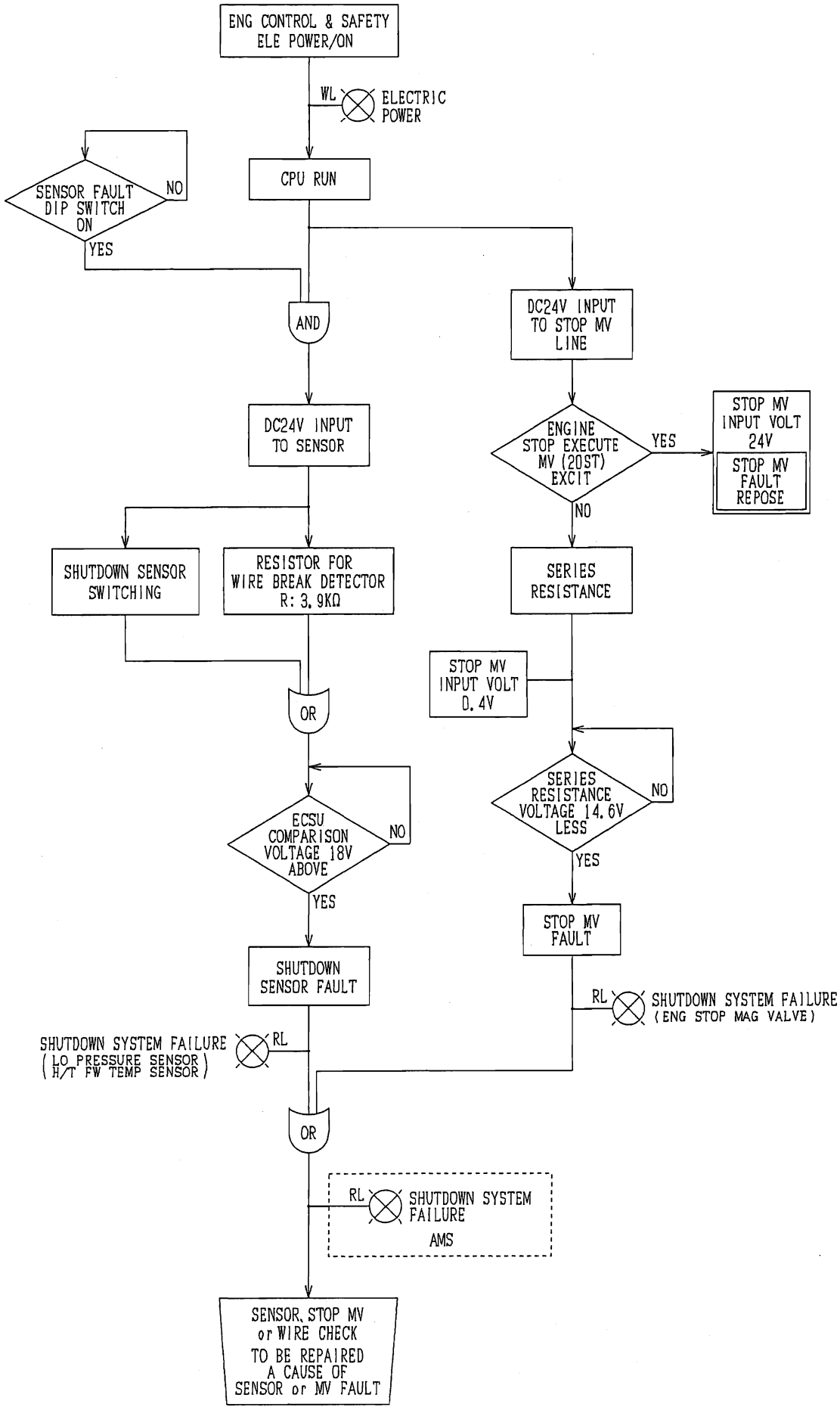
TITLE OPERATION FLOW CHART

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 016-EF8

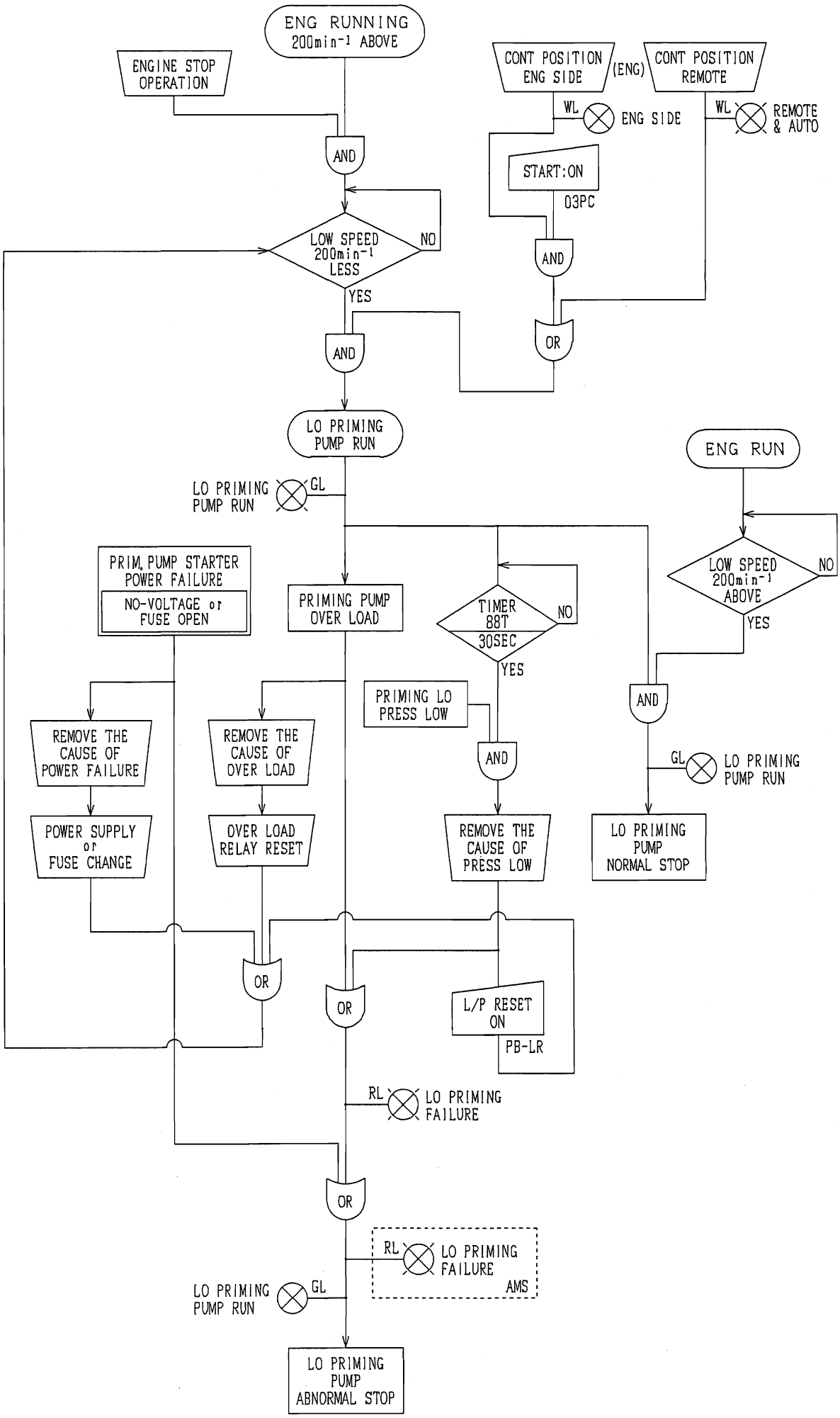
6EY18L(AL)

SHUTDOWN SENSOR & STOP MV FAULT (WIRE BREAK)



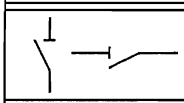
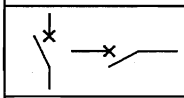
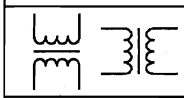
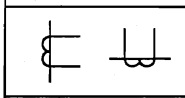
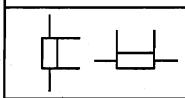
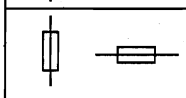
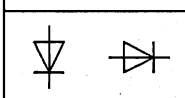
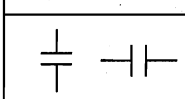
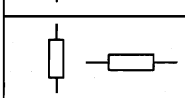
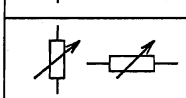
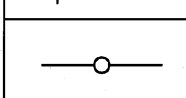
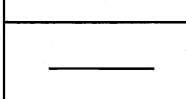
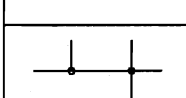
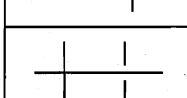
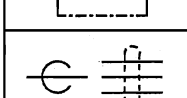
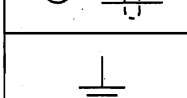
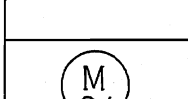
2008/10/17								FL
							DWG. NO.	0806-014-17
						TITLE	OPERATION FLOW CHART	
					株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.			
				FILE NO. 017-EF9				
			6EY18L(AL)					

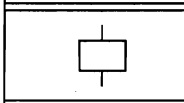
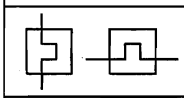
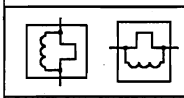
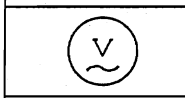
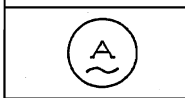
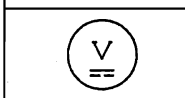
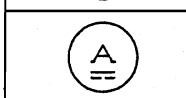
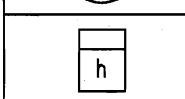
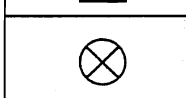
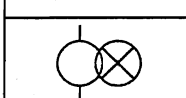
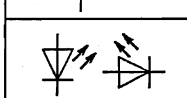
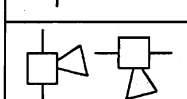
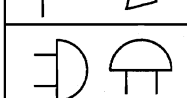
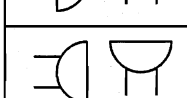
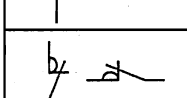
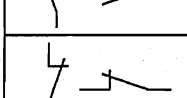
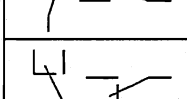
ENGINE LO PRIMING PUMP OPERATION

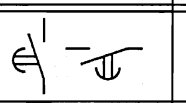
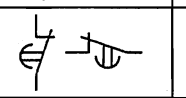
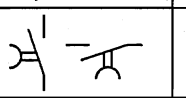


DWG. NO.	0806-014-18
TITLE	OPERATION FLOW CHART
	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG.CO.,LTD.
FILE NO.	018-EF10
	6EY18L(AL)
	FL

SHEET NO. (18)

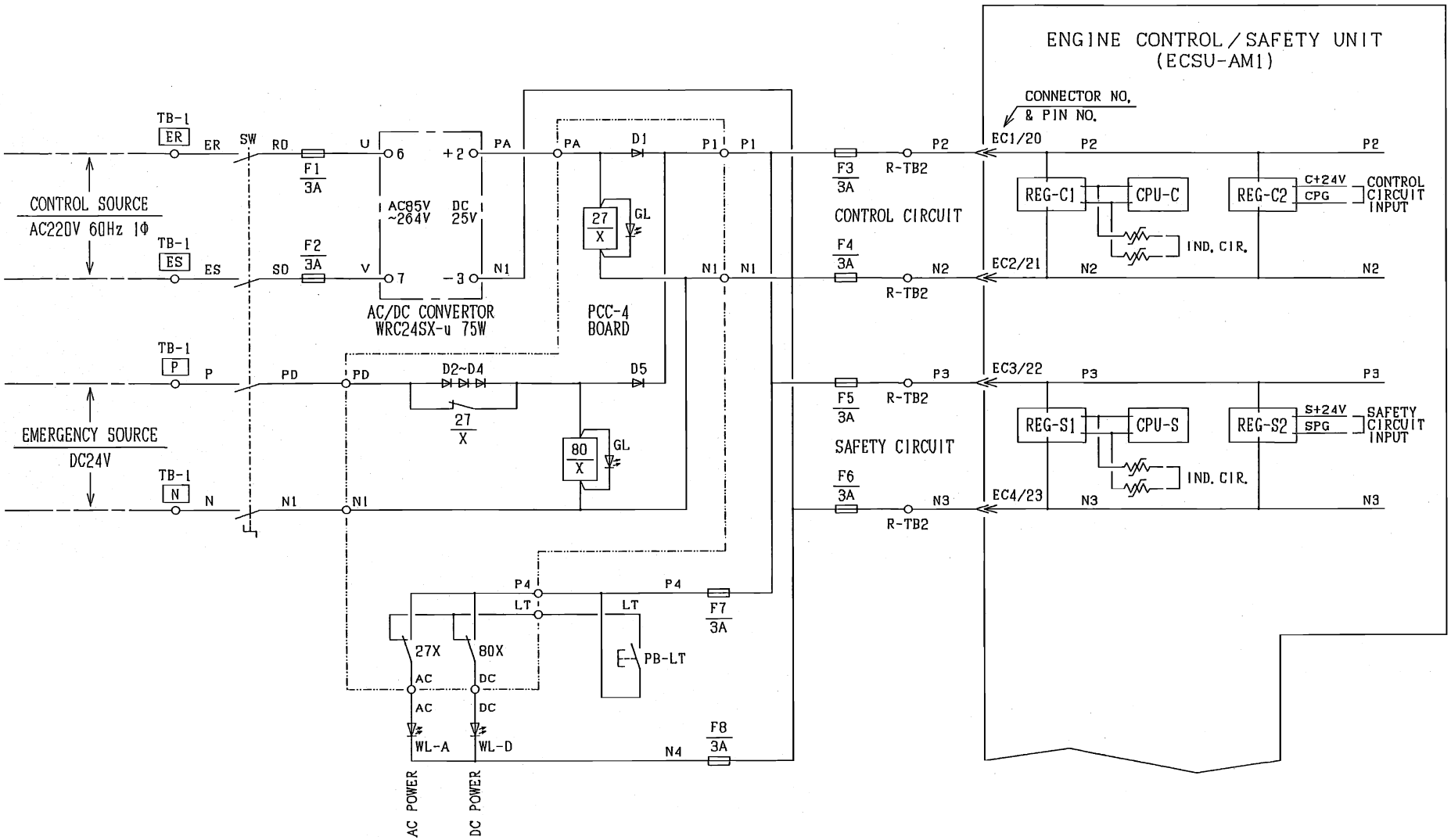
SYMBOL	DESCRIPTION
	DISCONNECTION SWITCH
	MAIN CIRCUIT BRAKER
	AC VOLTAGE TRANSFORMER
	AC CURRENT TRANSFORMER
	DC CURRENT TRANSFORMER
	FUSE
	DIODE
	CONDENSER
	RESISTOR
	ADJUSTABLE RESISTOR
	TERMINAL
	CABLE
	CONNECTED CABLE
	NOT CONNECTED CABLE
	SHIELD
	SHIELD CABLE
	EARTH
	AC MOTOR

SYMBOL	DESCRIPTION
	RELAY & TIMER COIL
	THERMAL RELAY
	THERMAL RELAY WITH REACTOR
	AC VOLTAGE METER
	AC CURRENT METER
	DC VOLTAGE METER
	DC CURRENT METER
	HOUR METER
	INDICATOR LAMP
	INDICATOR LAMP WITH TRANS
	LED
	HORN
	BELL
	BUZZER
	MAGNET MAIN N/O CONTACT
	MAGNET MAIN N/C CONTACT
	AUX RELAY N/O CONTACT
	AUX RELAY N/C CONTACT
	COMBINATION CONTACT

SYMBOL	DESCRIPTION
	ON TIME DELAY N/O CONTACT
	ON TIME DELAY N/C CONTACT
	OFF TIME DELAY N/O CONTACT
	OFF TIME DELAY N/C CONTACT
	FLICKER RELAY N/O CONTACT
	FLICKER RELAY N/C CONTACT
	MECHANICAL N/O CONTACT
	MECHANICAL N/C CONTACT
	CHANGE OVER SWITCH
	SELECTOR SW N/O CONTACT
	SELECTOR SW N/C CONTACT
	SELECTOR SW AUTO RETURN N/O CONTACT
	SELECTOR SW AUTO RETURN N/C CONTACT
	PUSH BUTTON MOMENTARY N/O CONTACT
	PUSH BUTTON MOMENTARY N/C CONTACT
	PUSH BUTTON MOMENTARY LAP N/O CONTA
	PUSH BUTTON MOMENTARY LAP N/C CONTA
	MANUAL RESET N/O CONTACT
	MANUAL RESET N/C CONTACT

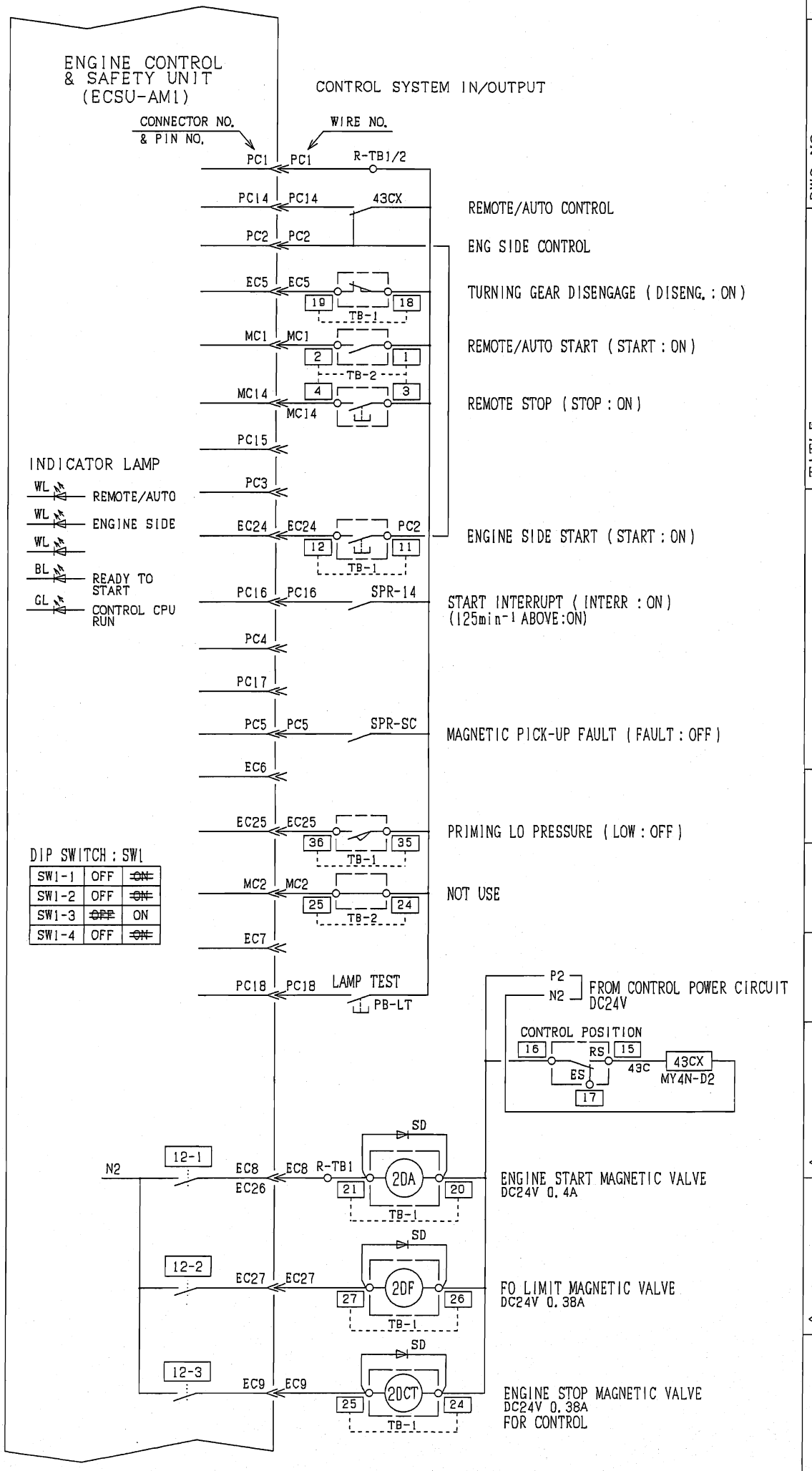
④	⑤	⑥			FILE NO. 019-ESY
①	②	③			

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE ELE SYMBOL DESCRIPTION	DWG. NO. 0806-014-19	CN



④	⑤	⑥		6EY18L(AL)	FILE NO. 020-ECP	株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE GENERATOR ENGINE CONTROL PANEL	DWG. NO. 0806-014-20	CN
①	②	③							

SHEET NO. (20)



DWG. NO. 0806-014-21

TITLE GENERATOR ENGINE CONTROL PANEL

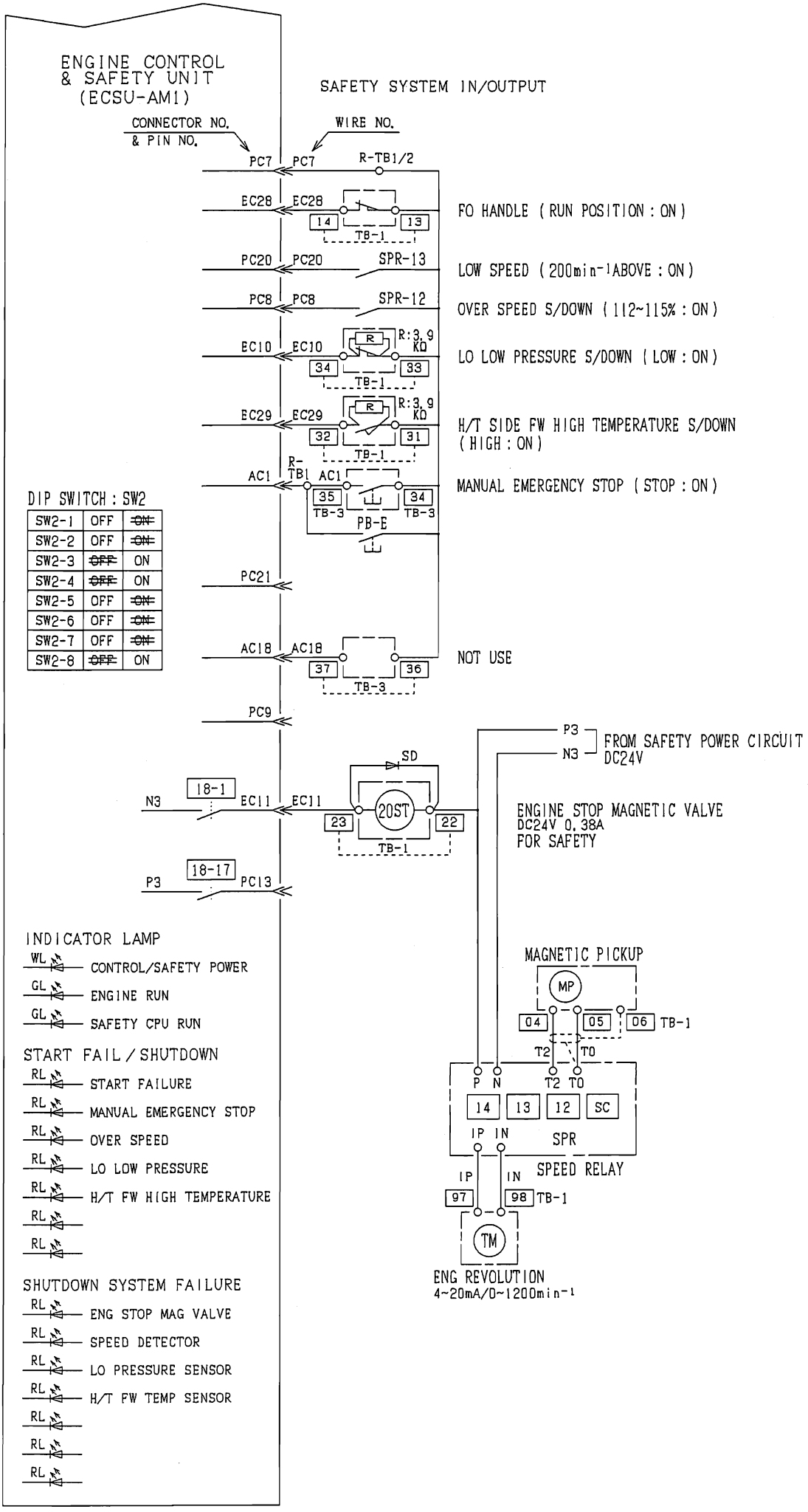
株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG.CO., LTD.

FILE NO. 021-ECC

6EY18L(AL)

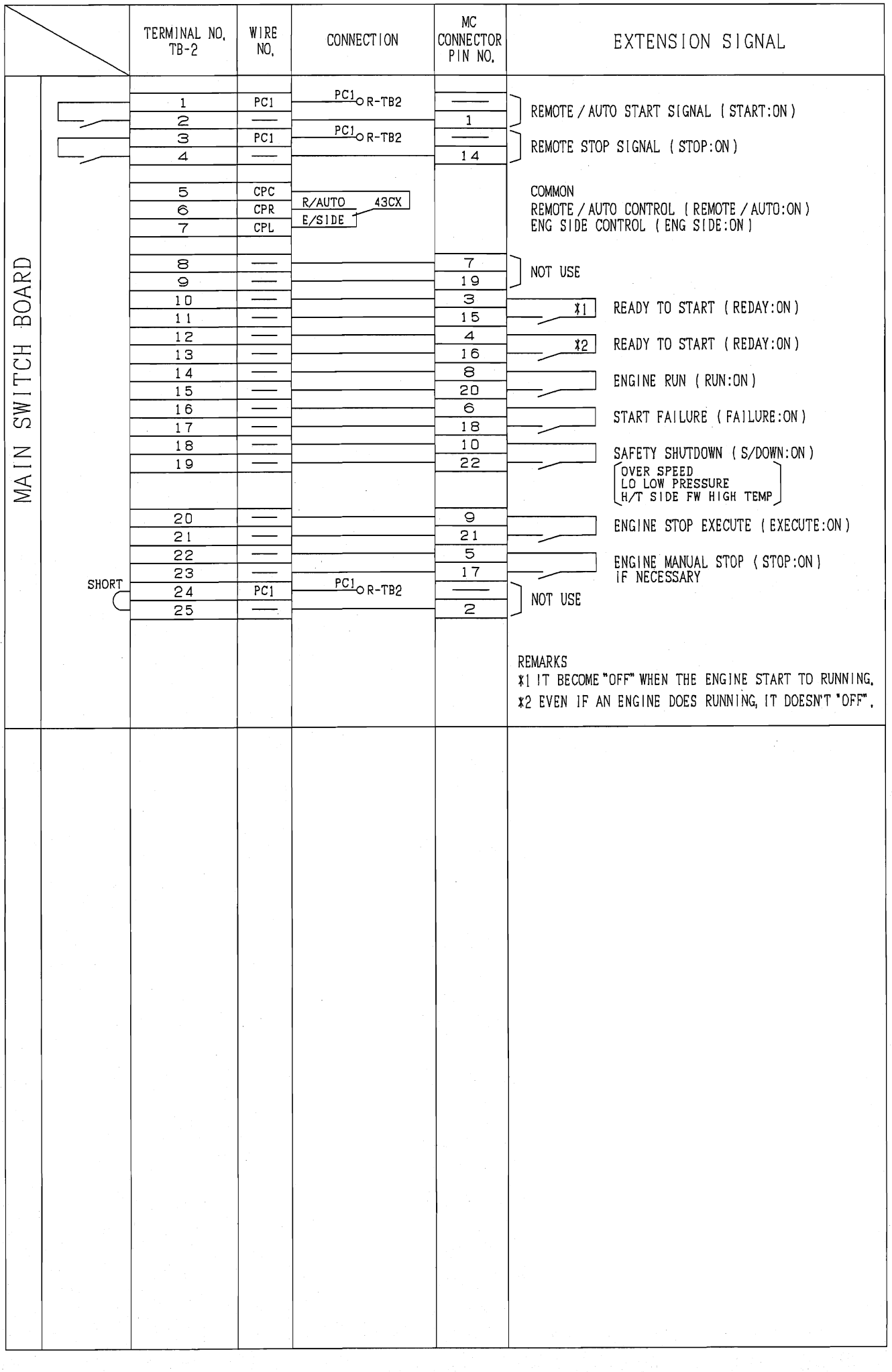
CN

SHEET NO. (21)



DWG. NO.	0806-014-22	CN
TITLE	GENERATOR ENGINE CONTROL PANEL	
株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.		
FILE NO.	022-ESC	
6EY18L(AL)		

SHEET NO. (22)



CN

DWG. NO. 0806-014-23

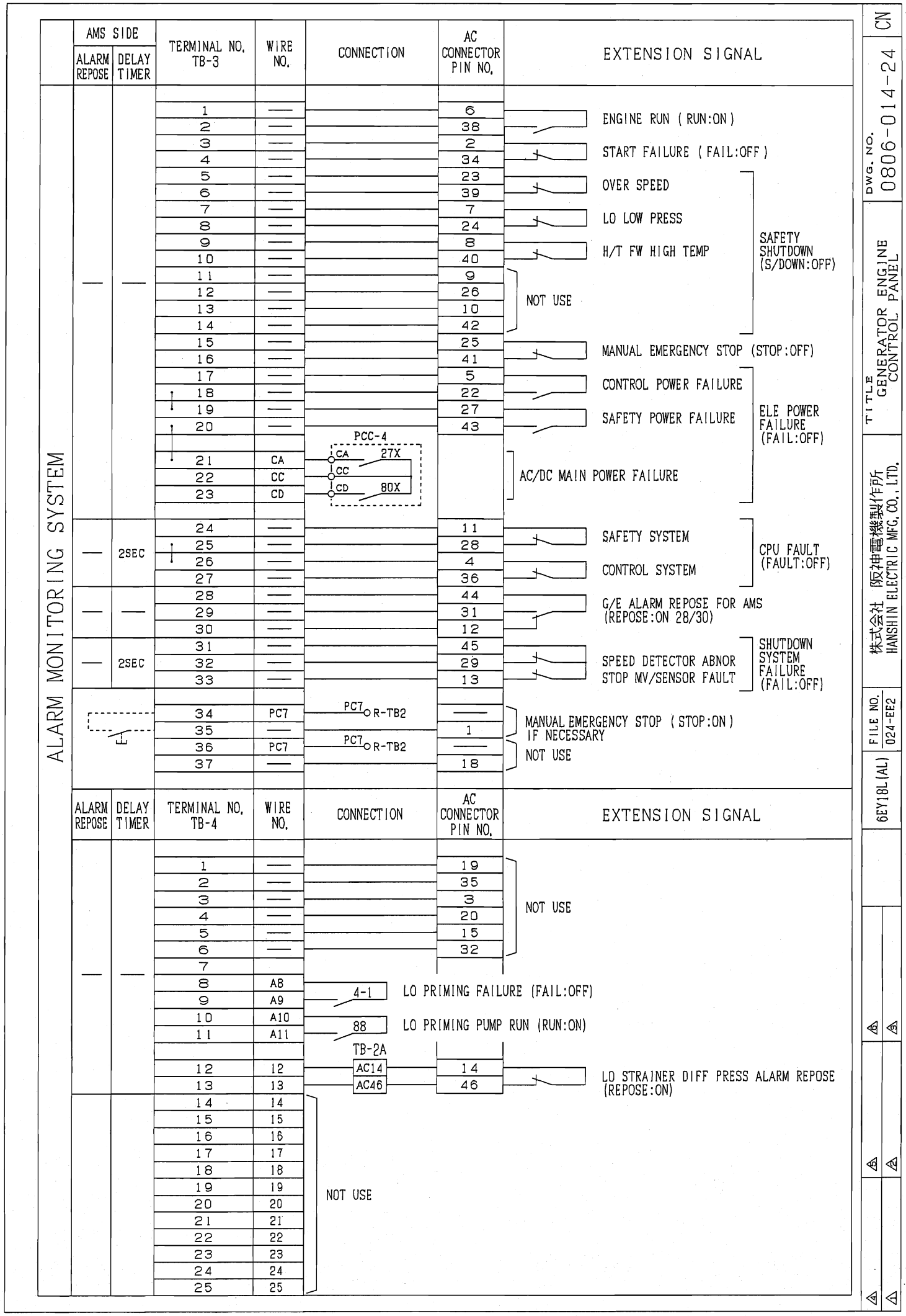
TITLE GENERATOR ENGINE CONTROL PANEL

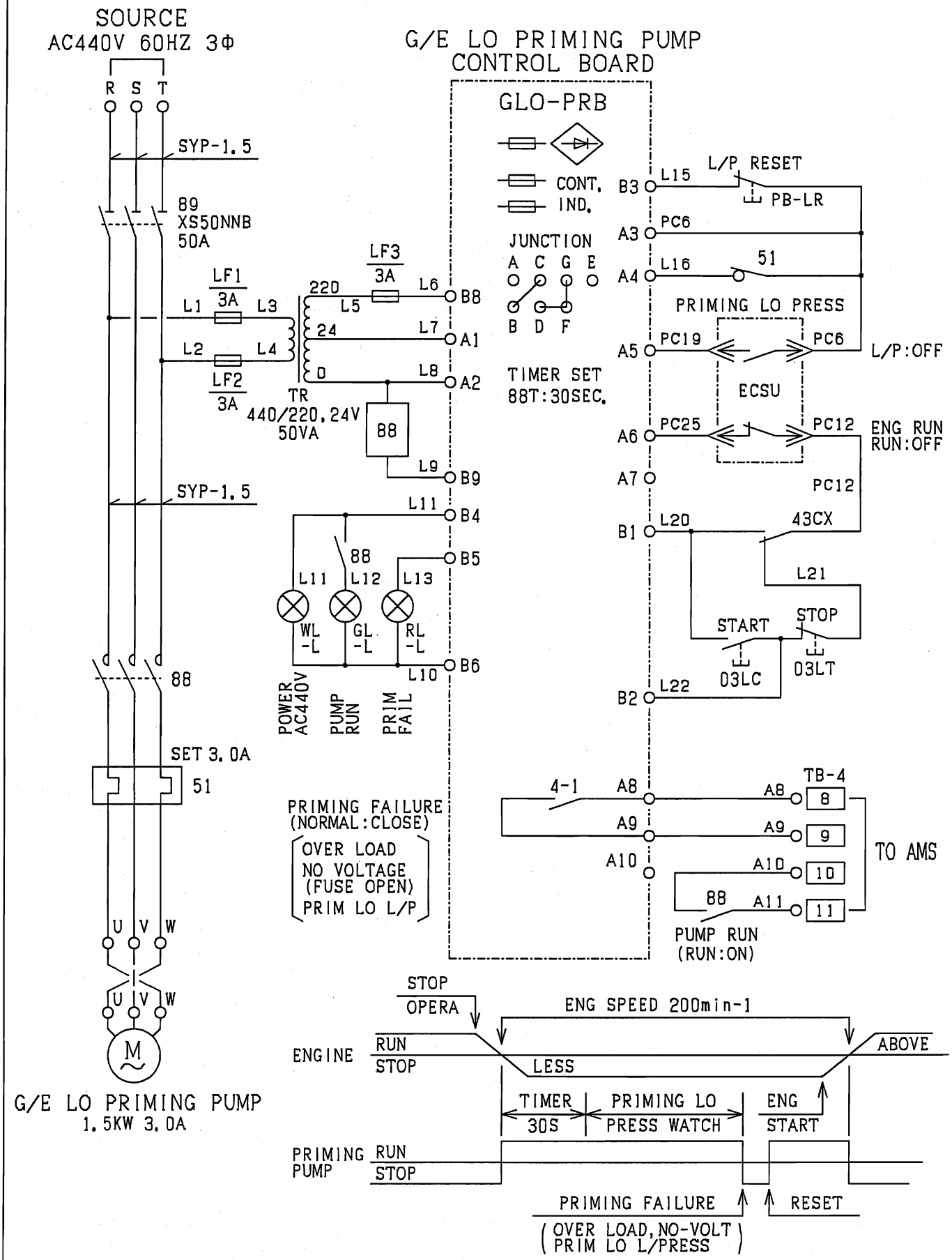
株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 023-EE1

6EY18L(AL)

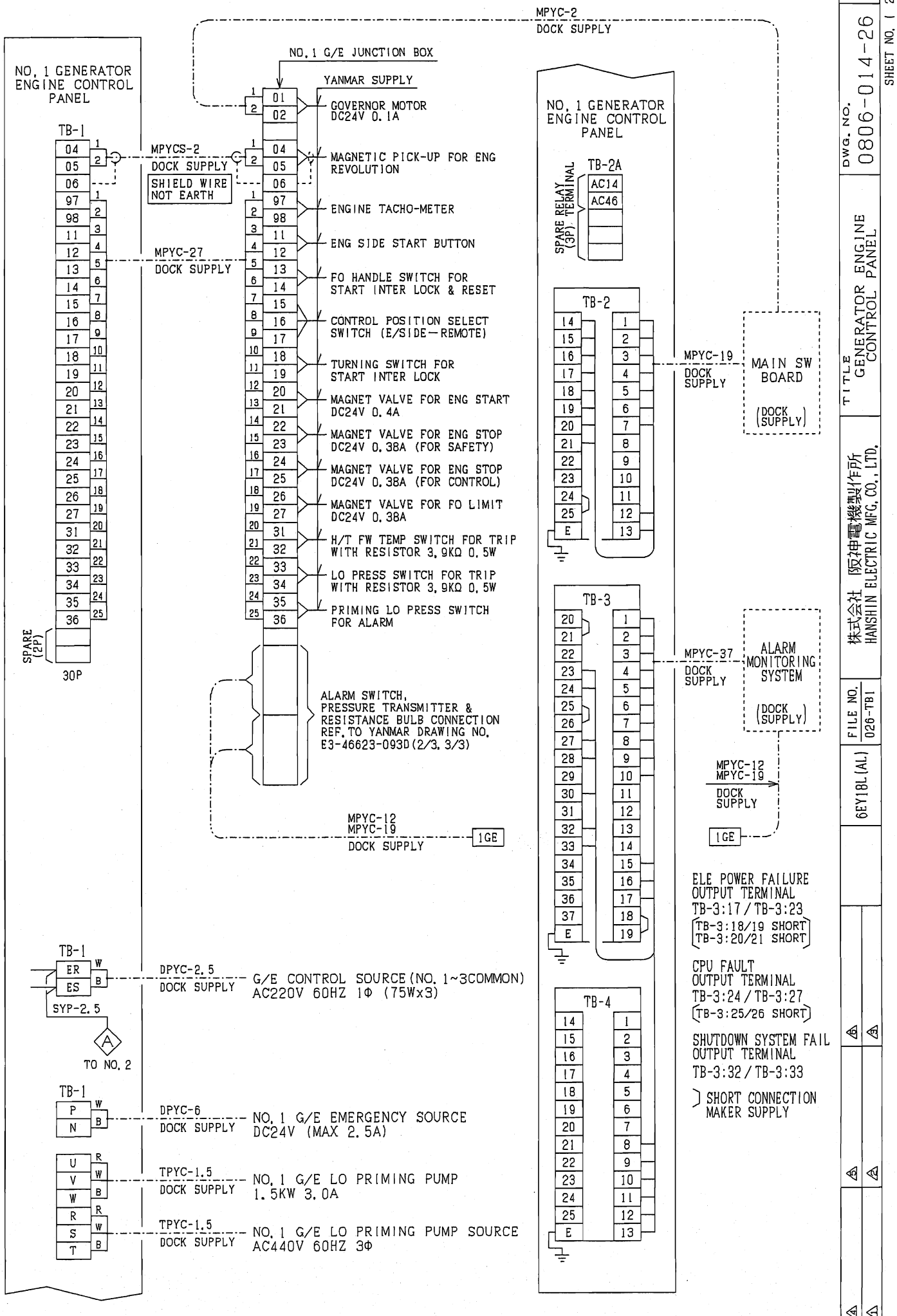
SHEET NO. (23)


ALARM MONITORING SYSTEM
AMS SIDE
ALARM REPOSE
DELAY TIMER
TERMINAL NO. TB-3
WIRE NO.
CONNECTION
AC CONNECTOR PIN NO.
EXTENSION SIGNAL
ENGINE RUN (RUN:ON)
START FAILURE (FAIL:OFF)
OVER SPEED
LO LOW PRESS
H/T FW HIGH TEMP
SAFETY SHUTDOWN (S/DOWN:OFF)
NOT USE
MANUAL EMERGENCY STOP (STOP:OFF)
CONTROL POWER FAILURE
SAFETY POWER FAILURE
ELE POWER FAILURE (FAIL:OFF)
PCC-4
CA
CC
CD
27X
80X
AC/DC MAIN POWER FAILURE
2SEC
SAFETY SYSTEM
CONTROL SYSTEM
CPU FAULT (FAULT:OFF)
G/E ALARM REPOSE FOR AMS (REPOSE:ON 28/30)
SPEED DETECTOR ABNOR
STOP MV/SENSOR FAULT
SHUTDOWN SYSTEM FAILURE (FAIL:OFF)
PC7
R-TB2
MANUAL EMERGENCY STOP (STOP:ON) IF NECESSARY
TERMINAL NO. TB-4
LO PRIMING FAILURE (FAIL:OFF)
LO PRIMING PUMP RUN (RUN:ON)
TB-2A
AC14
AC46
LO STRAINER DIFF PRESS ALARM REPOSE (REPOSE:ON)
TITLE
GENERATOR ENGINE CONTROL PANEL
DWG. NO.
0806-014-24
SHEET NO. (24)
CN
株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG, CO., LTD.
FILE NO.
024-EE2
6EY18L(AL)



④	⑤	⑥			FILE NO. 025-LCN
①	②	③			

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG.CO., LTD.	TITLE G/E LO PRIMING PUMP STARTER	DWG. NO. 0806-014-25	CN



TB

DWG. NO. 0806-014-26

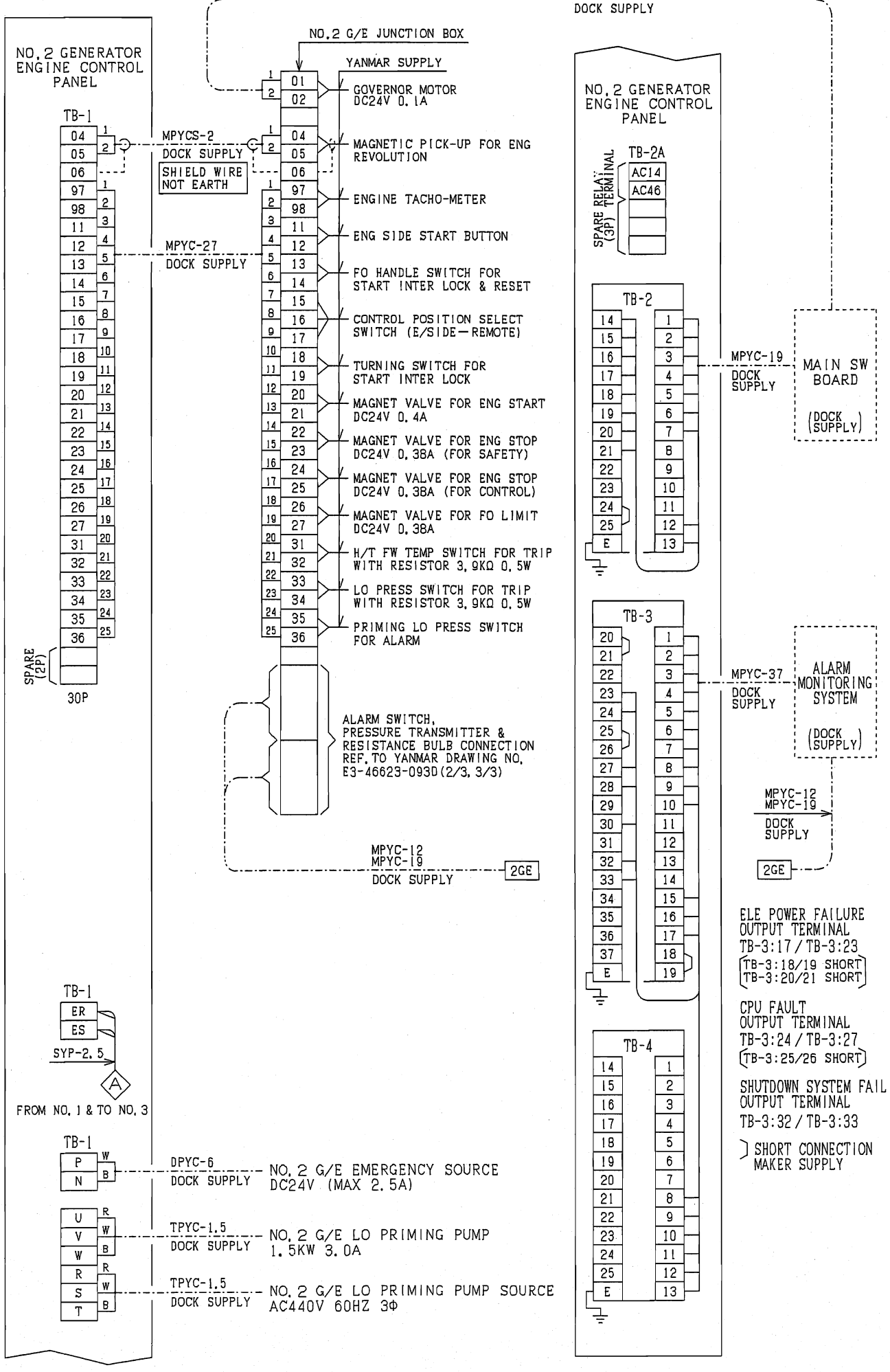
SHEET NO. (26)

TITLE GENERATOR ENGINE CONTROL PANEL

株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 026-TB1

6EY18L(AL)



TB

DWG. NO. 0806-014-27

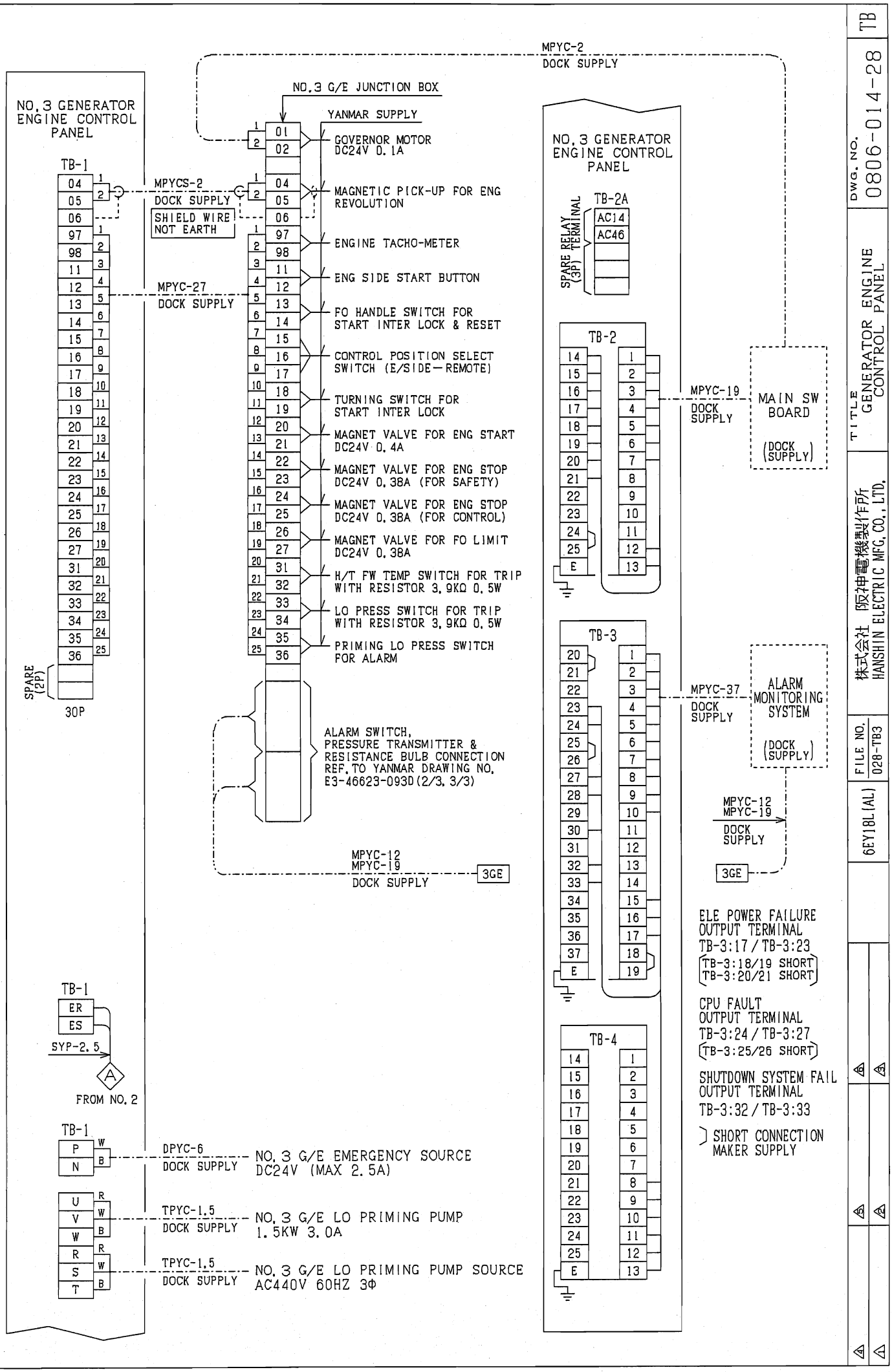
SHEET NO. (27)

TITLE GENERATOR ENGINE CONTROL PANEL

株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 027-TB2

6EY18L(AL)



TB

DWG. NO. 0806-014-28

SHEET NO. (28)

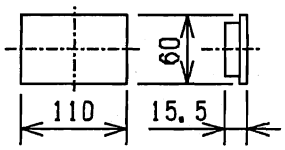
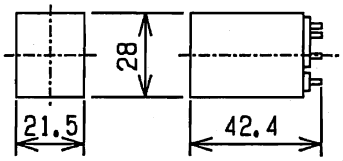
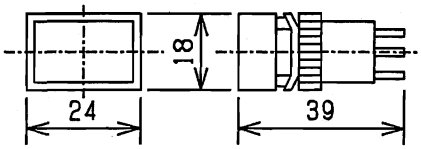
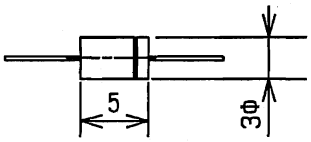
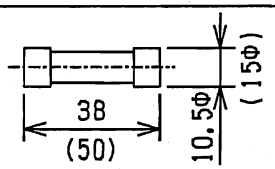
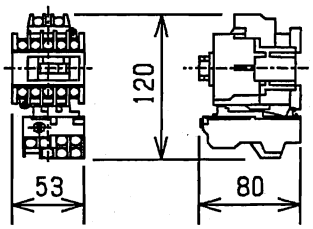
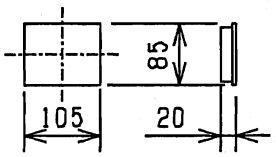
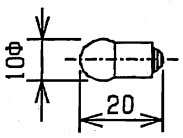
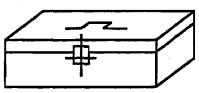
TITLE GENERATOR ENGINE CONTROL PANEL

株式会社 阪神電機製作所
HANSHIN ELECTRIC MFG. CO., LTD.

FILE NO. 028-TB3

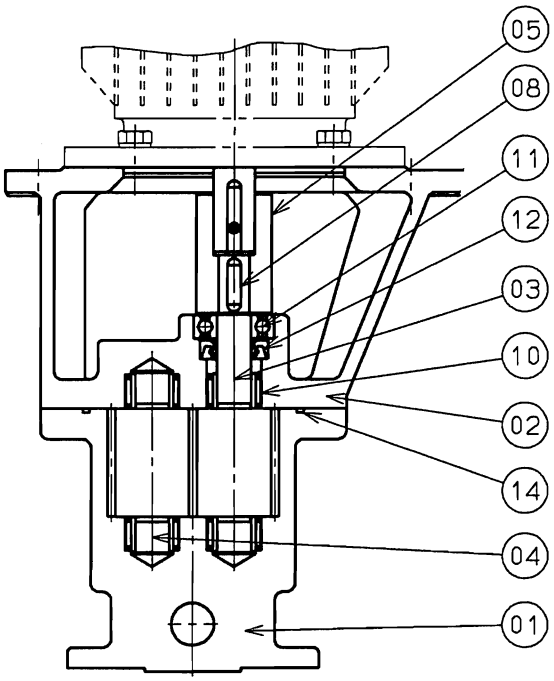
6EY18L(AL)

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
		GEN ENGINE CONTROL & LO PRIMING PUMP PANEL	1

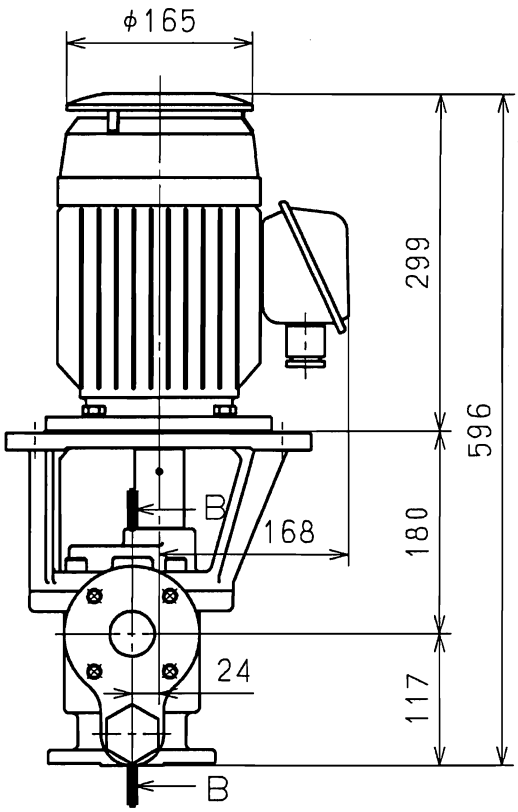
ITEM NO.	NAME OF PART	OUTLINE	QUANTITY WORKING PER SET	QUANTITY WORKING PER VESS	QUANTITY SPARE	REMARKS
1	POWER CHANGE CIRCUIT BOARD		3	3	1	HANSHIN ELE. PCC-4 DC24V
2	AUX RELAY		3	3	1	OMRON MY4N-D2 DC24V
3	LED		6	6	1	AL6G-P4PW
4	SURGE ABSORBING DIODE		12	12	2	FUJI ELE. ERB12-10
5	FUSE		24	24	10	ENGINE PANEL UTSUNOMIYA NC0 3A
6			9	9	9	LO P/P PANEL UTSUNOMIYA UC1 3A
7	MAGNET RELAY WITH OCR		3	3	1	FUJI ELE. SW-05 (5a) AC220V 60HZ OCR 2.8~4.2A SET 3.0A
8	LO PRIMING CONTROL BOARD		3	3	1	HANSHIN ELE. GLO-PRB DC24V
9	LAMP BULB		9	9	9	BA9S/13 30V 1W
10	SPARE BOX	 SP-2(250x200x160)	—	1	—	STEEL TYPE PAINT COLOR 2.5G8/2

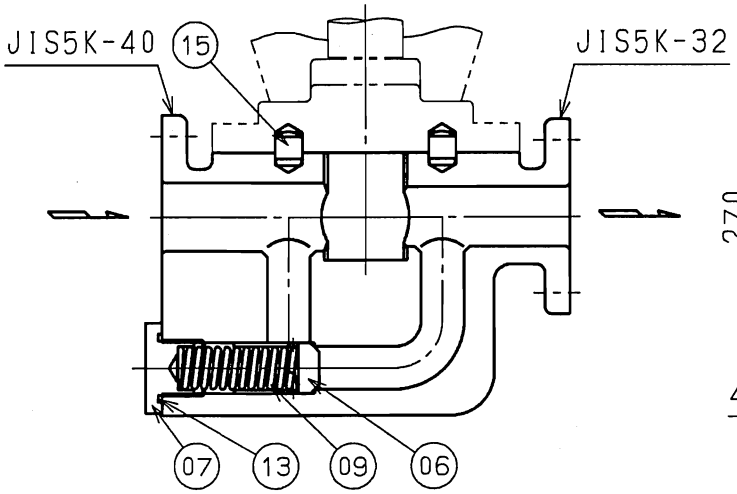
④	⑤	⑥			FILE NO.
① 2008/10/17	②	③			029-ESA

株式会社 阪神電機製作所 HANSHIN ELECTRIC MFG. CO., LTD.	TITLE GEN ENGINE CONTROL & LO PRIMING PUMP PANEL	DWG. NO. 0806-014-29	SP

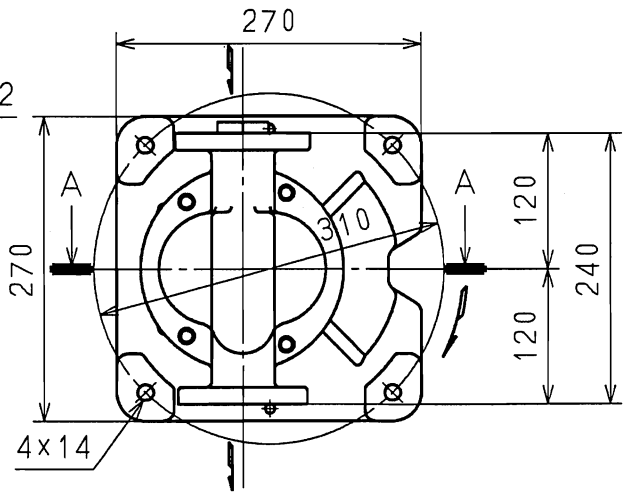


SECTION A-A





SECTION B-B



仕様 SPECIFICATION			
吐出量	CAPACITY	m^3/h	4
吐出圧力	PRESSURE	MPa	0.15
吸込揚程	SUCTION HEAD	m	3
回転速度	SPEED	min^{-1}	1750
電動機	MOTOR	4P, 1.5kW, AC440V, 60HZ	
定格	RATING	連続 CONTINUOUS	
電流	AMPERE	3.4A	
絶縁	INSULATION CLASS	B	
保護	PROTECTION	IP44	
グランド	CABLE GLAND	20b	
ポンプメーカー	PUMP MAKER	MANSEI INC.	
ヤンマーコード	YANMAR CODE	46130-060350	

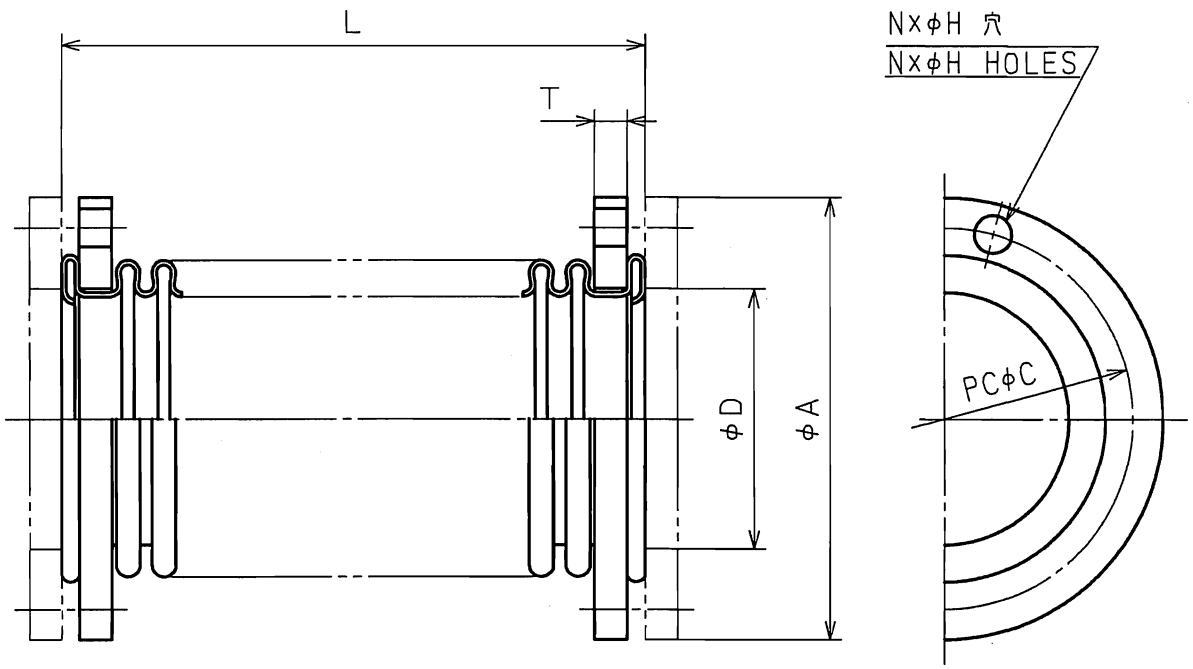
番号 NO.	品名 NAME OF PARTS	材質 MATERIAL	数量 QTY.
01	PUMP CASING	FC200	1
02	MOTOR FRAME	FC200	1
03	DRIVE SHAFT	S45C	1
04	IDLE SHAFT	S45C	1
05	COUPLING	S45C	1
06	SAFETY VALVE	S45C	1
07	SPRING COVER	SS400	1
08	KEY	S45C	1
09	SAF.VAL.SPRING	SWPA	1
10	NEEDLE BEARING	SUJ	4
11	BALL BEARING	SUJ	1
12	OIL SEAL	NBR	1
13	O RING G35	NBR	1
14	O RING G125	NBR	1
15	PARALLEL PIN	S45C	2

GV-43P (3φ, AC440V, 60Hz)

潤滑油プライミングモーターポンプ

L.O.PRIMING MOTOR PUMP

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	B4-00003-1220



適用ガス管 TUBE SIZE (SGP)	主要寸法 DIMENSION (mm)							部品番号 PART NO.
	L	D	C	A	T	N	H	
250A	400	268.5	345	385	22	12	23	43720-003190

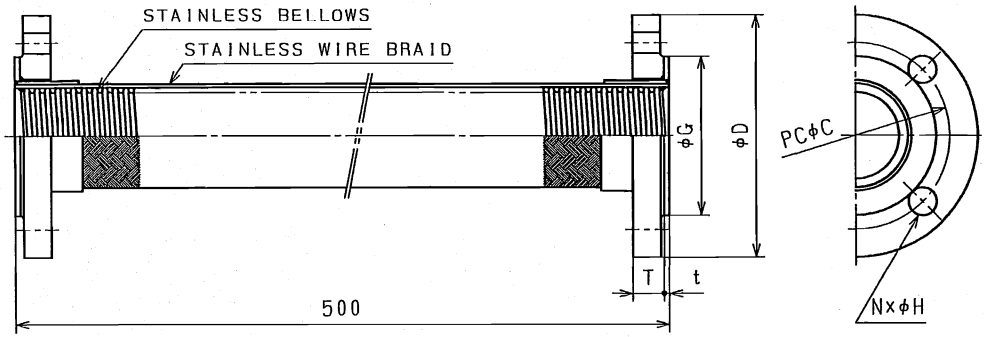
許容変位量 ALLOWABLE MOVEMENT	
半径方向 LATERAL	軸方向 AXIAL
±24	±56

Q'TY/ENG.	SYMBOL
1	A1

SYMBOL MARKS ARE SAME AS ONES IN THE OUTLINE DRAWING

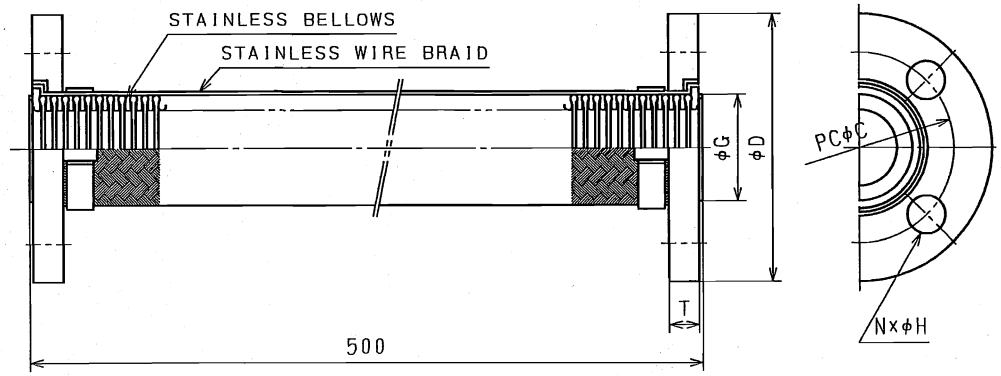
排気タワミ管
FLEXIBLE TUBE FOR EXH. GAS

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	B3-00001-9570



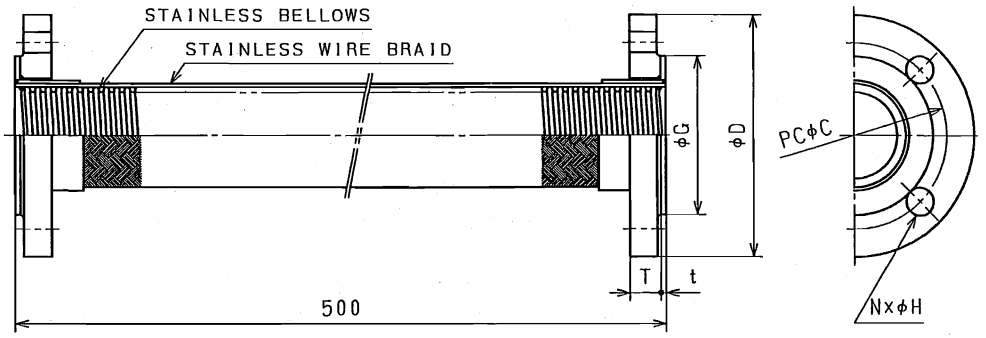
Notes. FLUID :OIL & WATER: TEMP RANGE:~100℃
WORKING PRESS:~0.49MPa (5kgf/cm²) TEST PRESS:0.98MPa (10kgf/cm²)

ITEM	NOMINAL SIZE	DIMENSION						MOVEMENT		PART NO.
		φD	φG	PCφ-C	N-φH	T	t	LATERAL	AXIAL	
A	15A	80	44	60	4-12	9	4.0	±6mm	0	43720-002310CC
B	20A	85	49	65	4-12	10	4.5	±8mm	0	43720-002320CC



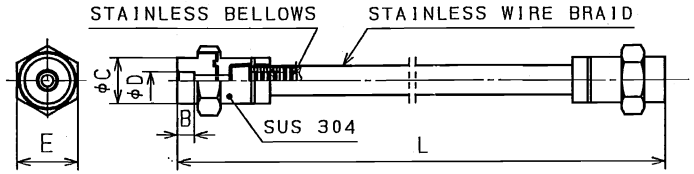
Notes. FLUID :OIL & WATER: TEMP RANGE:~100℃
WORKING PRESS:~0.79MPa (8kgf/cm²) TEST PRESS:1.18MPa (12kgf/cm²)

ITEM	NOMINAL SIZE	DIMENSION					MOVEMENT		PART NO.
		φD	φG	PCφ-C	N-φH	T	LATERAL	AXIAL	
C	25A	95	48.5	75	4-12	10	100mm	0	43720-001191CC
D	40A	120	63.5	95	4-15	12	62mm	0	43720-001711CC
E	50A	130	73.5	105	4-15	14	62mm	0	43720-002361CC
F	65A	155	89.0	130	4-15	14	50mm	0	43720-002241CC
G	80A	180	103.5	145	4-19	14	42mm	0	43720-002251CC
H	100A	200	130.0	165	8-19	16	33mm	0	43720-002261CC
I	125A	235	157.0	200	8-19	16	27mm	0	43720-002271CC



Notes. FLUID :COMPRESSED AIR TEMP RANGE:~100℃
WORKING PRESS:~2.94MPa (33kgf/cm²) TEST PRESS:5.89MPa (60kgf/cm²)

ITEM	NOMINAL SIZE	DIMENSION						MOVEMENT		PART NO.
		φD	φG	PCφ-C	N-φH	T	t	LATERAL	AXIAL	
J	20A	120	60	85	4-19	18	4.5	±8mm	0	43720-002400CC
K	25A	130	70	95	4-19	20	4.5	±8mm	0	43720-002410CC



Notes. FLUID :COMPRESSED AIR & OIL TEMP RANGE:~100℃
WORKING PRESS:~1.49MPa (~15kgf/cm²) TEST PRESS:2.05MPa (22.5kgf/cm²)

ITEM	NOMINAL SIZE	DIMENSION					PART NO.
		L	φD	B	C	E	
L	φ10	300	10.7	10	27	41	43720-007860CC
	φ12	300	12.2	10	27	41	43720-008040CC

ITEM	FLUID	SIZE	Q'TY/ENG.	SYMBOL
A	HOT WATER INLET & OUTLET, AIR VENT	5ᴬ-15	3	W3, W4, W5
B				
C	F.O. DRAIN	5ᴬ-25	1	F3
D	L.O. INLET & OUTLET	5ᴬ-40	2	L1, L2
E	MIST GAS OUTLET	5ᴬ-50	1	MG
F	L.O. OVER FLOW	5ᴬ-65	1	L8
G	F.W. INLET & OUTLET	5ᴬ-80	2	W6, W7
H				
I				
J				
K	STARTING AIR	40ᴬ-25	1	A2
L	CONTROL AIR	ODφ10	1	A3

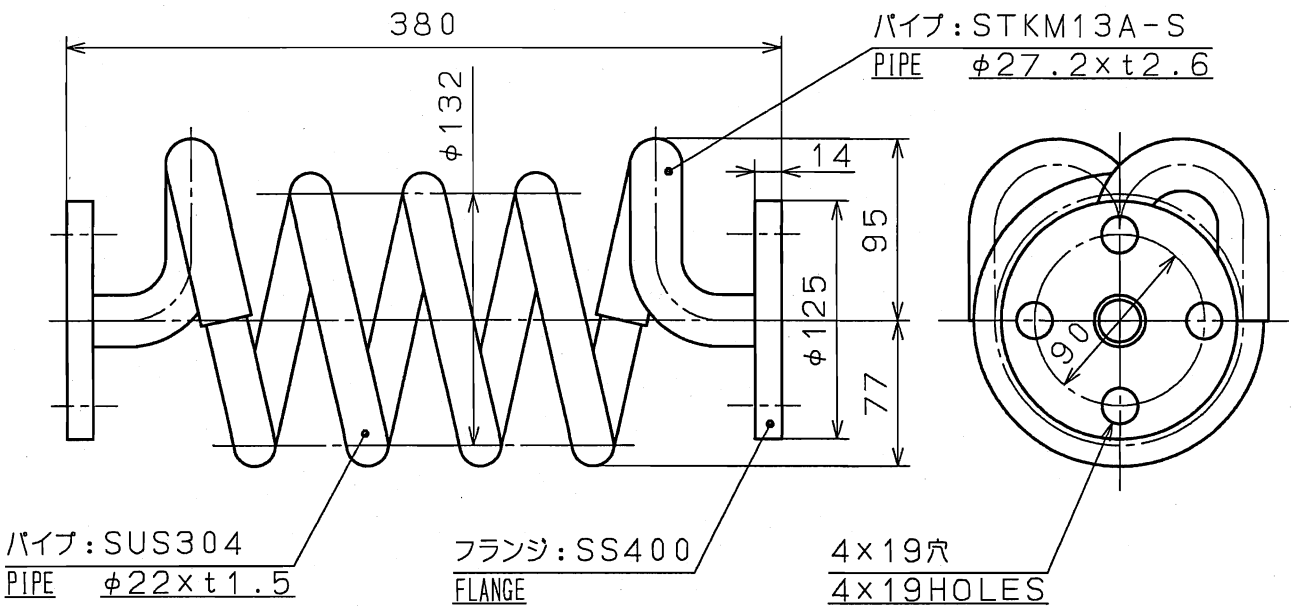
SYMBOL MARKS ARE SAME AS ONES IN THE OUTLINE DRAWING.

FLEXIBLE TUBE

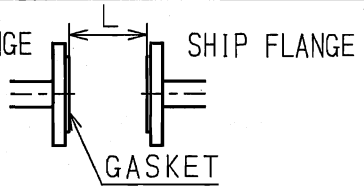
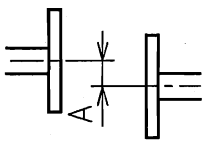
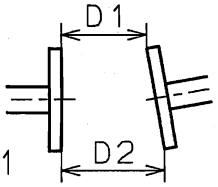
ヤンマー株式会社
YANMAR CO., LTD.

DWG. No. B4-00009-5640

L548



仕　様　SPECIFICATION			
使用流体 FLUID	FUEL OIL	最大使用圧力 MAX.WORK. PRESS	0.97MPa
使用温度 SERVICE TEMP.	0℃～150℃	質量 MASS	4.27kg

取付寸法許容誤差　MOUNTING TOLERANCE			
長さ LENGTH	L	380^{+3}_{-2}mm	
芯振れ OFFSET	A	≤2mm	
平行度 PARALLEL	B	≤2mm	

Q'TY/ENG.	SYMBOL
2	F1, F2

SYMBOL MARKS ARE SAME AS ONES IN THE OUTLINE DRAWING

部品コード：43720-014480
PART NO.

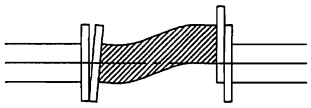
燃　料　油　接　続　管　継　手
CONNECTION TUBE FOR FUEL OIL

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	B4-00005-2481

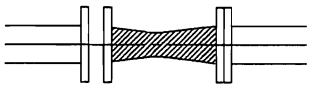
INSTRUCTION MANUAL ON (VIBRATION ABSORBING) FLEXIBLE TUBE

1. METHOD OF FITTING
REFRAIN FROM SUCH METHOD OF FITTING WHICH CAUSES THE INITIAL STRESS FOR CONTRACTION. ELONGATION, EXCESSIVE OFFSET, BENDING, TWISTING, ETC, AS MUCH AS POSSIBLE.

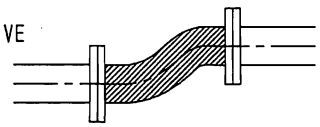
1) DO NOT FIT IT AS CONTRACTED. IF THE TUBE IS FITTED AS COMPRESSED FROM ITS MANUFACTURE LENGTH, A STRESS IS APPLIED TO THE BELLOWS AND THE WIRE BLADE SLACKS TO CAUSE THE DAMAGE EARLIER THAN USUAL THEREFORE, IF THE TUBE IS FOUND TOO LONG, CUT THE PIPING TO THE PROPER DIMENSION. X



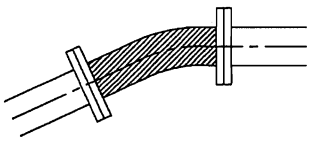
2) DO NOT FIT IT AS ELONGATED. IF THE TUBE IS FITTED AS ELONGATED FORCIBLY EXCESSIVE STRESS IS APPLIED TO THE BLADE AND JOINT TO CAUSE THE DAMAGE EARLIER THAN USUAL. THUS, MEASURE THE CORRESPONDING PIPING WITH ATTENTION GIVEN SO THAT THE PIPING WILL BE CUT TO THE PROPER LENGTH. X

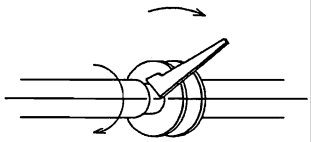


3) DO NOT IMPART EXCESSIVE OFFSET AND/OR BENDING TO IT. IF THE TUBE IS FITTED WITH EXCESSIVE OFFSET (RADIAL DISPLACEMENT) AND/OR BENDING, THE BELLOWS IS EXTENSIVELY DEFORMED TO CAUSE THE INITIAL STRESS. CONSEQUENTLY, ARRANGE THE PIPING SO THAT NEITHER OFFSET NOR BENDING WILL TAKE PLACE. X



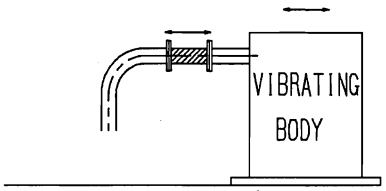
4) DO NOT IMPART TWISTING TO IT. TWISTING CAUSES THE RESIDUAL SHEARING STRESS TO APPLY ON THE BELLOWS AND RESULTS IN CRACKING OF THE WAVLIKE PART OF THIS TUBE. BECAUSE THE TUBE HAS BEEN DESIGNED TO ABSORB A SLIGHT RADIAL MOTION AND NOT DESIGNED TO WITH STAND TWISTING, REFRAIN FROM SUCH METHOD OF FITTING WHICH BRINGS ABOUT TWISTING ABSOLUTELY. X



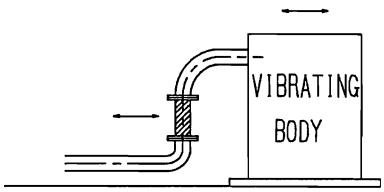


2. FITTING POSITION
FIT THE TUBE SO THAT IT IS POSITIONED IN PERPENDICULAR TO THE DIRECTION OF VIBRATION.

1) BECAUSE THIS TUBE HAS BEEN DESIGNED TO ABSORB MAINLY THE RADIAL MOTION AND BECAUSE EXPANSION AND CONTRACTION OF SPIRAL SHAPED BELOWS IN THE AXIAL DIRECTION BRING ABOUT TWISTING OF BELOWS BECAUSE OF FIXED BOTH ENDS AND THUS CAUSE THE DAMAGE EARLIER THAN USUAL, IN THIS CONNECTION, CARRY OUT PIPING SO THAT THE TUBE BECOMES PERPENDICULAR TO THE DIRECTION OF VIBRATION AS MUCH AS POSSIBLE. X



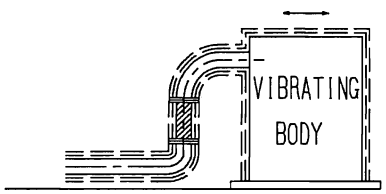
X



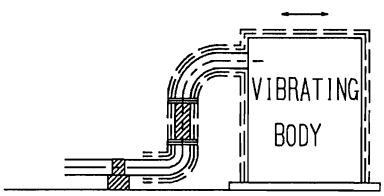
○

2) ATTACH THE TUBE TO A POINT WHERE PRESSURE FLUCTUATION IS SMALL. BECAUSE THE BELLOWS IS NOT VERY STRONG AGAINST PRESSURE FLUCTUATION, ATTACH THIS TUBE AT A POSITION AWAY FROM A VALVE IN ORDER TO AVOID PULSATING PRESSURE AND IMPACT PRESSURE AS MUCH AS POSSIBLE.

3) BE SURE TO SET UP AN ANCHOR. UNLESS THE OPPOSITE SIDE OF A VIBRATING BODY IS FIXED, THIS TUBE NOT ONLY TRANSMITS VIBRATION TO THE PIPING WITHOUT ABSORBING THE VIBRATION TO THE PIPING WITHOUT ABSORBING THE VIBRATION BUT ALSO ACTUALLY ACTS AS A SPRING TO AMPLIFY THE VIBRATION, CAUSING THE DAMAGE EARLIER THAN UAUAL. FOR THAT REASON, ATTACH THIS TUBE AT THE POSITION AS NEAR AS POSSIBLE TO A VIBRATING BODY, AND BE SURE TO SET UP A FIXED POINT (AN ANCHOR) AT THE POSITION NEAREST TO THE TUBE ON THE OPPOSITE SIDE OF A VIBRATING BODY.



X



ANCHOR

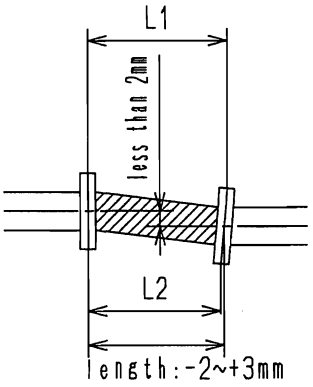
○

4) DO NOT USE THIS TUBE TO SUPPORT ANY WEIGHTY THING. THOUGH THIS TUBE HAS BEEN DESIGNED TO HAVE A STRENGTH TO WITHSTAND THE PIPE INTERNAL PRESSURE BUT NOT DESIGNED TO SUPPORT A DEVICE AND OTHER EXTERNAL FORCE, SUPPORT AN EXTERNAL FORCE BY USING A HANGAR AT THE PIPING NEAR THE TUBE.

3. DIMENSION FOR FITTING

1) FITTING OF FLEXIBLE TUBE FOR EXHAUST GAS IS TO BE SET WITHIN 0mm~+4.0mm OF LENGTH OF AXIS, LESS THAN 1.0 mm OFFSET OF AXIS FOR DRAWING DIMENSIONS.

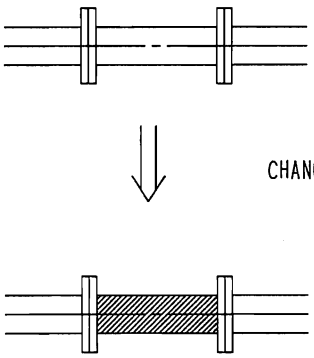
2) FITTING OF FLEXIBLE TUBE FOR LUBRICATION OIL,COOLING WATER,FUEL OIL AND MIST ARE TO BE SET WITHIN -2.0mm ~ +3.0mm,OF LENGTH OF AXIS, LESS THAN 2.0 mm OFFSET OF AXSIS FOR DRAWING DIMENSIONS.
ALSO PARALLEL DEGREE OF BEFORE AND BEHIND PIPE FLANGE OF FLEXIBLE TUBE IS TO BE CARRIED OUT ACCORDING TO THE NEXT TABLE.



FLANGE SIZE	PARALLEL DEGREE L1-L2
15A~50A	less than 2mm
65A~100A	less than 3mm
125A~150A	less than 4mm

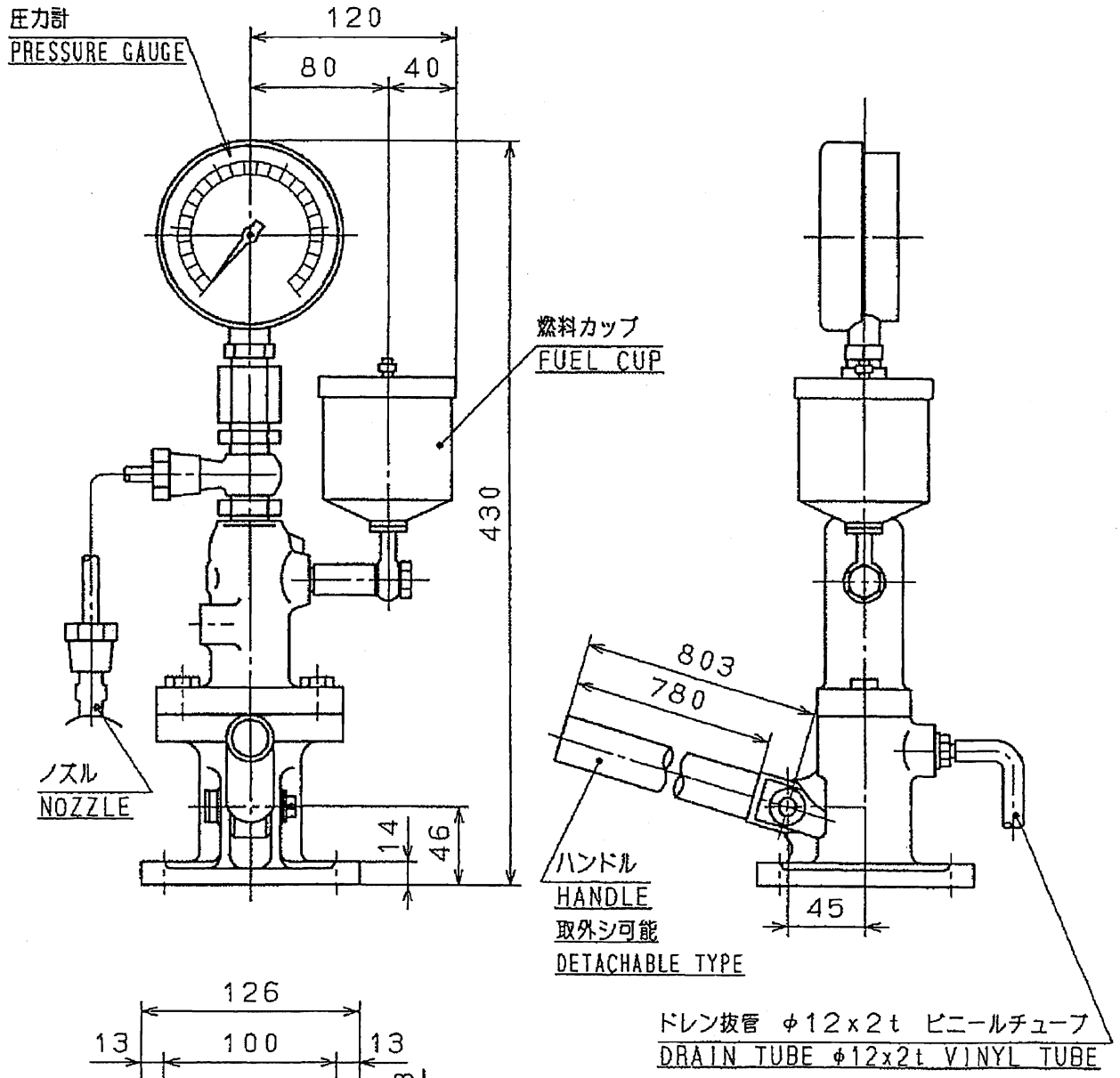
PIPE FLANGE IS TO BE ROTATED AND SET SO THAT DIMENSION BETWEEN FLANGES OF OFFSET SIDE BECOMES SHORT.
(OPPSITE WAY IS IMPOSSIBLE)

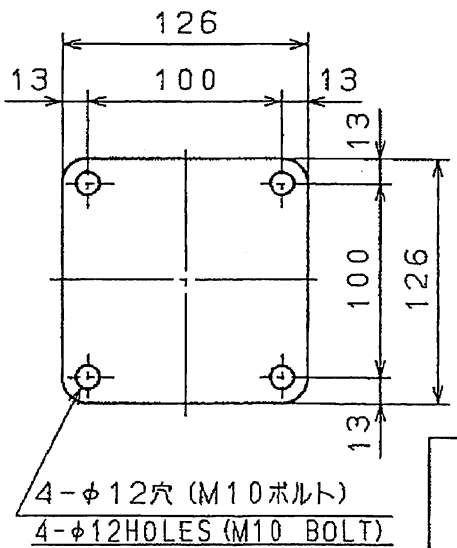
3) IF FITTING ARENGEMENTS OF 1) AND 2) ARE DIFFICULT TO KEEP, MAKE THE PIECE WITH PRESCRIBED DIMENSION AND SET,CHANGE TO FLEXIBLE TUBE AFTER THAT.



CHANGE TO FLEXIBLE TUBE AFTER SETTING BY PIECE (SHORT STEEL TUBE)

M901





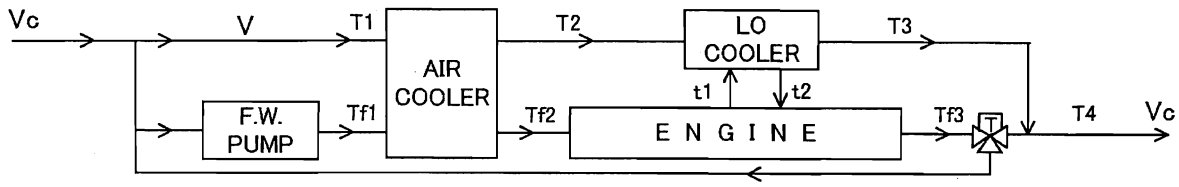
燃料カップ容量 CAPACITY OF FUEL CUP	0.3ℓ
圧力計目盛範囲 GAUGE SCALE	0~500kgf/cm² 0~50 MPa
質 量 MASS	8kg

ノズルテスター
NOZZLE TESTER

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	84-00000-2122

1. SYSTEM DIAGRAM FOR HEAT BALANCE (MIXED COOLING SYSTEM)

F.W. LOW TEMP. T1= 36 ℃
F.W. OUTLET TEMP. OF ENG. Tf3= 85 ℃
L.O. INLET TEMP. OF ENG. t2= 65 ℃



2. CALCULATION

2-1. QUANTITY OF HEAT TRANSMISSION

TO L.O : Q1 = 320 MJ/h
TO AIR : $Q2_L$ = 167 MJ/h
: $Q2_H$ = 440 MJ/h
TO F.W : Q3 = 641 MJ/h

2-2. F.W. SYSTEM

F.W. TEMP. DIFFERENCE BETWEEN INLET & OUTLET OF AIR COOLER
$$\Delta T1 = \frac{Q2_L}{V * Rf * Cf} = 1.5 \text{ ℃}$$

F.W. OUTLET TEMP. OF AIR COOLER
$$T2 = T1 + \Delta T1 = 37.5 \text{ ℃}$$

F.W. TEMP. DIFFERENCE BETWEEN INLET & OUTLET OF L.O. COOLER
$$\Delta T2 = \frac{Q1}{V * Rf * Cf} = 2.8 \text{ ℃}$$

F.W. OUTLET TEMP. OF L.O. COOLER
$$T3 = T2 + \Delta T2 = 40.3 \text{ ℃}$$

F.W. TEMP. DIFFERENCE BETWEEN INLET & OUTLET OF ENGINE
$$\Delta Tf2 = \frac{Q3}{Vf * Rf * Cf} = 5.7 \text{ ℃}$$

F.W. INLET TEMP. OF ENGINE
$$Tf2 = Tf3 - \Delta Tf = 79.3 \text{ ℃}$$

F.W. TEMP. DIFFERENCE BETWEEN INLET & OUTLET OF AIR COOLER
$$\Delta Tf1 = \frac{Q2_H}{Vf * Rf * Cf} = 3.9 \text{ ℃}$$

F.W. INLET TEMP. OF AIR COOLER
$$Tf1 = Tf2 - \Delta Tf = 75.4 \text{ ℃}$$

F.W. CAPA. TO F.W. COOLER
$$Vc = V + \frac{Q3+Q2_H}{(Tf3 - T1) * Rf * Cf} = 32.3 \text{ m}^3/\text{h}$$

F.W. INLET TEMP. OF F.W. COOLER
$$T4 = \frac{T3 * V + Tf2 * (Vc-V)}{Vc} = 47.6 \text{ ℃}$$

2-3. L.O. SYSTEM

L.O. TEMP. DIFFERENCE BETWEEN INLET & OUTLET OF L.O. COOLER
$$\Delta t = \frac{Q1}{Vl * Rl * Cl} = 8.8 \text{ ℃}$$

L.O. INLET TEMP. OF L.O. COOLER
$$t1 = t2 + \Delta t = 73.8 \text{ ℃}$$

L.O. & F.W. MEAN TEMP. DIFFERENCE OF L.O. COOLER
$$\Delta tm = \frac{(t1-T2) - (t2-T3)}{2.3\text{Log}((t1-T2)/(t2-T3))} = 30.2 \text{ ℃}$$

COOLING AREA OF L.O. COOLER
$$A = \frac{Q1}{\Delta tm * K} = 5.76 \text{ m}^2 < 8.70 \text{ m}^2$$

V	F.W. FLOW CAPA. FOR COOLER	27.0	m^3/h
Vf	F.W. PUMP CAPA. FOR ENGINE	27.0	m^3/h
Rf	DENSITY OF F.W.	1000	kg/m^3
Cf	SPECIFIC HEAT OF F.W.	4.19	kJ/(kg·℃)
Vl	L.O PUMP CAPACITY	21.4	m^3/h
Rl	DENSITY OF L.O.	900	kg/m^3
Cl	SPECIFIC HEAT OF L.O.	1.88	kJ/(kg·℃)
K	OVERALL HEAT TRANSFER COEFFICIENT OF L.O. COOLER	1.84	MJ/(m^2·℃·h)

THE CALCULATION FOR HEAT BALANCE	DRAW. NO.	D3 - 46623 - 316A
MODEL : 6EY18AL DIESEL ENGINE	(615 kW / 900 min^{-1})	
YANMAR CO., LTD.		

軸系ネジリ振動計測結果
THE REPORT FOR THE TORSIONAL VIBRATION

1．計　測　日
Measuring Date ： 26. Jun., 2009

2．計　測　器　　電気式ネジリ振動記録計
Torsiograph ： Electric Torsiograph

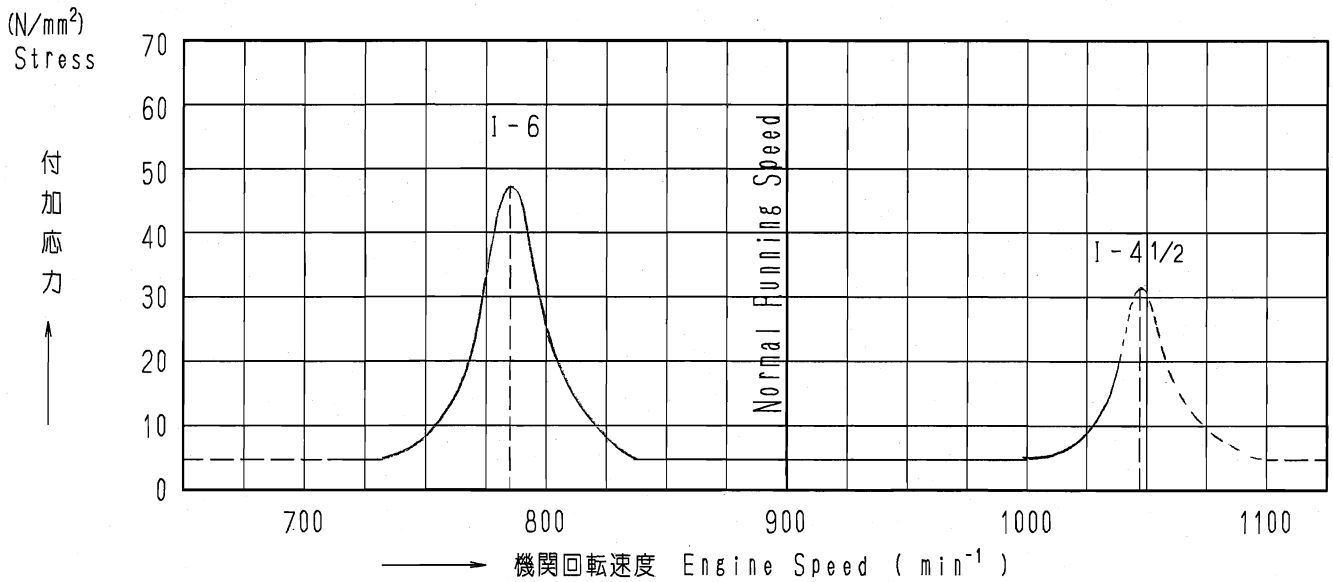
3．計 測 位 置　　発電機軸反直結側自由端
Measuring Point ： Free End of Generator Shaft

4．実 測 振 動 数
Natural Frequency ： I Node ： abt. 4710 cpm

5．最大応力の生ずる軸およびその軸径
Actual Dia. of the shaft At the Question:

発電機軸　　：軸径
Generator Saft ： 160 mm

6．最大付加応力線図
The Max. Torsional Vibration Stress Diagram :

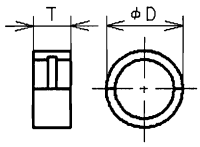
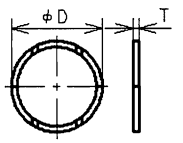
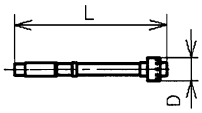
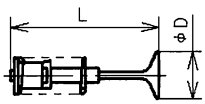
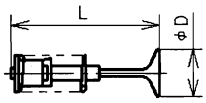
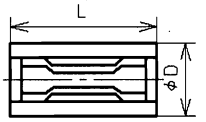
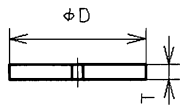
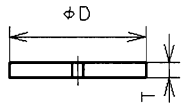


7．回避回転速度表示範囲
Barred Speed Range ： 760 ～ 820 min^{-1}

8．上記計測結果より軸系ネジリ振動は問題ありません
There is no problem in the torsional vibration of the shaft system from the above mentioned measurement result

Designing Department		Customer	GUANGZHOU HUANGPU SHIPBUILDING CO.,LTD.		
Drawn By	M. Sato	Work No.	R8-B08101		
Checked By	S. Iwata	Rule	CCS	S.No.	HPS3002
Approved By		Model	6EY18AL X 560 kW (TAIYO) (615 kW / 900 min^{-1})		
YANMAR CO.,LTD. LARGE POWER PRODUCTS OPERATIONS DIVISION DEVELOPMENT DEPT. ENGINEERING DEPT., MARINE GROUP		Date	10.Jul.,'09	Draw. No.	T3-46623-2050

SPARE PARTS		PAGE	1
MODEL 6EY18AL DIESEL ENGINE (3) ENGS.		SHIP NO.	3002
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
1	MAIN BEARING METAL ASSY. ｼｭｼﾞｸｳｹﾒﾀﾙｼｸﾐ	 SIZE (mm) L: D:190 T:60 MASS: 1.4 kg	S10C A40	21	1	14667302351	
2	THRUST METAL ASSY. ｽﾗｽﾄﾒﾀﾙｼｸﾐ	 SIZE (mm) L:- D:225 T:5.0 MASS: 0.34 kg	SPES A40	6	2	14662302370	Δ5/10
3	BOLT ASSY. (MAIN BEARING) ｼｭｼﾞｸｳｹﾎﾞﾙﾄｼｸﾐ	 SIZE (mm) L:417 D:54 T:- MASS: 2.8 kg	SCM435 S45C	42 SETS	2 SETS	C4660002070	WITH NUT
4	SUCTION VALVE ASSY. ｷｭｳｷﾍﾞﾝｼｸﾐ	 SIZE (mm) L:287 D:58 T:- MASS: 1.5 kg	SUH37 FC200 SWPV (ASSY.)	36 SETS	2 SETS	C4660011470	WITH VALVE SEAT
5	EXHAUST VALVE ASSY. ﾊｲｷﾍﾞﾝｼｸﾐ (ﾅｲﾓﾆｯｸ)	 SIZE (mm) L:287 D:58 T:- MASS: 1.5 kg	NCF80A FC200 SWPV (ASSY.)	36 SETS	4 SETS	C4660011480	WITH VALVE SEAT
6	PISTON PIN ASSY. ﾋﾟｽﾄﾝﾋﾟﾝ ｼｸﾐ	 SIZE (mm) L:149 D:75 T:- MASS: 4.1 kg	SCM415 STKM11	18	1	14667322310..D	
7	NO.1 PISTON RING NO.1 ﾋﾟｽﾄﾝﾘﾝｸﾞ	 SIZE (mm) L:- D:180 T:4.5 MASS: 0.125 kg	P221	18	1	14667322130..3	
8	NO.2 PISTON RING NO.2 ﾋﾟｽﾄﾝﾘﾝｸﾞ	 SIZE (mm) L:- D:180 T:4.0 MASS: 0.1 kg	P111	18	1	14667322140..3	

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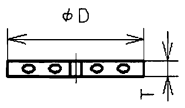
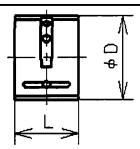
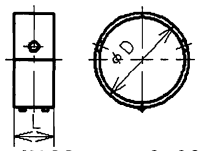
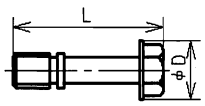
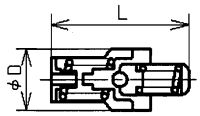
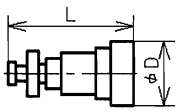
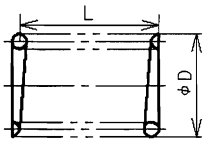
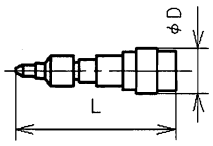
No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		PART NO.	REMARKS
				WORK-ING	SPARE		
9	OIL RING WITH COIL EXPANDER コイルエキスパンダツキ オイルリング	 SIZE (mm) L:- D:180 T:6 MASS: 0.090 kg	P111 P632	18	1	14667322180..3	
10	METAL FOR PISTON PIN ピストンピンメタル	 SIZE (mm) L:64 D:83 T:- MASS: 0.43 kg	L10 SPCE	18	1	14667323120..3	
11	CRANK PIN METAL ASSY. クランクピンメタルシクミ	 SIZE (mm) L:65 D:153 T:- MASS: 0.33 kg	A17X	18	1	14667323380	
12	ROD BOLT. (CONNECTING ROD ロッドボルト	 SIZE (mm) L:180 D:43 T:- MASS: 0.66 kg	SCM435	36	2	14667323220..3	
13	DELIVERY VALVE ASSY. FOR F.O. INJECTION PUMP FOトシュツベンシクミ	 SIZE (mm) L:48 D:13.8 T: MASS: 0.2 kg	ASSY.	18	1	14667351380..3	
14	PLUNGER ASSY. FOR FUEL INJECTION PUMP FOフンシャポンプヨウ プランジャシクミ	 SIZE (mm) L:196 D:109 T:- MASS: 3.3 kg	ASSY.	18	1	14662351100..3	
15	PLUNGER SPRING FOR F.O. INJEC-TION PUMP FOフンシャポンプヨウ プランジャバネ	 SIZE (mm) L:120 D:55.5 T:- MASS: 0.22 kg	SWOSCV	18	1	15167351170..3	
16	FUEL INJECTION VALVE ASSY. FOフンシャベンシクミ	 SIZE (mm) L:214 D:50 T: MASS: 2.0 kg	ASSY.	18 SETS	3 SETS	74662353100..3	
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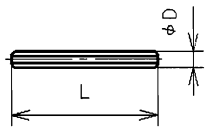
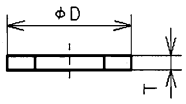
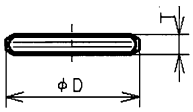
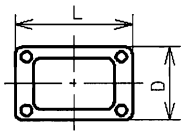
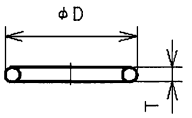
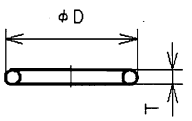
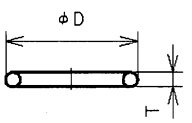
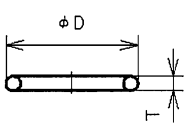
				WORK-ING	SPARE		
17	F.O. INJECTION PIPE FO ﾌﾝｼｬｶﾝ	 SIZE (mm) L:227 D:10 T:- MASS: 0.2 kg	SCM435	18	1	14667359230..D	
18	PACKING FOR CYLINDER HEAD ｼﾘﾝﾀﾞ ﾍｯﾄﾞ ﾊﾟｯｷﾝ	 SIZE (mm) L:- D:240 T:1.0 MASS: 0.045 kg	SUS304	18	1	14664401340 A	
19	PACKING FOR INLET OF CYLINDER HEAD ｼﾘﾝﾀﾞ ﾍｯﾄﾞ ｲﾘｸﾞﾁ ﾖｳ ﾊﾟｯｷﾝ	 SIZE (mm) L:- D:103 T:14 MASS: 0.023 kg	RUBBER	18	1	14667311602..3	
20	GASKET FOR EXHAUST OUTLET OF CLYINDER HEAD ｼﾘﾝﾀﾞ ﾍｯﾄﾞ ﾖｳﾊｲｷ ﾃﾞｸﾞﾁﾖｳｶﾞｽｹｯﾄ	 SIZE (mm) L:127 D:112 T:1.65 MASS: 0.01 kg	SPCC EGS ASSY.	18	1	14667313210..3	
21	PACKING FOR CYLINDER LINER ｼﾘﾝﾀﾞ ﾗｲﾅ ﾊﾟｯｷﾝ	 SIZE (mm) L:- D:205 T:6.6 MASS: 0.005 kg	RUBBER	18	1	14661301301 A	
22	PACKING FOR CYLINDER LINER ｼﾘﾝﾀﾞ ﾗｲﾅ ﾊﾟｯｷﾝ	 SIZE (mm) L:- D:204 T:6.6 MASS: 0.029 kg	RUBBER	18	1	14667301291 A	
23	O-RING FOR HYDRAULIC JACK (HEAD BOLT ﾕｱｯｼﾞｬｯｷ(ﾍｯﾄﾞ BT O-ﾘﾝｸﾞ	 SIZE (mm) L:- D:55.6 T:3.1 MASS: 0.002 kg	RUBBER		4	24321000500 J	1A-G50
24	O-RING FOR HYDRAULIC JACK (HEAD BOLT ﾕｱｯｼﾞｬｯｷ(ﾍｯﾄﾞ BT O-ﾘﾝｸﾞ	 SIZE (mm) L:- D:95.6 T:3.1 MASS: 0.003 kg	RUBBER		4	24321000900 A	1A-G90

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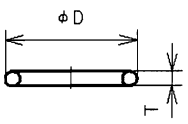
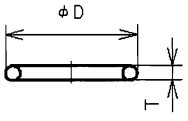
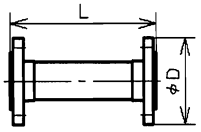
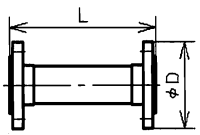
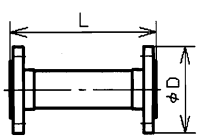
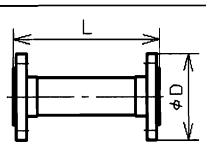
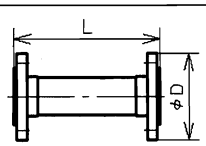
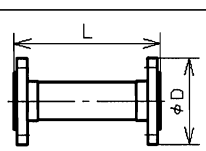
No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
25	BACK-UP RING FOR HYDRAULIC JACK (HEAD BOLT ユアツジ ャッキ(ヘッド BT バ ックアップ リング	 SIZE (mm) L:- D:55 T:1.25 MASS: 0.001 kg	RUBBER		4	24375000500..3	T2-G50
26	BACK-UP RING FOR HYDRAULIC JACK (HEAD BOLT ユアツジ ャッキ(ヘッド BT バ ックアップ リング	 SIZE (mm) L:- D:95 T:1.25 MASS: 0.001 kg	RUBBER		4	24375000900..3	T2-G90
27	FLEXIBLE TUBE フレキチューブ 15A	 SIZE (mm) L: 500 D: 80 T: MASS: kg	PURCHA-SE	9	1	43720002310CC3	W3,W4,W5
28	FLEXIBLE TUBE フレキチューブ 25A	 SIZE (mm) L: 500 D: 95 T: MASS: kg	PURCHA-SE	3	1	43720001191CC3	F3
29	FLEXIBLE TUBE フレキチューブ 40A	 SIZE (mm) L: 500 D: 120 T: MASS: kg	PURCHA-SE	6	1	43720001711CC3	L1,L2
30	FLEXIBLE TUBE フレキチューブ 50A	 SIZE (mm) L: 500 D: 130 T: MASS: kg	PURCHA-SE	3	1	43720002361CC3	MG
31	FLEXIBLE TUBE フレキチューブ 65A	 SIZE (mm) L: 500 D: 155 T: MASS: kg	PURCHA-SE	3	1	43720002241CC3	L8
32	FLEXIBLE TUBE フレキチューブ 80A	 SIZE (mm) L: 500 D: 180 T: MASS: kg	PURCHA-SE	6	1	43720002251CC3	W6,W7

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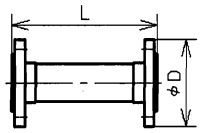
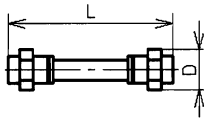
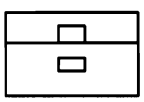
No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		PART NO.	REMARKS
				WORK-ING	SPARE		
33	FLEXIBLE TUBE フレキチューブ 25A	 SIZE (mm) L: 500 D: 130 T: MASS: kg	PURCHA-SE	3	1	43720002410CC3	A2
34	FLEXIBLE TUBE フレキチューブ φ10	 SIZE (mm) L: 300 D: 47 T: MASS: kg	PURCHA-SE	3	1	43720007860CC3	A3
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
	SPARE PARTS BOX ヨビヒンバコ	 SIZE (mm) L: D: T: MASS: kg					

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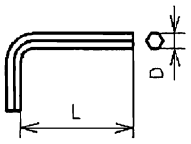
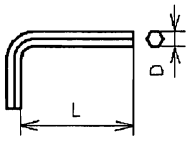
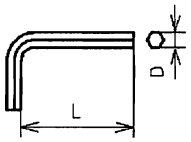
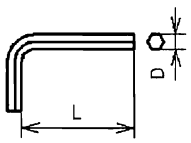
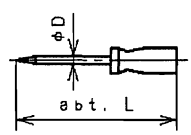
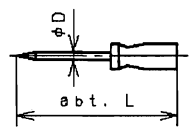
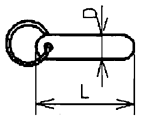
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
1	HEXAGON WRENCH KEY FOR FUEL INJECTION PUMP 燃料噴射ﾎﾟﾝﾌﾟ分解用六角棒ｽﾊﾟﾅ	 SIZE (mm) L: 100 D: 8 T: – MASS: 0.058 kg	SCM435	1		28150080000	
2	HEXAGON WRENCH KEY FOR FUEL INJECTION PUMP 燃料噴射ﾎﾟﾝﾌﾟ分解用六角棒ｽﾊﾟﾅ	 SIZE (mm) L: 90 D: 6 T: – MASS: 0.029 kg	SCM435	1		28150060000	
3	HEXAGON WRENCH KEY FOR PRESSURE SWITCH 圧力ｽｲｯﾁ用六角棒ｽﾊﾟﾅ	 SIZE (mm) L: 80 D: 5 T: – MASS: 0.018 kg	SCM435	1		28150050000	
4	HEXAGON WRENCH KEY FOR PRESSURE SWITCH 圧力ｽｲｯﾁ用六角棒ｽﾊﾟﾅ	 SIZE (mm) L: 70 D: 4 T: – MASS: 0.010 kg	SCM435	1		28150040000	
5	SCREW DRIVER (–) ﾈｼﾞﾏﾜｼ(–)	 SIZE (mm) L: 180 D: 6 T: – MASS: 0.07 kg	PURCHASE	1		28130061000	
6	SCREW DRIVER (+) ﾈｼﾞﾏﾜｼ(+)	 SIZE (mm) L: 220 D: 8 T: – MASS: 0.12 kg	PURCHASE	1		28140081000	
7	ADJUSTABLE ANGLE WRENCH ﾓﾝｷｰﾚﾝﾁ 200	 SIZE (mm) L: 205 D: – T: – MASS: 0.33 kg	PURCHASE	1		28120002000	
8	THICKNESS GAUGE FOR SUCTION VALVE 給気弁隙間調整用具	 SIZE (mm) L: 75 D:12.5 T: 0.3 MASS: 0.001 kg	SK5	1		28312300750	

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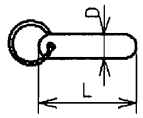
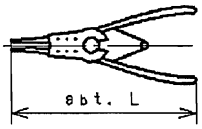
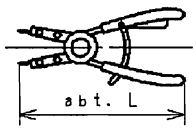
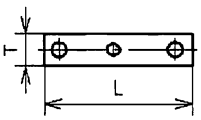
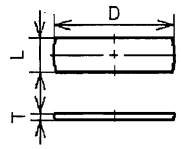
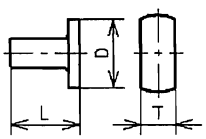
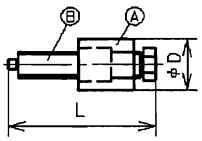
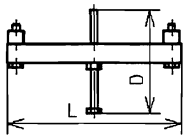
MODEL : 6EY18 DIESEL ENGINE		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORKING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
9	THICKNESS GAUGE FOR EXHAUST VALVE 排気弁隙間調整用具	 SIZE (mm) L: 75 D:12.5 T:0.60 MASS: 0.001 kg	SK5	1		14787392750	
10	PLIERS FOR CIRCLIP (ST2:FOR SHAFT) ｻｰｸﾘｯﾌﾟ用ﾌﾟﾗｲﾔ (軸用)	 SIZE (mm) L: 180 D: – T: – MASS: 0.1 kg	PURCHASE	1		28190000020	
11	PLIERS FOR CIRCLIP (RT3:FOR HOLE) ｻｰｸﾘｯﾌﾟ用ﾌﾟﾗｲﾔ (穴用)	 SIZE (mm) L: 180 D: – T: – MASS: 0.17 kg	PURCHASE	1		28190000130	
12	SETTING AND EXTRACTING TOOL FOR PLUNGER GUIDE OF FUEL INJECTION PUMP 燃料噴射ﾎﾟﾝﾌﾟ ﾌﾟﾗﾝｼﾞｬｶﾞｲﾄﾞ着脱用具	 SIZE (mm) L: 150 D: – T: 32 MASS: 0.29 kg	SS400 S45C S45C	1 2 1		14667392900 26206120952 26206120454	 M12x95 BOLT M12x45 BOLT
13	EXTRACTING TOOL FOR PROTECTION RING ﾌﾟﾛﾃｸｼｮﾝﾘﾝｸﾞ 抜出用具	 SIZE (mm) L: 90 D: 180 T: 9 MASS: 1.0 kg	SS400	1		14667392030	
14	SETTING AND EXTRACTING PIN FOR UPPER MAIN BEARING 主軸受上部ﾒﾀﾙ 着脱ﾋﾟﾝ	 SIZE (mm) L:42.5 D: 30 T:16.5 MASS: 0.07 kg	S40C	1		14667392970	
15	EXTRACTING TOOL FOR MAIN BEARING CAP 主軸受ｷｬｯﾌﾟ抜出用具	 SIZE (mm) L: 160 D: 55 T: – MASS: 1.4 kg	SS400 S45C	2 2		14667392110 14667392120	TOOL A TOOL B
16	EXTRACTING TOOL FOR MAIN BEARING CAP 主軸受ｷｬｯﾌﾟ抜出用具	 SIZE (mm) L: 275 D: 163 T: – MASS: 2.3 kg	SS400 S45C S45C S40C	1 2 1 1		14667392100 26206100602 26206121554 26706120002	METAL CAP M10x60 BOLT M12x155 BOLT M12 NUT

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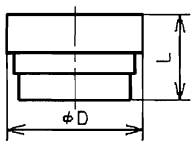
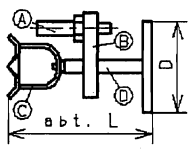
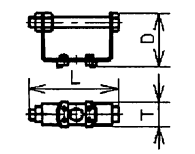
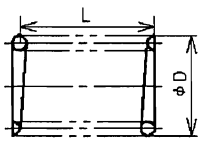
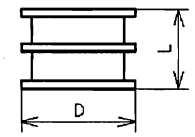
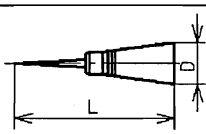
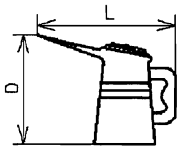
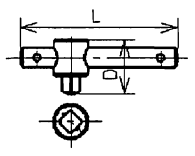
MODEL : 6EY18 DIESEL ENGINE		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORKING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
17	SETTING TOOL FOR PISTON ﾋﾟｽﾄﾝ挿入用具	 SIZE (mm) L: 130 D: 216 T: - MASS: 4.3 Kg	STKM13A	1		14662392140	
18	SETTING AND EXTRACTING TOOL FOR SUCTION AND EXHAUST VALVE SPRING 給排気弁ﾊﾞﾈ着脱用具	 SIZE (mm) L: 190 D:92.5 T: - MASS: 1.5 kg	S25C SS400 S40C SS400 S30C	1 1 1 1 1		14667392350 14667392360 26706120002 14161692330 13965392340	TOOL A TOOL B M12 NUT TOOL C TOOL D
19	LAPPING TOOL FOR SUCTION AND EXHAUST VALVE 14667392700(仕組) 給排気弁摺合せ用具	 SIZE (mm) L: 140 D: 84 T: 38 MASS: 0.5 kg	SS400 SPCC S45C SPCC S25C S40C S25C	2 1 4 4 1 1 1		14667392710 14667392720 26116060102 22137060000 26111161302 26712160002 26751160002	STOPPER BODY M6x10 BOLT M6 WASHER M16x130 BOLT M16 NUT M16 NUT
20	LAPPING SPRING FOR SUCTION AND EXHAUST VALVE 給排気弁摺合せ用ﾊﾞﾈ	 SIZE (mm) L: 110 D:25.3 T: - MASS: 0.018 kg	SWB	1		14661392250	
21	POWDER FOR LAPPING TOOL 摺合せ用具用ﾊﾟｳﾀﾞｰ	 SIZE (mm) L: 26 D: 58 T: - MASS: 0.070 kg	PURCHASE	1		28210000070	
22	OIL FEEDER 油ｻｼ	 SIZE (mm) L: 181 D: 51 T: - MASS: 0.02 kg	PURCHASE	1		28210000140	
23	OIL FEEDER 油ｻｼ	 SIZE (mm) L: 280 D: 240 T: - MASS: 0.17 kg	PURCHASE	1		28210000130	
24	SLIDING T HANDLE FOR SOCKET ｿｹｯﾄ用 ｽﾗｲﾃﾞｨﾝｸﾞ Tﾊﾝﾄﾞﾙ	 SIZE (mm) L: 500 D: 60 T: - MASS: 1.26 kg	PURCHASE	1		14261392810	

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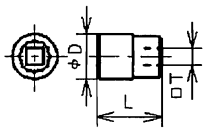
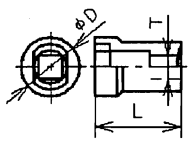
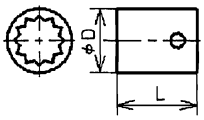
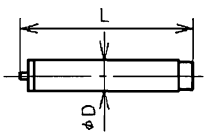
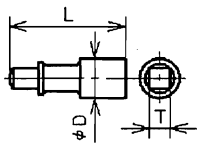
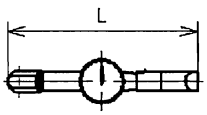
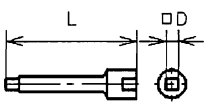
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORKING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
25	SOCKET ソケット	 SIZE(mm) L: D: T: MASS (kg)					
	24	55 33.0 19.1 0.20	PURCHASE	1		42111001850	
	36	58 51.0 19.1 0.30	PURCHASE	1		42112002740	
26	SOCKET FOR TIGHTENING OF FUEL INJECTION VALVE 燃料噴射弁取付用ソケット	 SIZE (mm) L: 70 D: 48 T:19.1 MASS: 0.5 kg	SCM435	1		14667392260	
27	BOX SPANNER FOR CONNECTING ROD BOLT (A) 連接棒ボルト用ボックススパナ(A) 32	 SIZE (mm) L: 130 D: 46 T: - MASS: 1.1 kg	SCM435 S45C	1 1		14667392850 13965392770	HEXAGON SCREW
28	DISASSEMBLY TOOL FOR NOZZLE SLEEVE ノズルスリーブ分解用具	 SIZE (mm) L: 175 D: 48 T: - MASS: 2.4 kg	S45C	1		14667392250	
29	EXTENSION BAR FOR SOCKET WRENCH ソケットレンチ用エクステンションバー	 SIZE (mm) L: 200 D: 37 T:19.1 MASS: 0.8 kg	PURCHASE	1		42112002930	
30	TORQUE WRENCH FOR FUEL INJECTION VALVE 燃料噴射弁用トルクレンチ	 SIZE (mm) L: 320 D: - T: - MASS: 0.6 kg	PURCHASE	1		15263392251	
31	EXTENSION BAR FOR FUEL INJECTION VALVE 燃料噴射弁用エクステンションバー	 SIZE (mm) L: 150 D: 9.5 T: - MASS: 0.4 kg	PURCHASE	1		14667392790	
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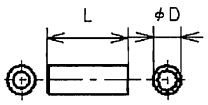
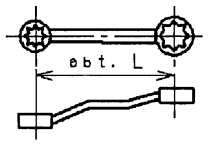
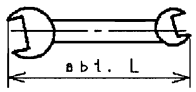
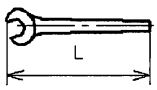
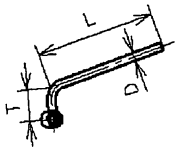
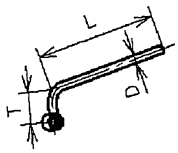
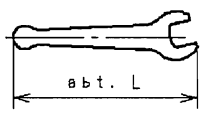
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORKING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
32	SOCKET FOR FUEL INJECTION VALVE 燃料噴射弁用ｿｹｯﾄ 17	 SIZE (mm) L: 27 D:23.1 T: - MASS: 0.1 kg	PURCHASE	1		14261392740	
33	OFFSET WRENCH ﾒｶﾞﾈﾚﾝﾁ 17x19	 SIZE (mm) L: 255 D: - T: - MASS: 0.26 kg	S55C	1		28160170190	
34	DOUBLE ENDED SPANNER 両口ｽﾊﾟﾅ	 SIZE: (mm) MASS: (kg)					
	10x13	L: 130 0.06	S45C	1		28110100130	
	17x19	180 0.20	S45C	1		28110170190	
	22x24	218 0.23	S45C	1		28110220240	
	27x30	267 0.49	S45C	1		28110270300	
	32x36	305 0.55	S45C	1		28110320360	
	41x46	378 1.00	S45C	1		28110410460	
35	SINGLE ENDED SPANNER FOR ADJUSTING OF FUEL INJECTION VALVE 燃料噴射弁開弁圧調整用 片口ｽﾊﾟﾅ 41	 SIZE (mm) L: 360 D: - T: - MASS: 0.85 kg	PURCHASE	1		14667392270	
36	DISASSEMBLY AND REASSEMBLY BOX SPANNER FOR FUEL INJECTION PUMP 燃料噴射ﾎﾟﾝﾌﾟ分解組立用ﾎﾞｯｸｽｽﾊﾟﾅ	 SIZE (mm) L: 350 D: 14 T: 55 MASS: 0.54 kg	SCM435 S45C	1		14667392560	
37	DISASSEMBLY AND REASSEMBLY BOX SPANNER FOR FUEL INJECTION PUMP 燃料噴射ﾎﾟﾝﾌﾟ分解組立用ﾎﾞｯｸｽｽﾊﾟﾅ	 SIZE (mm) L: 350 D: 14 T: 55 MASS: 0.54 kg	SCM435 S45C	1		14667392570	
38	SINGLE ENDED SPANNER 片口ｽﾊﾟﾅ 24	 SIZE (mm) L: 216 D: - T: - MASS: 0.25 kg	S45C	1		13860392510	

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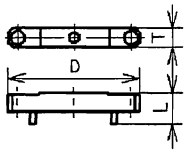
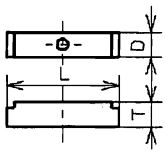
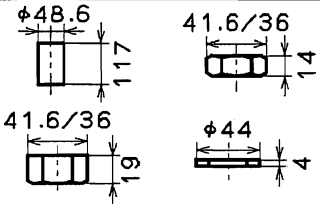
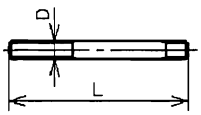
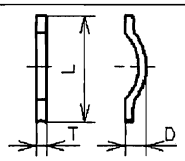
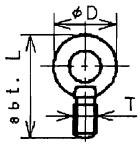
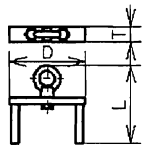
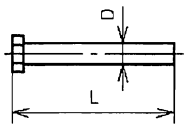
TOOLS	746623-92060	PAGE	6/8
MODEL : 6EY18 DIESEL ENGINE		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
39	EXTRACTING TOOL FOR CYLINDER LINER (A) シリンダライナ抜出用具 (A)	 SIZE (mm) L: 82 D: 348 T: 50 MASS: 5.8 kg	SS400	1		14667392010	REMOVER (LINER UPPER
40	EXTRACTING TOOL FOR CYLINDER LINER (B) シリンダライナ抜出用具 (B)	 SIZE (mm) L: 204 D: 44 T: 44 MASS: 2.82 kg	SS400	1		14666392020	REMOVER (LINER LOWER
41	EXTRACTING TOOL FOR CYLINDER LINER (C) シリンダライナ抜出用具 (C)	 MASS: 1.1 kg	SGP S40C S40C SPCC	2 2 1 1		13965392040 26732240002 26772240002 22137240000	DISTANCE PIECE M24 NUT M24 NUT M24 WASHER
42	EXTRACTING TOOL FOR CYLINDER LINER (D) シリンダライナ抜出用具 (D)	 SIZE (mm) L: 750 D: M24 T: – MASS: 3.29 kg	S25C	1		13765592030	REMOVER BOLT
43	SETTING TOOL FOR UPPER MAIN BEARING 主軸受上部メタル挿入用具	 SIZE (mm) L: 210 D: 42 T: 22 MASS: 0.6 kg	SS400	1		14667392950	
44	LIFTING TOOL FOR PISTON OR AIR COOLER ピストン又は空気冷却器用吊上用具	 SIZE (mm) L: 73 D: 50 T: M12 MASS: 0.10 kg	SS400	2		26610120002	
45	LIFTING TOOL FOR CYLINDER HEAD (A) シリンダヘッド吊上用具 (A)	 SIZE (mm) L: 213 D: 172 T: 50 MASS: 3.2 kg	SS400 SS400 S45C	1 1 1		14667392310 26620160002 26116160452	 M16 EYENUT M16x45 BOLT
46	LIFTING TOOL FOR CYLINDER HEAD (B) シリンダヘッド吊上用具 (B)	 SIZE (mm) L: 125 D: 16 T: – MASS: 0.2 kg	SS400	2		14667392320	

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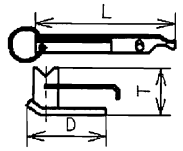
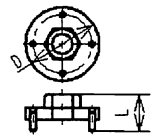
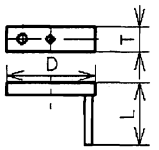
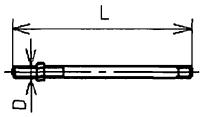
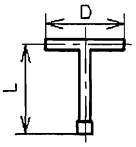
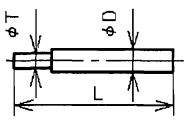
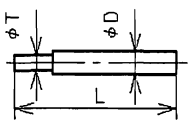
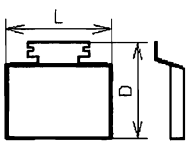
TOOLS	746623-92060, 746623-92150	PAGE	7/8
MODEL : 6EY18 DIESEL ENGINE		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
47	PRIMING TOOL FOR FUEL INJECTION PUMP 14662392910(仕組) 燃料噴射ﾎﾟﾝﾌﾟ用 ﾌﾟﾗｲﾐﾝｸﾞ用具	 SIZE (mm) L: 400 D:59.3 T: 45 MASS: 0.7 Kg	SS400 SS400 SS400 PURCHASE	1 1 2 1		14662392920 14662392930 14161692941 14161692950	TOOL A TOOL C TOOL B RING
48	TIGHTENING TOOL FOR COOLING WATER PUMP IMPELLER 冷却水ﾎﾟﾝﾌﾟ ｲﾝﾍﾟﾗ締付用具	 SIZE (mm) L:37.5 D: 75 T: - MASS: 0.5 kg	S45C	1		14667392751	
49	EXTRACTING TOOL FOR FUEL INJECTION VALVE (A) 燃料噴射弁抜出用具(A)	 SIZE (mm) L: 173 D: 172 T: 50 MASS: 2.7 kg	SS400	1		14667392340	ATTACHED TO SUPPORT OF ROCKER ARM
50	EXTRACTING TOOL FOR FUEL INJECTION VALVE (B) 燃料噴射弁抜出用具(B)	 SIZE (mm) L: 203 D: M16 T: - MASS: 0.35 kg	S45C S40C	1 1		14667392330 26732160002	BOLT M16 NUT
51	T HANDLE FOR INDICATOR COCK ｲﾝｼﾞｹｰﾀｺｯｸ用 Tﾊﾝﾄﾞﾙ	 SIZE (mm) L: 150 D: 120 T: - MASS: 0.22 kg	SS400	1		15360592360	
52	BOX SPANNER HANDLE FOR CONNECTING ROD BOLT (B) 連接棒ﾎﾞﾙﾄ用 ﾎﾞｯｸｽｽﾊﾟﾅﾊﾝﾄﾞﾙ(B)	 SIZE (mm) L:1400 D: 30 T: 26 MASS: 7.6 kg	S45C	1		13898792760	LOOSE SUPPLY 単品付属品
53	TURNING BAR FOR FLYWHEEL ﾊｽﾞﾐ車ﾀｰﾆﾝｸﾞﾊﾞｰ	 SIZE (mm) L:1000 D: 28 T: 26 MASS: 4.78 kg	SS400	1		13760092910	LOOSE SUPPLY 単品付属品
54	OIL PAN FOR LUB. OIL FILTER 潤滑油こし器分解用 受け皿	 SIZE (mm) L: 240 D: 220 T: - MASS: 0.7 kg	SPCC S45C	1 2		14662392360 26206080122	M8x12 BOLT
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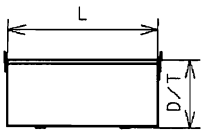
TOOLS	746623-92060	PAGE	8/8
MODEL : 6EY18 DIESEL ENGINE		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		PART NO.	REMARKS
				WORK-ING	SPARE		
	TOOL BOX 用具箱	 SIZE (mm) L: 800 D: 450 T: 360 MASS: 37 kg	PURCHASE	1		42112007291	

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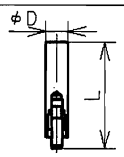
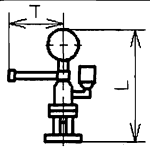
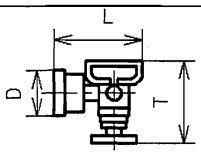
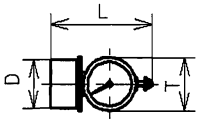
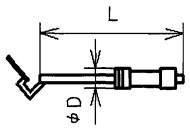
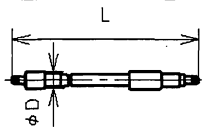
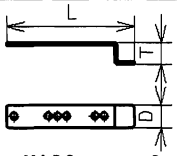
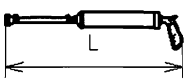
SPECIAL TOOLS		PAGE	1
MODEL 6EY18AL DIESEL ENGINE (3) ENGS.		SHIP NO.	3002
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
1	SETTING TOOL FOR STEM SEAL ステムシールソウニュウヨウグ	 SIZE (mm) L:141 D:30 T: MASS: 0.72 kg	S45C S25C	1		14667492050..3	
2	NOZZLE TESTER ASSY. ノズルテスタシクミ	 SIZE (mm) L:430 D:- T:260 MASS: 8.0 kg	STS410 S40C (ASSY.)	1 SET		74161693110	
3	INDICATOR (TYPE 25MPA) サイコウシアツキ (25MPA)	 SIZE (mm) L:120 D:71.2 T:133 MASS: 1.0 kg	PURCHA-SE	1		14767393753..3	
4	DEFLECTION GAUGE デフレクションゲージ	 SIZE (mm) L:98 D:32 T:46.5 MASS: 0.48 kg	PURCHA-SE	1		42111000040..3	
5	MIRROR FOR DEFLECTION GAUGE デフレクションゲージヨウミラー	 SIZE (mm) L:690 D:40 T:- MASS: 1.05 kg	PURCHA-SE	1		42111001420..3	
6	INSIDE MICROMETER インサイドマイクロメータ	 SIZE (mm) L:200 D:- T:- MASS: 0.3 kg	PURCHA-SE	1		42111001980..3	
7	ATTACHMENT FOR INSIDE MICROMETER シリンダライナ ナイケイ ケイソクイチ シジヨウグ	 SIZE (mm) L:425 D:30 T:32.3 MASS: 0.24 kg	SPCC	1		42111003990..3	
8	BLOWER CLEANING TOOL FOR TURBOCHARGER ブロワセンジョウソウチ	 SIZE (mm) L:1140 D: T: MASS: 1.5 kg	ASSY.	1		15360292900..3	

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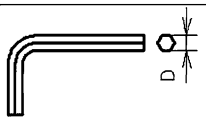
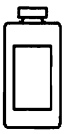
SPECIAL TOOLS		PAGE	2
MODEL 6EY18AL DIESEL ENGINE (3) ENGS.		SHIP NO.	3002
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		PART NO.	REMARKS
				WORK-ING	SPARE		
9	HEXAGON WRENCH KEY FOR AIR STARTER エアスタータヨウ ロツカクボ ウスパ ナ	 SIZE (mm) L:- D:- T:- MASS: 0.5 kg	ASSY. D:2.4 D:3.2 D:4.7	1		14667392980..3	D:6.3 D:7.9 D:9.5 D:11.2 D:12.7
10	ETHYLENE GLYCOL エチレングリコール	 SIZE (mm) L:- D:- T:- MASS: 1.4 kg	PURCHA-SE	3		41650003380..3	FOR SEAL POT
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					
		SIZE (mm) L: D: T: MASS: kg					

MFR'S NAME & ADDRESS	YANMAR CO., LTD. HIGASHI-DORI NAGASU, AMAGASAKI, JAPAN.

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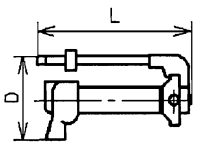
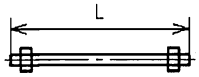
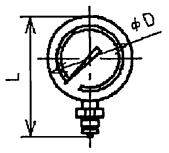
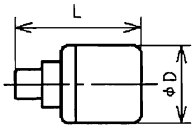
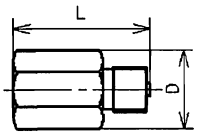
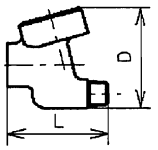
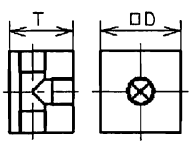
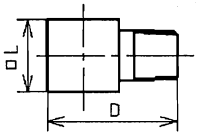
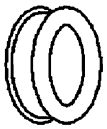
TOOLS	746673-92112	PAGE	1/2
MODEL : 6N18, 6·8N21 DIESEL ENGINE (FOR HYDRAULIC PUMP)		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
1	HYDRAULIC PUMP 油圧ﾎﾟﾝﾌﾟ	 SIZE (mm) L: 590 D: 165 T: – MASS: 7 kg	PURCHASE	1		14667392200	
2	HOSE FOR HYDRAULIC PUMP 油圧ﾎﾟﾝﾌﾟ用ｺﾞﾑﾎｰｽ	 SIZE (mm) L:3000 D: – T: – MASS: 4.6 kg	PURCHASE	1		15362592760	
3	PRESSURE GAUGE 圧力計	 SIZE (mm) L: 147 D: 103 T: – MASS: 0.5 kg	PURCHASE	1		15362592801	
4	COUPLER ｵｽｶｯﾌﾟﾗｰ	 SIZE (mm) L: 48 D:28.5 T: – MASS: 0.12 kg	PURCHASE	4		15362592770	
5	GAUGE DUMPER ｹﾞｰｼﾞﾀﾞﾝﾊﾟｰ	 SIZE (mm) L: 54 D:33.5 T: – MASS: 0.4 kg	PURCHASE	1		15360592481	
6	JOINT FOR PRESSURE GAUGE 圧力計用取付金具	 SIZE (mm) L: 71 D: 71 T: – MASS: 0.7 kg	PURCHASE	1		14667392210	
7	BRANCH ﾌﾞﾗﾝﾁ	 SIZE (mm) L: – D: 50 T: 40 MASS: 0.7 kg	S45C	1		14667392220	
8	ELBOW 角ｴﾙﾎﾞ	 SIZE (mm) L: 28 D: 48 T: – MASS: 0.12 kg	PURCHASE	2		15160592740	
MFR'S NAME & ADDRESS	YANMAR CO., LTD. HIGASHI-DORI NAGASU, AMAGASAKI, JAPAN.						

2006.3.20

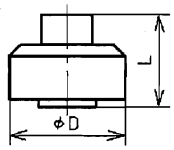
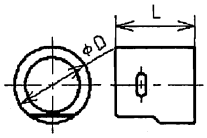
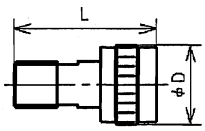
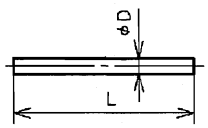
TOOLS	746673-92112	PAGE	2/2
MODEL : 6N18, 6·8N21 DIESEL ENGINE (FOR HYDRAULIC PUMP)		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
9	HOSE FOR HYDRAULIC PUMP 油圧ポンプ用ゴムホース	 SIZE (mm) L:1000 D: – T: – MASS: 3.0 kg	PURCHASE	4		15362592750	
10	SEAL TAPE シールテープ	 SIZE (mm) L: – D: – T: – MASS: – kg	PURCHASE	1		14667392190	

MFR 'S NAME & ADDRESS	YANMAR CO., LTD. HIGASHI-DORI NAGASU, AMAGASAKI, JAPAN.

2006.3.20

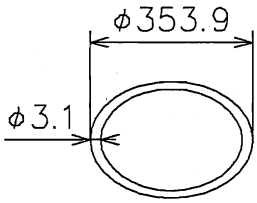
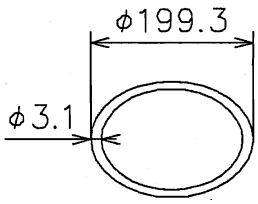
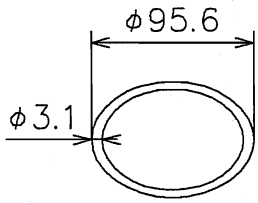
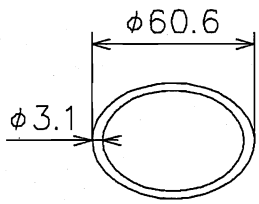
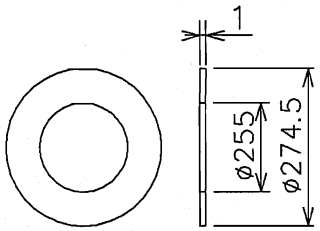
TOOLS	746673-92132	PAGE	1/1
MODEL : 6N18 DIESEL ENGINE (FOR HYDRAULIC JACK)		SHIP NO.	
		BOX NO.	

No	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP WORK-ING	SUPPLY PER SHIP SPARE	PART NO.	REMARKS
1	HYDRAULIC JACK FOR CYLINDER HEAD BOLT, MAIN BEARING CAP BOLT ｼﾘﾝﾀﾞｰﾍｯﾄﾞﾎﾞﾙﾄ, 主軸受ｷｬｯﾌﾟﾎﾞﾙﾄ用 油圧ｼﾞｬｯｷ	 SIZE (mm) L: 85 D:117.4 T: - MASS: 3.56 kg	ASSY	4		14667392613	
2	DISTANCE PIECE FOR HYDRAULIC JACK, CYLINDER HEAD BOLT, MAIN BEARING CAP BOLT 油圧ｼﾞｬｯｷ用間座 (ｼﾘﾝﾀﾞｰﾍｯﾄﾞﾎﾞﾙﾄ, 主軸受ｷｬｯﾌﾟﾎﾞﾙﾄ)	 SIZE (mm) L: 70 D: 75 T: - MASS: 1.0 kg	S45C	4		14667392481	
3	COUPLER ﾒｽｶｯﾌﾟﾗｰ	 SIZE (mm) L: 59 D:30.5 T: - MASS: 0.12 kg	PURCHASE	4		15362592780	
4	TURNING HANDLE ﾀｰﾆﾝｸﾞﾊﾝﾄﾞﾙ	 SIZE (mm) L: 100 D: 4.5 T: - MASS: 0.01 kg	SWP-B	1		14667392510	

MFR 'S NAME & ADDRESS	YANMAR CO., LTD. HIGASHI-DORI NAGASU, AMAGASAKI, JAPAN.

2006.3.20

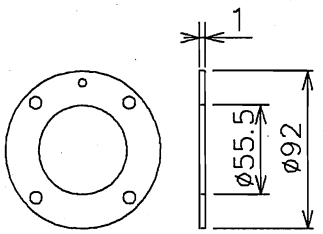
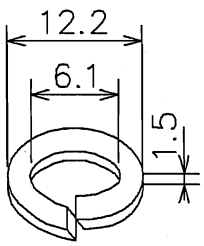
SPARES	C3-00000-8630(1/2)	PAGE	1
For MET18SRC x 1Set ( )		SHIP NO.	
		BOX NO.	

NO.	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		DRAWING		REMARKS (Kg)
				Work' /unit	SPARE	NO.	PART NO.	
1	O Ring Oリング		Rubber (4D)	1	1	N36-361-0063-1	306	0.013
2	O Ring Oリング		Rubber (4D)	1	1	N36-361-0064-1	472	0.007
3	O Ring Oリング		Rubber (4D)	1	1	361-031-090-6	362	0.002
4	O Ring Oリング		Rubber (4D)	1	1	361-031-055-6	373	0.001
5	Gasket ガスケット		SPCC	1	1	N36-362-0161-1	309	0.06

MFR'S NAME &ADDRESS	NAGASAKI SHIPYARD & MACHINERY WORKS. MITSUBISHI HEAVY INDUSTRIES,LTD

2008.11.13

SPARES	C3-00000-8630(2/2)	PAGE	2
For MET18SRC x 1Set ( )		SHIP NO.	
		BOX NO.	

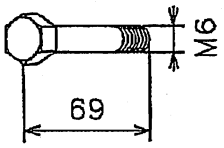
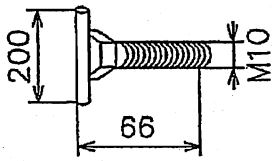
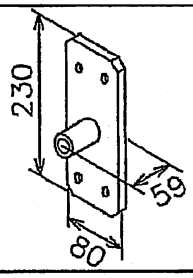
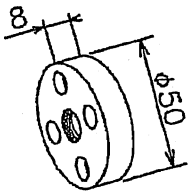
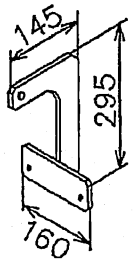
NO.	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		DRAWING		REMARKS (Kg)
				Work' /unit	SPARE	NO.	PART NO.	
6	Gasket ガスケット		SPCC	1	1	N36-362-0231-1	357	0.01
7	Spring Washer ば ね 座 金 M6		Hard Steel Wire (SWRH62)	4	4	168-400-106-2	323	0.001

MFR'S NAME &ADDRESS	NAGASAKI SHIPYARD & MACHINERY WORKS. MITSUBISHI HEAVY INDUSTRIES,LTD

2008.11.13

N36-18M-0005

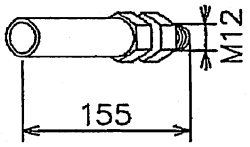
TOOLS	C3-00000-8600(1/2)	PAGE	1
Exhaust-Gas Turbocharger MET18SRC ( )		SHIP No.	
		BOX No.	

No.	NAME	SKETCH	MATERIALS	SUPPLY PER SHIP	DRAWING		REMARKS (Kg)
				WORK-ING	No.	PART No.	
1	Hex. Bolt M6×65 六角ボルト		Rolled Steel (SS400)	2	T-13	N36-101-0039	0.019
2	Starting Bolt for Draw-out tube M10×50 引抜管用 押上ボルト		Rolled Steel (SS400)	1	T-23	N36-Y02-5005	0.14
3	Locking Box ロッキングボックス		Carbon Steel (S45C)	1	T-43	N36-Y02-5004	1.40
4	Puller 引抜要具		Rolled Steel (SS400)	1	T-45	N36-982-5001	0.11
5	Slinging Device つり金具		Rolled Steel (SS400)	1	T-76	N36-Y02-5003	1.66

MFR'S NAME &ADDRESS	NAGASAKI SHIPYARD & MACHINERY WORKS. MITSUBISHI HEAVY INDUSTRIES,LTD

N36-18M-0005

TOOLS	C3-00000-8600(2/2)	PAGE	2
Exhaust-Gas Turbocharger MET18SRC ( )		SHIP No.	
		BOX No.	

No.	NAME	SKETCH	MATERIALS	SUPPLY PER SHIP	DRAWING		REMARKS (Kg)
				WORK-ING	No.	PART No.	
6	Starting Bolt 押上ボルト		Rolled Steel (SS400)	2	T-121	N36-Y00-5004-A	0.184

MFR'S NAME &ADDRESS	NAGASAKI SHIPYARD & MACHINERY WORKS. MITSUBISHI HEAVY INDUSTRIES,LTD

DATE DEC. 22 '08

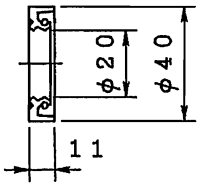
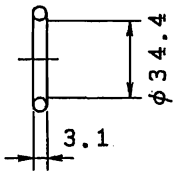
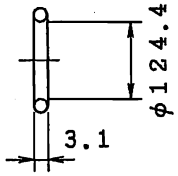
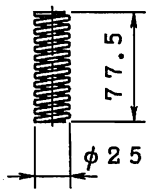
SHIPBUILDER

DRAWN Yamasaki

SHIP NO.

CHECK Yamawaki

MODEL	TITLE
GV-43P (N)	SPARE PARTS FOR LO PRIMING PUMP 4 (5) m^3/h × 0.15MPa × 1.5kW × 1750min^{-1}

NO.	NAME	SKETCH·SIZE	MATERIAL	QTY./1SHIP		WEIGHT		REMARKS
				WORK	SPARE	ONE	TOTAL	
1	OIL SEAL		NBR	1	1	0.016	—	TC204011
2	O RING		NBR	1	1	0.003	—	G-35
3	O RING		NBR	1	1	0.005	—	G-125
4	SAFETY VALVE SPRING		SWPA	1	1	0.07	—	

TOTAL MASS 0.094 kg

MANSEI INC.

(46130-058781)
(46130-060350)

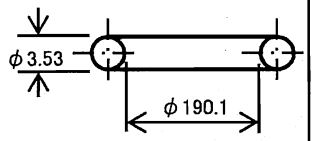
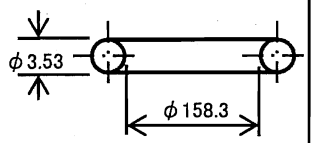
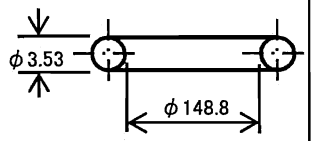
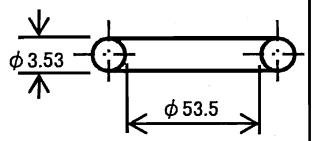
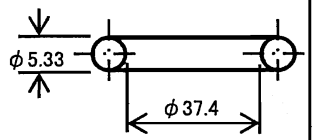
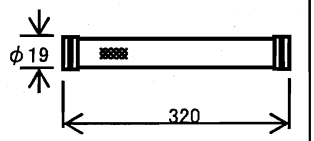
P18-10-001

SPARE PARTS

C3-00000-8891(1/1)

AUTOMATIC BACK-FLUSHING FILTER

MODEL : 6.46 DN50

NO.	NAME	SKETCH	MATERIAL	SUPPY PER JOB		DRAWING		REMARKS
				EQUIP	SPARE	NO.	POS.	
1	O-RING		NBR	1	1	Z113241	60	3035184
2	O-RING		NBR	1	1	Z113241	61	3040109
3	O-RING		NBR	2	2	Z113241	62	3040108
4	O-RING		NBR	1	1	Z113241	65	3031743
5	O-RING		NBR	1	1	Z113241	66	3040115
6	FILTER CANDLE		POLYESTER	19	1	Z113241	7	1360014 with POS#63

Bollfilter Japan Ltd.

Toroa Kobe Bldg. 7F, Hachiman-dori, Chuo-ku, Kobe 651-0085

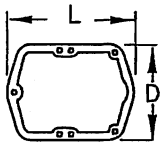
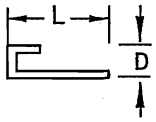
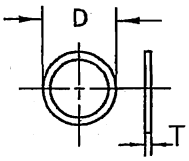
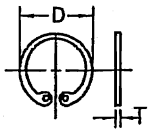
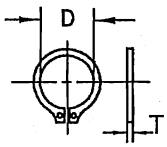
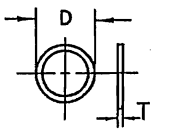
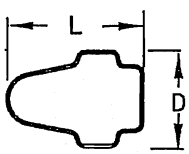
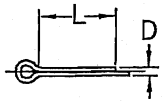
Tel : +81-78-242-8550, Fax : +81-78-242-8515

SPARES	KIT NO. 8934-705		LTR NEW

PAGE	1/2
SHIP No.	
BOX No.	

FOR PSG (CAST CASE)

WOODWARD GOVERNOR STANDARD SPARE PARTS

No.	NAME	SKETCH		MATERIAL	SUPPLY WORK UNIT	SUPPLY SPARE	MANUAL No.	REF. No.	REMARKS
1	GASKET ガスケット		SIZE(mm) L: 120 D: 89 T: 0.8 W:0.01Kg	Pulp & Rubber	1	1	37017	64	40419
2	PIN ピン		SIZE(mm) L: 25.7 D: 11.5 T: 1.9 W: 0.01Kg	Steel	1	1	37017	54	40793
3	RING スピロックス リング		SIZE(mm) L: D: 55.0 T: 1.2 W: 0.01Kg	Steel	1	1	37017	38	190141
4	SNAP RING スナップリング		SIZE(mm) L: D: 13.9 T: 1.2 W: 0.01Kg	Steel	1	1	37017	11	190186
5	SNAP RING スナップリング		SIZE(mm) L: D: 14.7 T: 1.0 W: 0.01Kg	Steel	1	1	37017	37	190683
6	WASHER ワッシャー		SIZE(mm) L: D: 22.2 T: 0.8 W: 0.01Kg	Copper	2	2	37017	17	186492
7	SEAL シール		SIZE(mm) L: 95.4 D: 66 T: 1.8 W: 0.01Kg	Rubber	1	1	37017	74	206573
8	PIN-COTTER カッターピン		SIZE(mm) L: 19.1 D: 2.4 T: W: 0.01Kg	Steel	1	1	37017	293	1001-845

Jpn. Original

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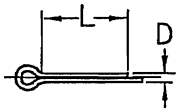
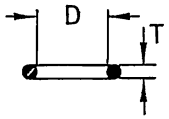
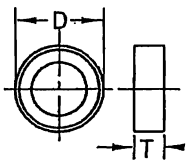
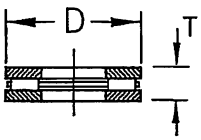
SPARES	KIT NO. 8934-705		LTR NEW	PAGE 2/2
FOR PSG (CAST CASE) WOODWARD GOVERNOR STANDARD SPARE PARTS				SHIP No.
				BOX No.

No.	NAME	SKETCH	MATERIAL	SUPPLY WORK UNIT	SUPPLY SPARE	MANUAL No.	REF. No.	REMARKS
9	PIN-COTTER カッターピン	 SIZE(mm) L: 25.4 D: 2.4 T: W:0.01Kg	Steel	2	2	37017	308	1001-847
10	PACKING パッキング	 SIZE(mm) L: D: 4.5 T: 1.8 W:0.01Kg	Rubber	1	1	37017	8	1355-029
11	SEAL-OIL オイルシール	 SIZE(mm) L: D: 14.4 T: 4.1 W:0.01Kg	Steel & Rubber	2	2	37017	48	182729
12	BEARING ベアリング	 SIZE(mm) L: D: 15.5 T: 7.2 W:0.01Kg	Steel	1	1	37017	39	5303-007

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