

# SPECIFICATIONS

MITSUBISHI HIGH SPEED DIESEL ENGINE  
 MODEL MITSUBISHI S4S-Z361SD △

EU EMISSION CONTROL ENGINE (STAGE 3A)

APPLICATION  
FOR APPROVAL



PLEASE RETURN AFTER APPROVAL

APPROVED		REMARKS		
DATE · SIGNATURE				
DATE Oct. 16. 2009 MITSUBISHI HEAVY INDUSTRIES, LTD.				
CHG	DATE	APPROVED	CHECKED	DRAWN
△	Jul. 16. 2012	<i>R. Nagase</i>	<i>K. Taketani</i> <i>K. Sawazaki</i>	A.IZAKA
△	Sep. 24. 2010			

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**Revised record**

No.	Date	Items	New	Old	Remarks	
△	Sep. 24. 2010	MHI No.	32A00-03940	32A98-62101		
		Model	S4S-Z361SD	S4S	model name change	
		Regulations 97/68/EC Stage3A certified engine family S4S-DG3A (engine type ; S4S-DG 31.3kW-A1) 97/68/EC as last amended by 2010/26/EC				spec add
		Oil consumption	Approx. 0.1 ~ 0.3% of fuel consumption <reference value> @ Full load rated speed	Within 2.7g/kW-h	spec change	
		Engine attached items				spec add
		OIL FILTER	32A40-00400	—		
		COOLING FAN(6P-440)	32A48-00400	—		
		FILTER ASSY,FUEL	34462-00011	—		
		STARTER(12V-2.2kW)	32A66-10101	—		
		PLUG,GLOW	32A66-03102	—		
ALTERNATOR(12V-50A)	32A68-00302	—				
SOLENOID ASSY	30A87-17010	—				
△	Jul. 16. 2012	SDMO NO.	301010 97401	—	Addition	
		Model MHI No.	32A00-03941 1/2-CHG0,2/2-CHG0	32A00-03940	Addition of oil filler	
		Dimensions (Width)	Approx. 598mm	Approx. 593mm		
		Fuel pump	Yes(Built in injection pump)	—	Addition spec	
		Engine attached item & reference drawings parts change				
		STARTER(12V-2.2kW)	32A66-20100	32A66-10101	Interchangeable	
		SOLENOID ASSY	32A87-17010	30A87-17010	Correction	

## 1. Principal Particulars of Diesel Engine

### General Specification

Standard	All items, unless otherwise specified, are in accordance with JIS and maker's standards
△ Model	Mitsubishi S4S-Z361SD
△△	MHI No. 32A00-03941 1/2-CHG0,2/2-CHG0
△ Regulations	97/68/EC Stage3A certified engine family S4S-DG3A (engine type ; S4S-DG 31.3kW-A1) 97/68/EC as last amended by 2010/26/EC
Type	4 cycle water-cooled, vertical overhead valve, cylinder in line, swirl chamber type
Number of cylinders	4
Bore × Stroke	94mm × 120mm
Piston displacement	3.331 liters
Compression ratio	22 : 1
Rotation	Anti-Clockwise rotation as viewed from flywheel side
Firing order	1-3-4-2
Engine weight(Dry)	Approx. 245kgf
Dimensions(Length)	Approx. 780mm
△ (Width)	Approx. 598mm
(Height)	Approx. 710mm
Inclination(Continuous)	15°
(Temporary)	25°
Fuel	ASTM diesel fuel oil No.2-D(JIS K2204 gas oil specification No.2 or 3)
Lubricating oil	API classification service CF, CF-4 or CH-4 class
Output(Without fan)	St-by ; 31.3kW{42.5PS}/1485rpm Prime ; 28.3kW{38.5PS}/1485rpm (With Fan St-by ; 30.5kW{41.5PS}/1485rpm) (With Fan Prime ; 27.6kW{37.5PS}/1485rpm) (Output Tolerance ; ±5%)
Idling engine speed	Max 1567rpm (Governor lever is fixed)
Speed regulation	Steady state speed regulation at rated speed, within 5.5%
Rating conditions(Without fan)	ISO 15550 Total barometric pressure : 100kPa Air temperature : 298K Relative humidity : 30%
Fuel consumption(Without fan)	Approx. 258g/kW-h{190g/PS·h} at Prime output and standard air conditions
△ Oil consumption	Approx. 0.1 ~ 0.3% of fuel consumption <reference value> @ Full load rated speed
Fuel injection timing	18°BTDC
Mean effective pressure	0.69MPa{7.0kgf/cm <sup>2</sup> } at Prime(Without fan)
Piston speed	6.0m/s at 1500rpm

**Fuel system**

Fuel injection pump	In-Line type
Fuel injection nozzle	Throttle type
Governor	Mechanical centrifugal type
Fuel filter	Filtering paper type
△ Fuel pump	Yes(Built in injection pump)

**Lubricating system**

Lubricating system	Forced lubrication by trochoid gear pump
Lubricating oil filter	Filtering paper type, full flow
Oil pressure	0.19~0.39MPa (2~4kgf/cm <sup>2</sup> ) at duty run 0.1MPa (1.0kgf/cm <sup>2</sup> ) min. at low idling
Oil capacity	Approx. 10.0 liters (Oil pan high level 9.0 liters, Oil filter etc.) Approx. 1.0 liters, High ~ Low Approx. 3.0 liters)
Oil dipstick	Standard dipstick
Oil pressure switch	Yes
Oil pressure unit	No

**Cooling system**

Cooling system	Forced circulation of fresh water by centrifugal pump with thermostat
Engine water capacity	Approx. 5.5 liters
Cooling fan	Yes; 440mm diameter, pusher
Water pump pulley	PCD 116mm
Pulley ratio	1.38 ( Crankpulley : Water pump pulley = 160 : 116 )
Fan spacer	22mm thickness
Water temp. switch	Yes
Thermo. Unit	No
Thermostat	Open at 76.5deg.C - full open at 90deg.C

**Electrical system**

Alternator	12V - 50A
Voltage regulator	IC type (Built in alternator)
Regulator set voltage	14.7 ±0.3 V at Reg. temp:20°C, Na=5000rpm, I <sub>load</sub> =5~10A(Batt+R)
Alternator pulley	PCD 70mm
Starting system	Electric starting
Starter motor	12V-2.2kW
Glow plug	10.5V,9.7A x 4
Engine shut off system	Electric solenoid (ETR) <ul style="list-style-type: none"> <li>•No permitted to use S-terminal(stater) in the pull coil circuit</li> <li>•Before closing starter circuit,stop lever must be energized to 'run' position</li> <li>•Please note that battery condition and cable resistance affect the stop lever movement</li> </ul>

**Intake and Exhaust system**

Intake manifold(cover)	Rear Side way
Exhaust manifold	Side way
Induction Resistance	Max 1.96kPa{200mmH <sub>2</sub> O}
Exhaust Back Pressure	Max 6.67kPa{680mmH <sub>2</sub> O}

**<Remarks>**

Engine color	Black(MHI standard color)
Flywheel	11-1/2 inch
Flywheel housing	SAE #3

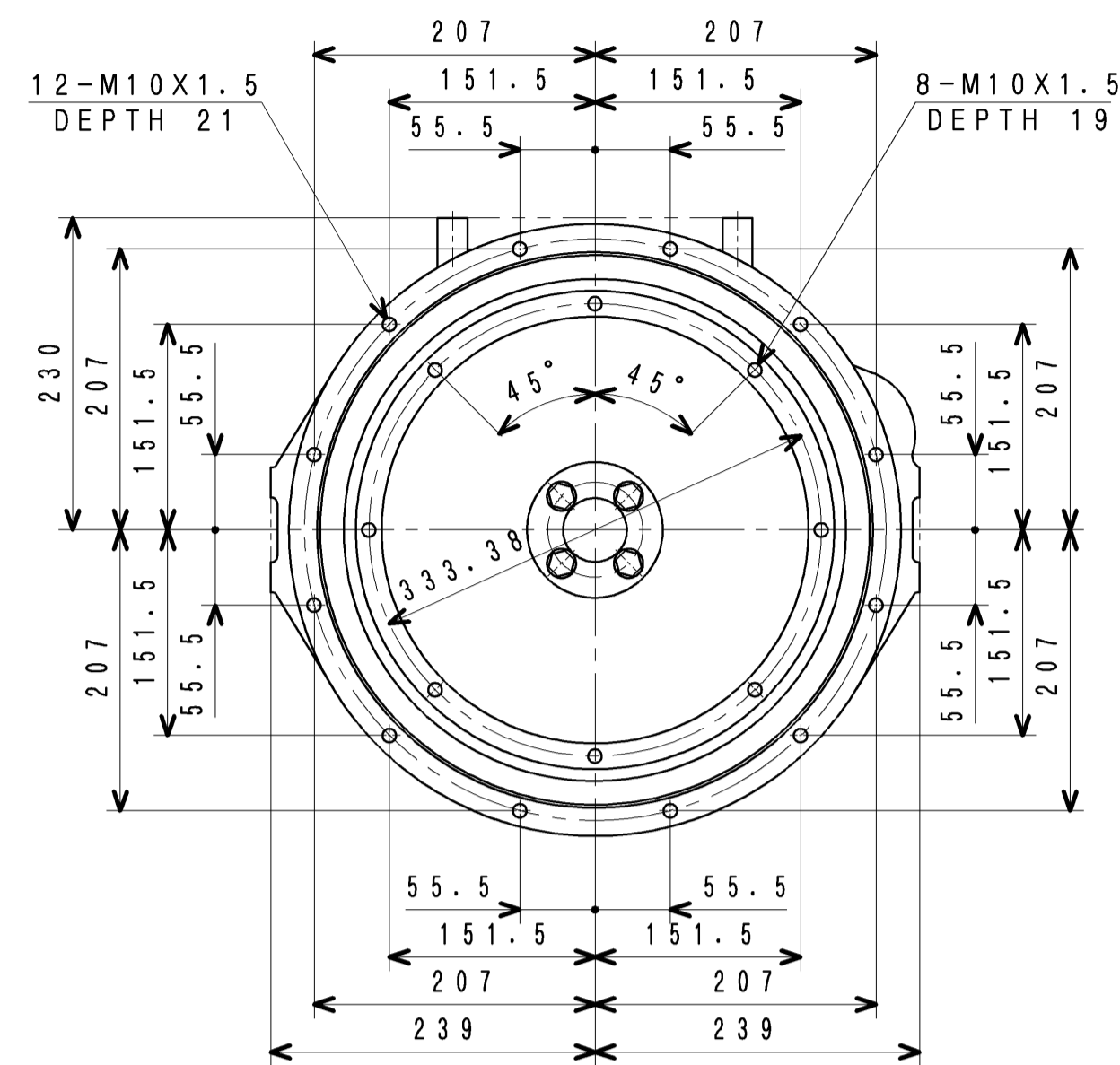
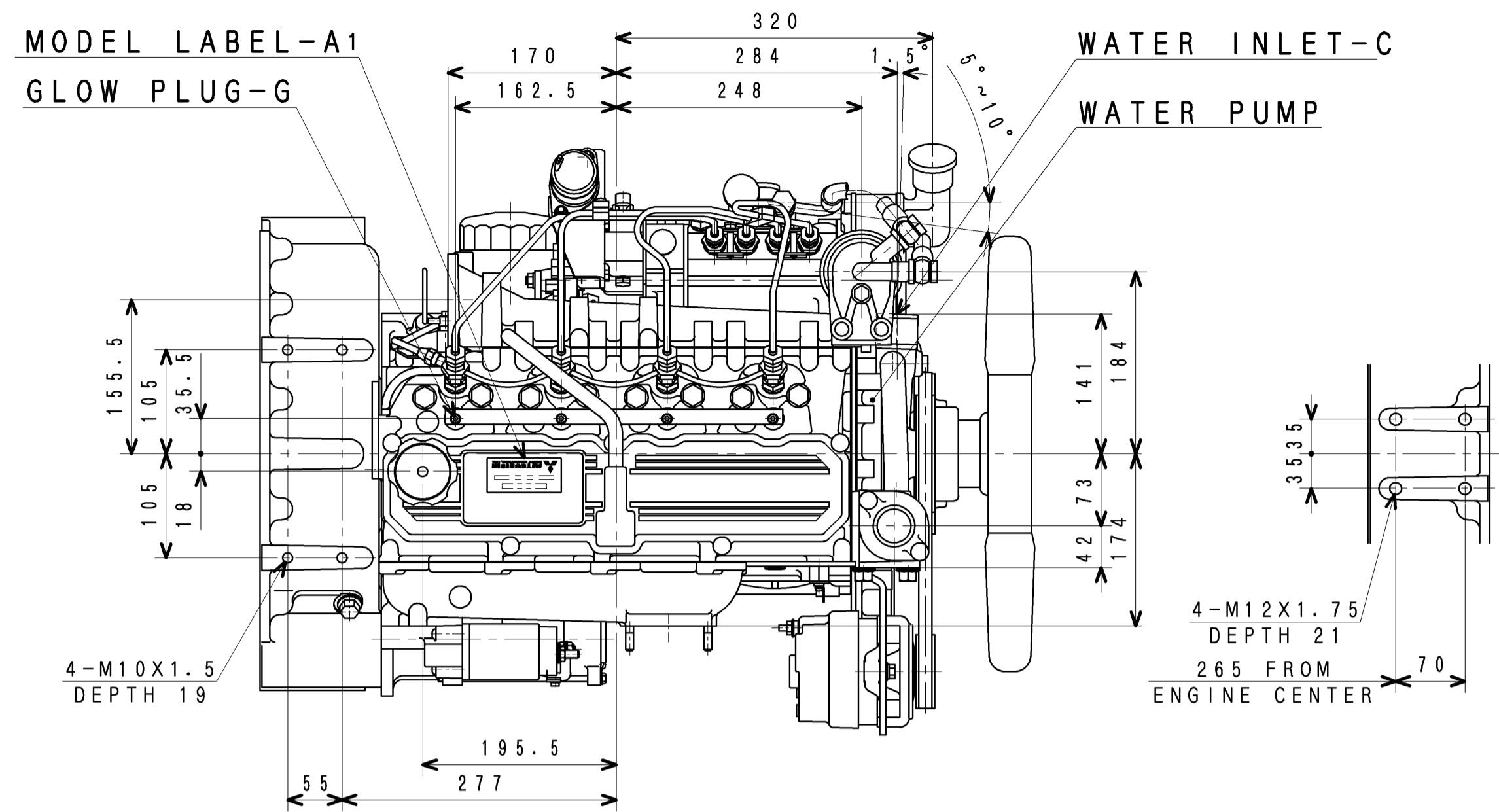
## 2. Engine attached items&Reference drawings

	Item	Parts No.	Q'ty	Remarks(Drawing number)	
	1	WIRING DIAGRAM	—	—	
	2	SWITCH,OIL PRESSURE	31A90-00500	1	A4
	3	SWITCH, THERMO	MC880-901	1	MC880-900(Writing together) A4
	4	UNIT,PRESSURE GAGE	—	—	
	5	UNIT,THERMOMETER	—	—	
△	6	OIL FILTER	32A40-00400	1	A4
△	7	COOLING FAN(6P-440)	32A48-00400	1	A4
△	8	FILTER ASSY,FUEL	34462-00011	1	A4
△△	9	STARTER(12V-2.2kW)	32A66-20100	1	A4
△	10	PLUG,GLOW	32A66-03102	4	A4
△	11	ALTERNATOR(12V-50A)	32A68-00302	1	A4
△△	12	SOLENOID ASSY	32A87-17010	1	(32A87-06011) A4

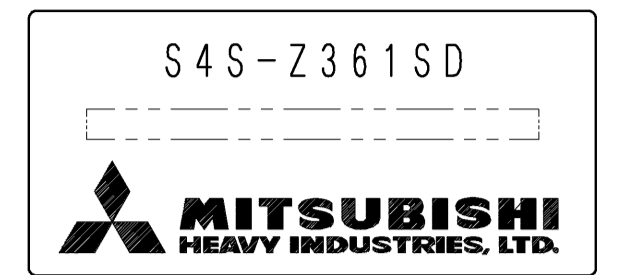
## 3. Accessories(Loose supply parts)

	Parts Name	Parts No.	Q'ty	Remarks	
	1	GASKET,EXHAUST	32A32-01400	1	A4
	2	RADIATOR ASSY	32A47-05011	1	Radiator Kit 32A47-02031
	3	HOSE,RUBBER	32A47-02700	1	
	4	HOSE,RUBBER	32A47-02800	1	
	5	CLAMP	05317-01700	2	
	6	CLAMP	05317-01600	2	
	7	CUSHION	31A47-03100	2	
	8	COCK ASSY	31A47-03500	1	
	9	CLIP,HOSE	42786-03300	1	
	10	NUT	F2300-08000	8	A4
	11	GASKET,AIR HEATER	34330-04300	1	A4

Note: Drawing No. subject to alteration without notice.



ENGINE TYPE S4S-DG 31.3kW-A1  
RATED OUTPUT 31.3 kW/1485 rpm  
ENGINE FAMILY S4S-DG3A  
EC TYPE-APPROVAL NO. e11H97/68K42010/26#1451#00

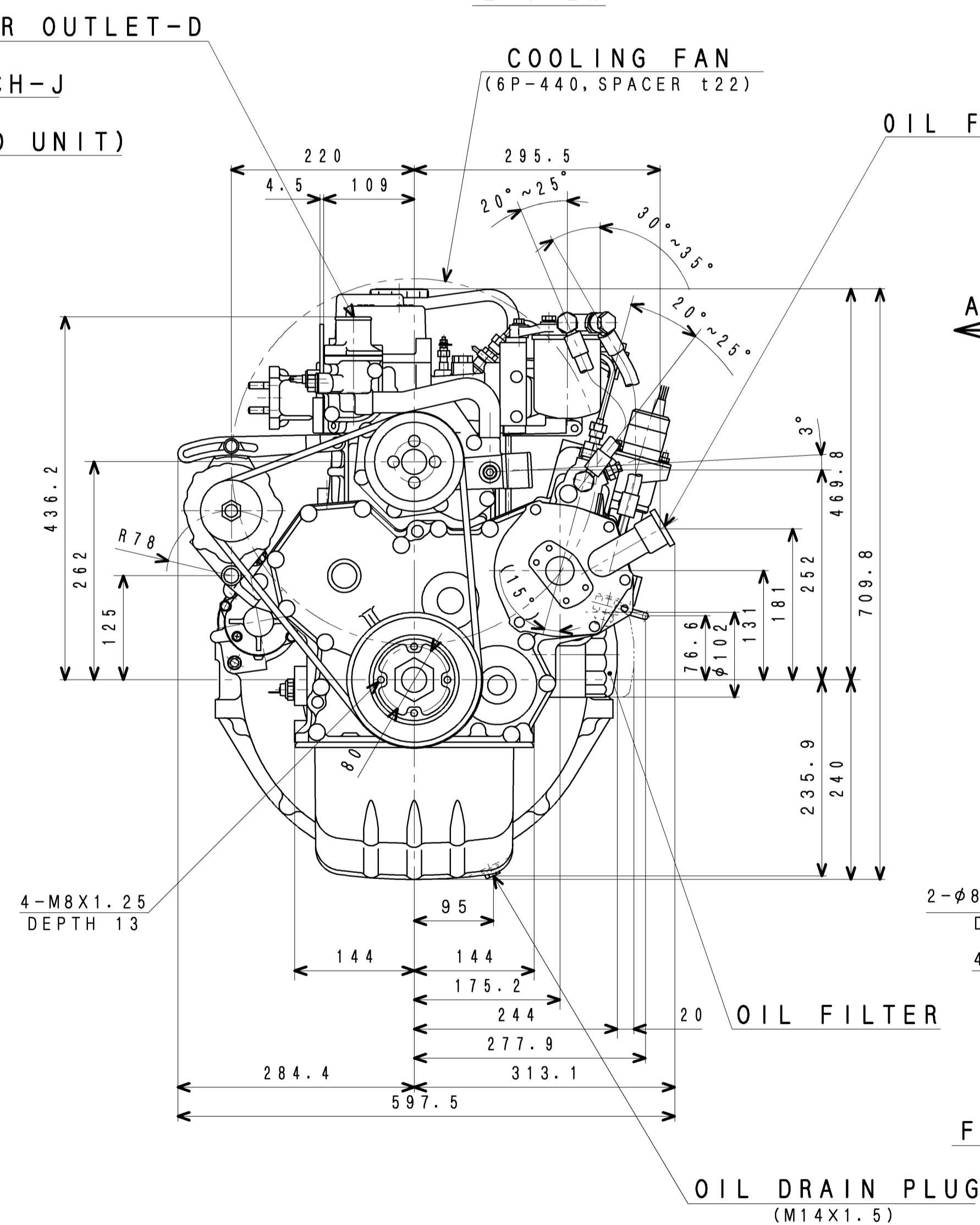
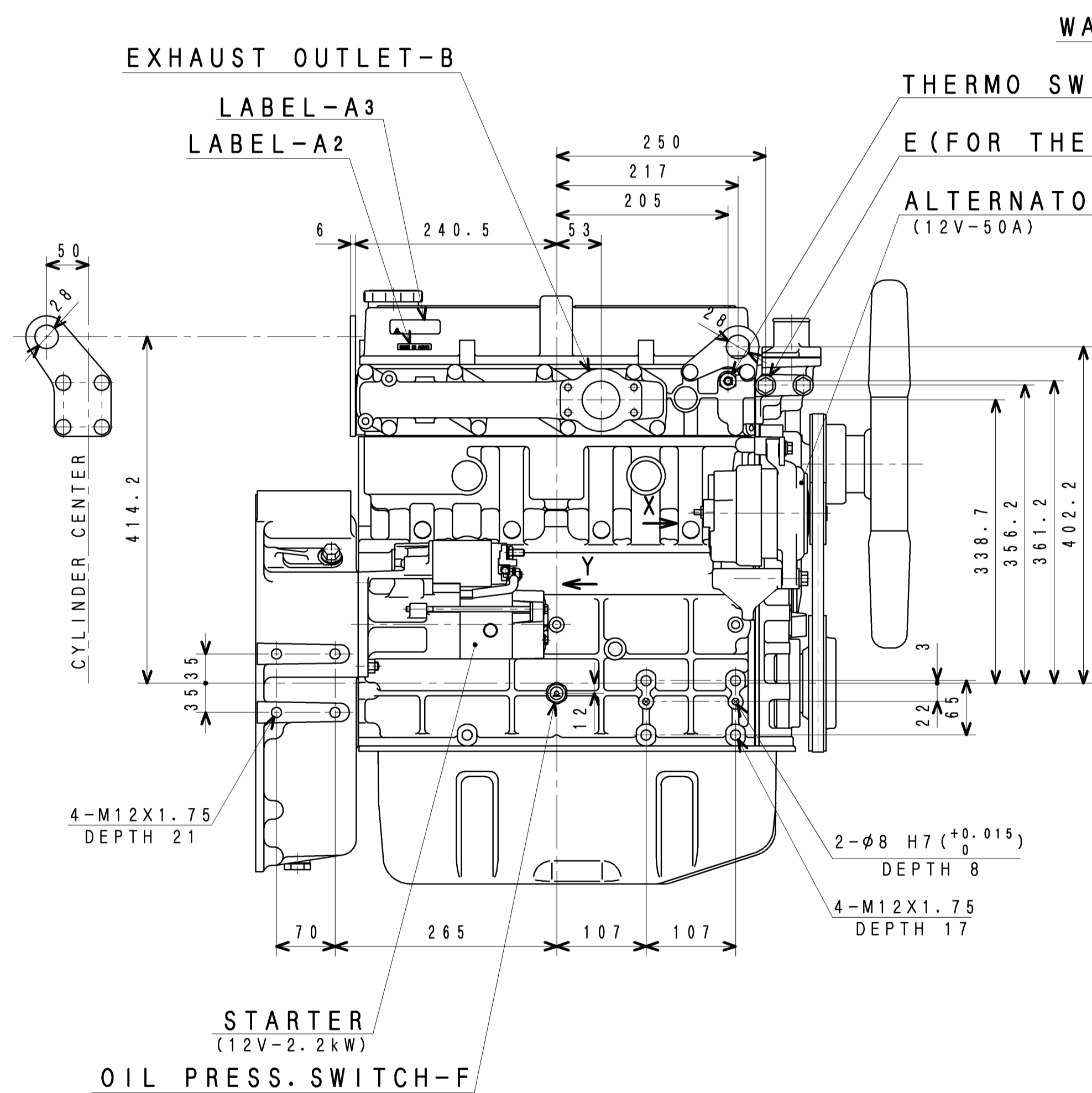


A3-DETAIL (1:1)

A1-DETAIL (1:1)

MADE IN JAPAN

A2-DETAIL (1:1)

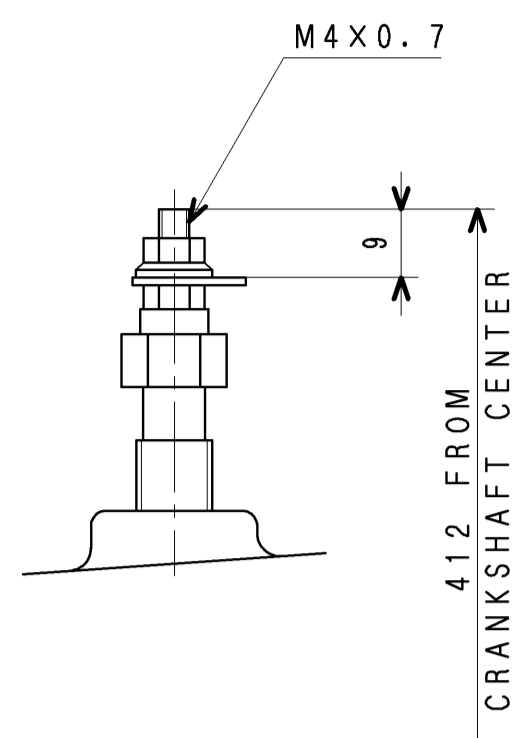


3rd ANGLE PROJECTION		R&R SCALE 1:5		S4S-Z361SD ENG ASSY	
MHI CONFIDENTIAL		MHI CONFIDENTIAL		三菱重工業株式会社 汎用機・特車事業本部	
MHI CONFIDENTIAL		MHI CONFIDENTIAL		MITSUBISHI HEAVY INDUSTRIES, LTD. GENERAL MACHINERY & SPECIAL VEHICLE HEADQUARTERS.	
MHI CONFIDENTIAL		MHI CONFIDENTIAL		図面番号 32A00-03941	
MHI CONFIDENTIAL		MHI CONFIDENTIAL		DRAWING NO. 1/2	
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MHI CONFIDENTIAL		MHI CONFIDENTIAL		1 2 3 4 5 6	

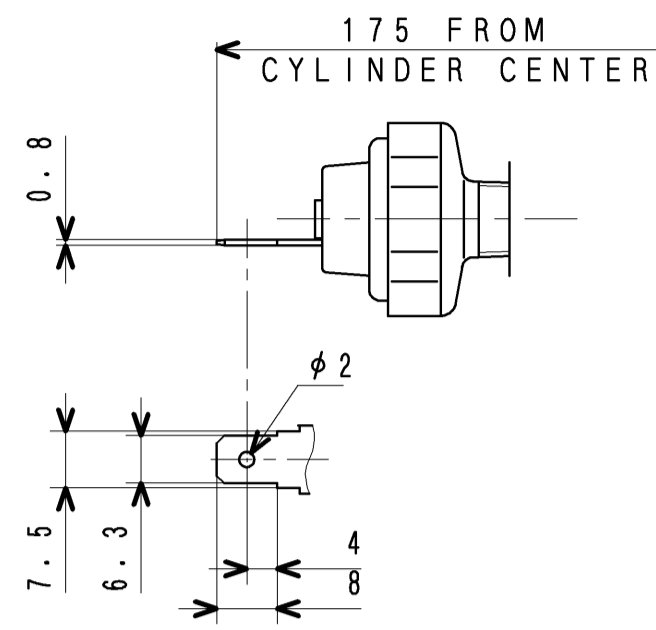
(For Aluminum Radiator) MHI CONFIDENTIAL

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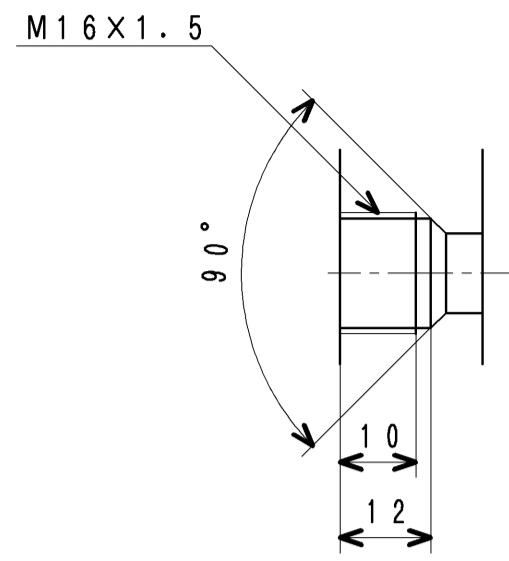
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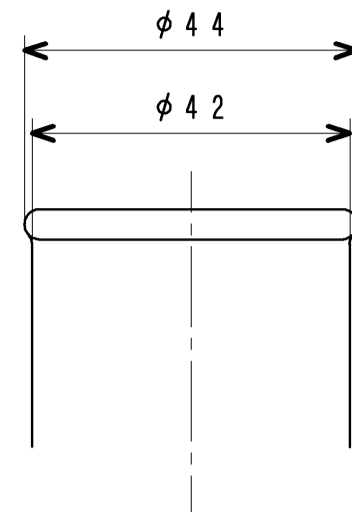
G-DETAIL



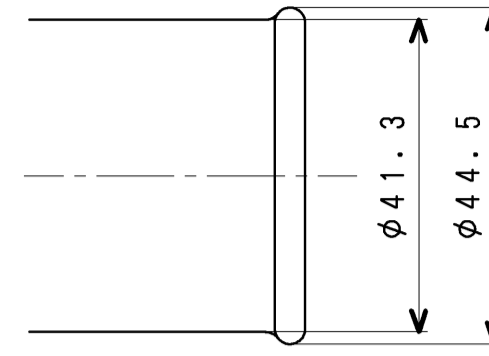
F-DETAIL



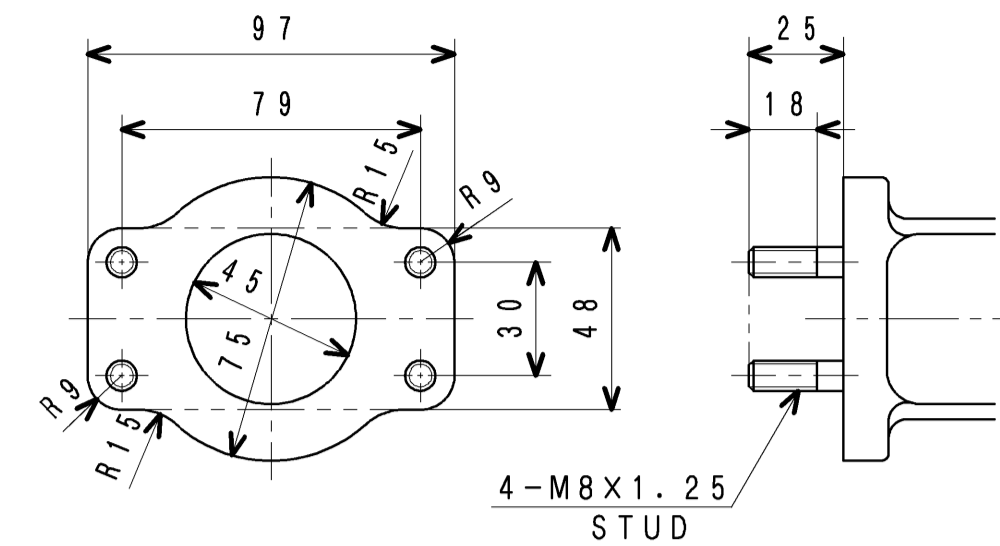
E-DETAIL



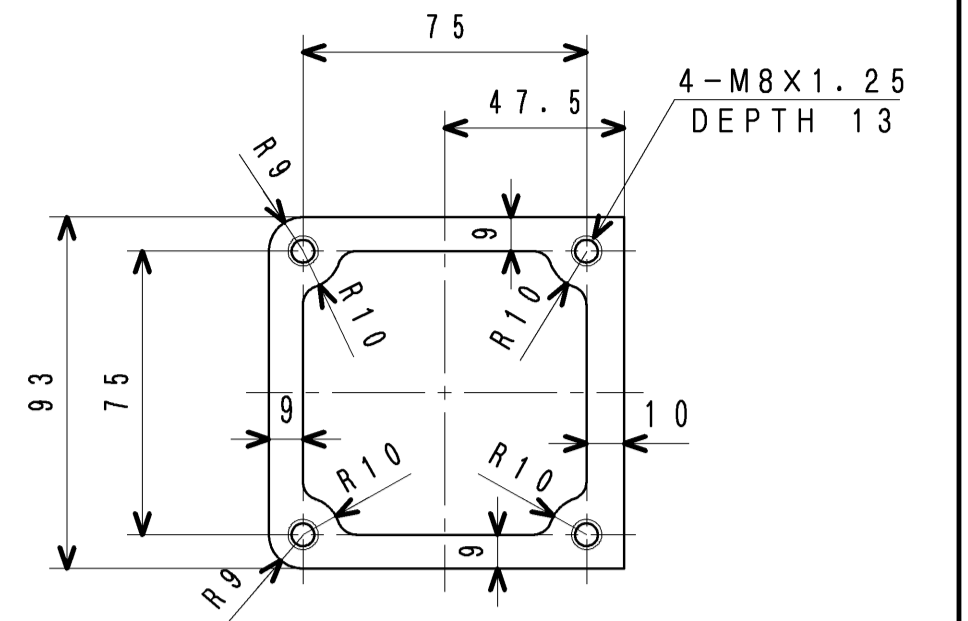
D-DETAIL



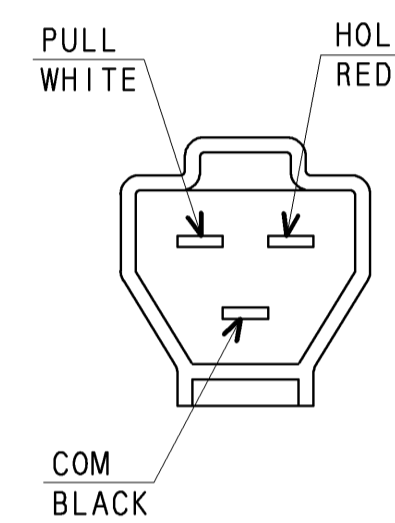
C-DETAIL



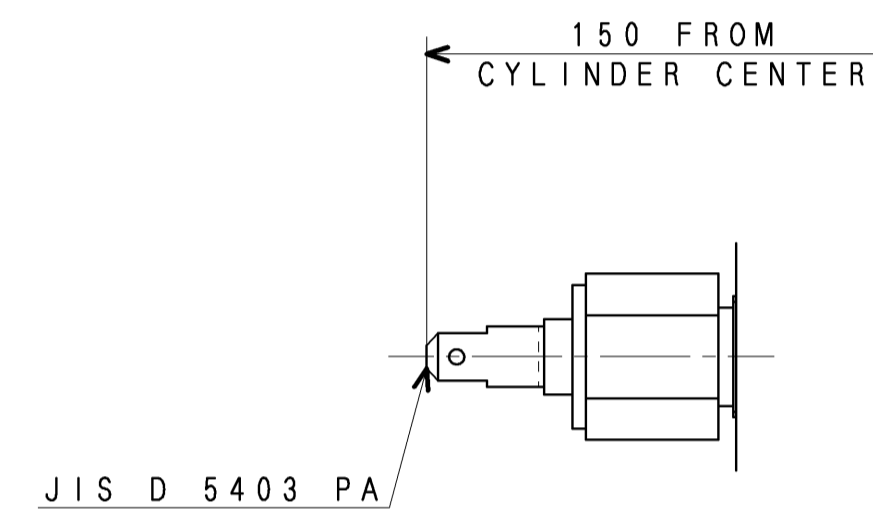
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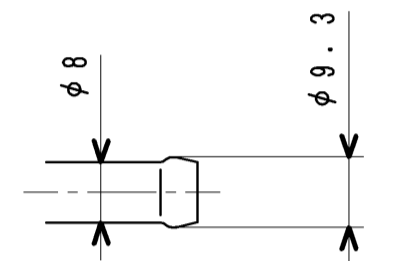
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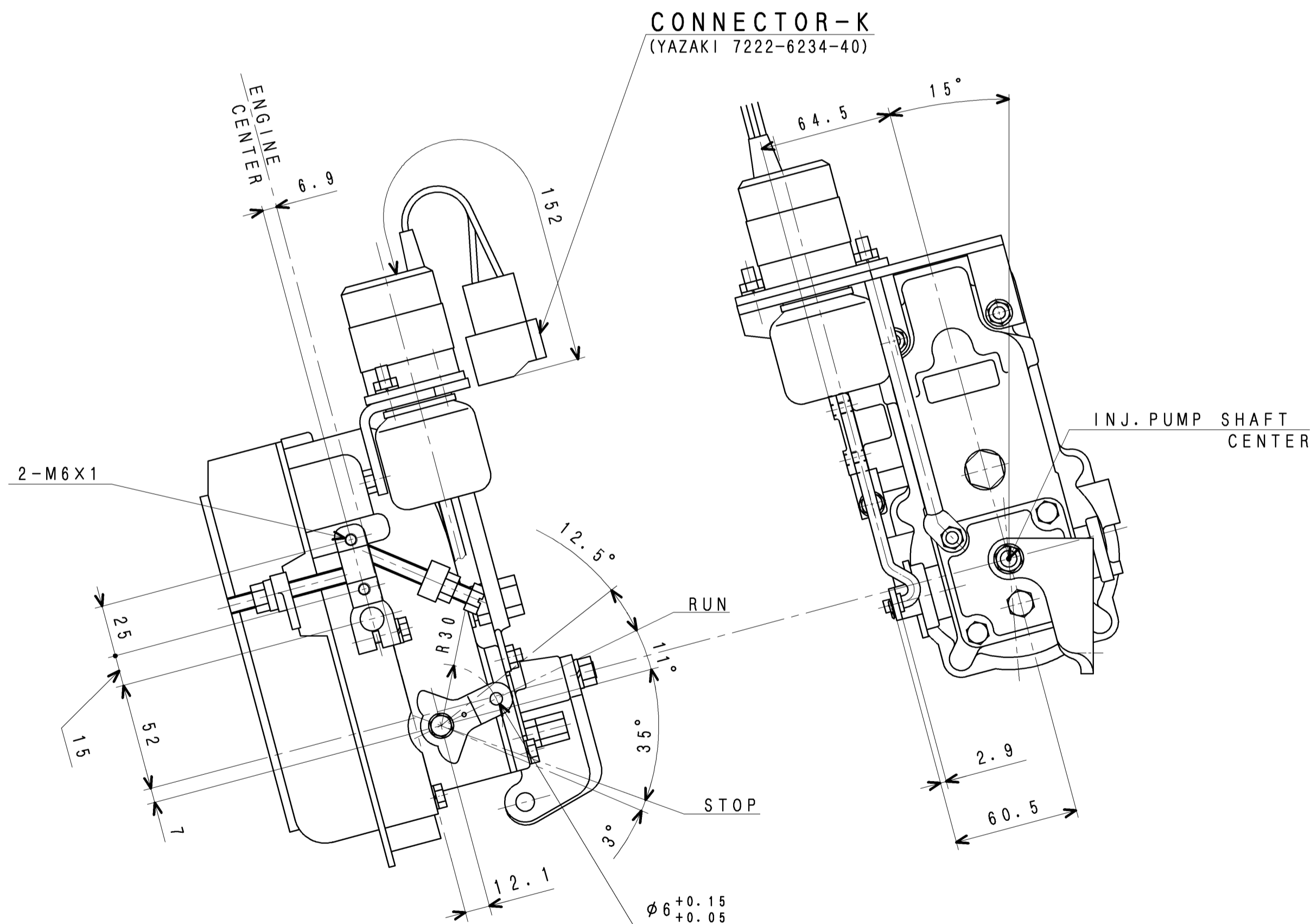
K-DETAIL



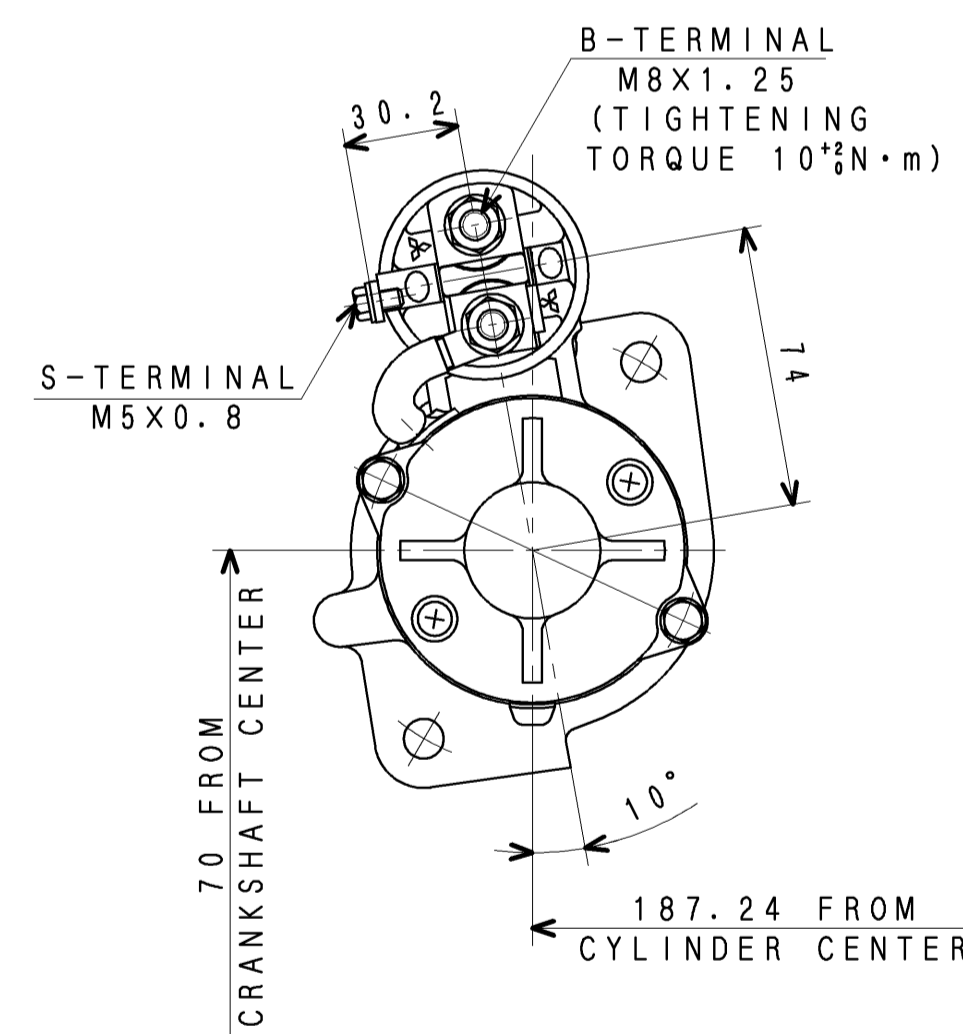
J-DETAIL



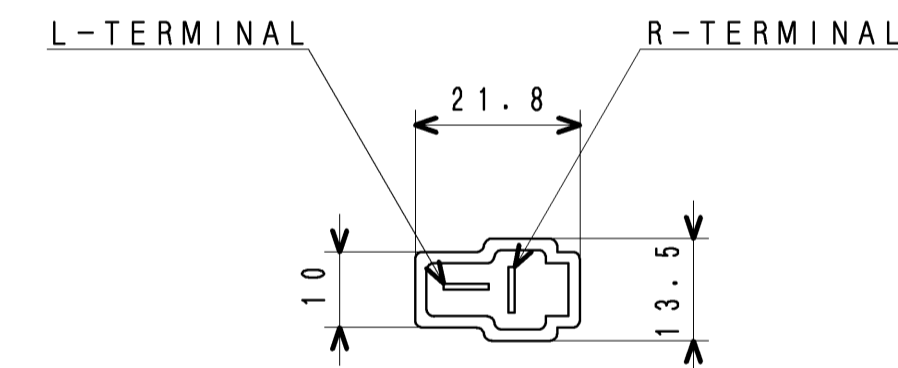
H-DETAIL



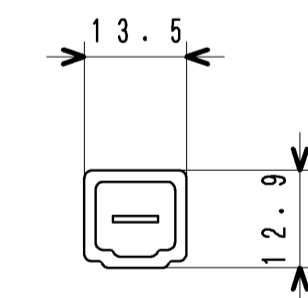
W-VIEW (1:2)



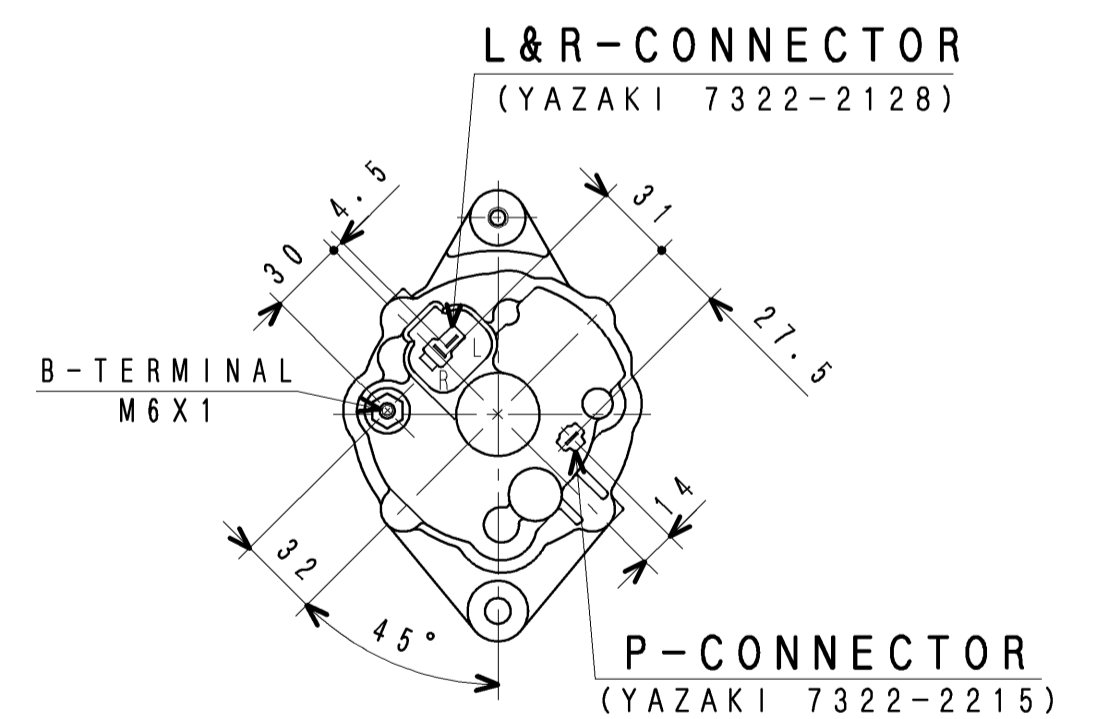
Y-VIEW (1:2)



L&R-DETAIL



P-DETAIL



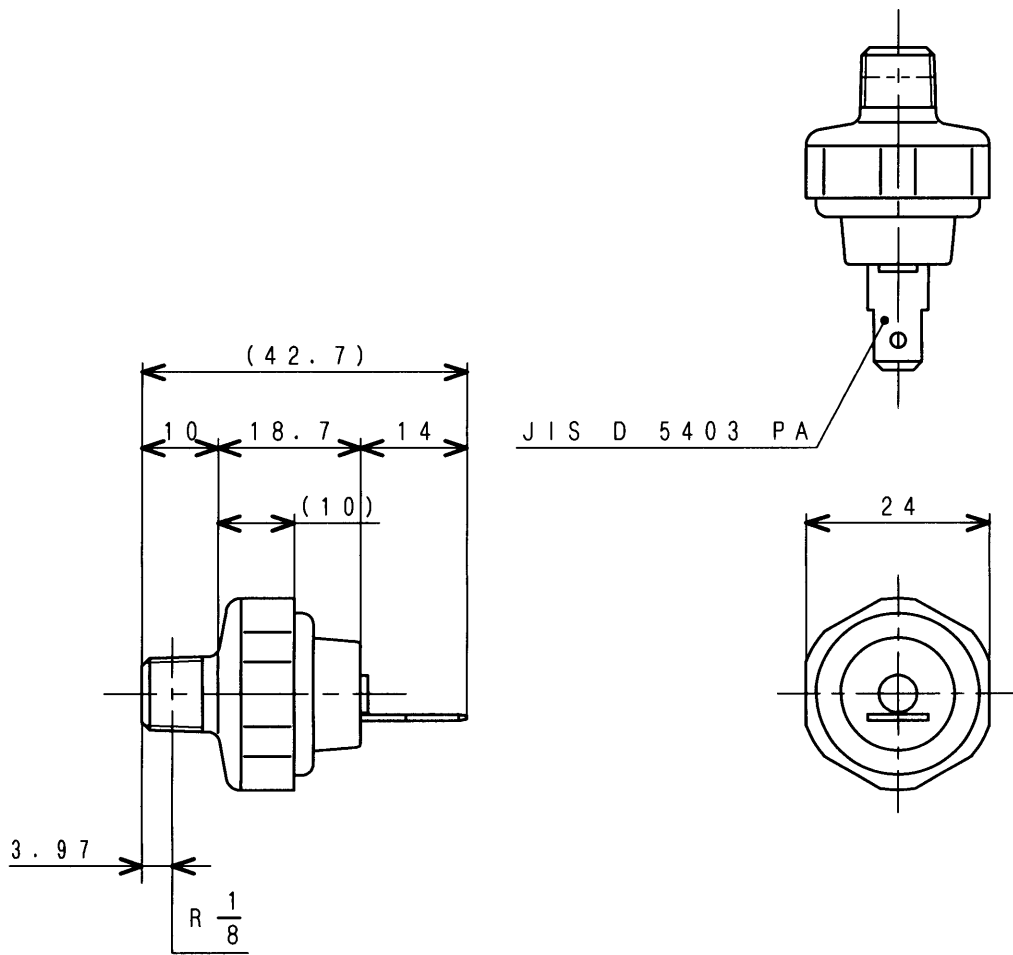
X-VIEW (1:3)

CHG				ED-NO				DATE				CHK				3rd ANGLE PROJECTION				S4S-Z361SD ENG ASSY			
R. Nagase				K. TAKETANI				T. HIROSE				2012. 6. 7				1:1				三菱重工業株式会社 汎用機・特車事業本部			
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仕 様  
SPECIFICATIONS

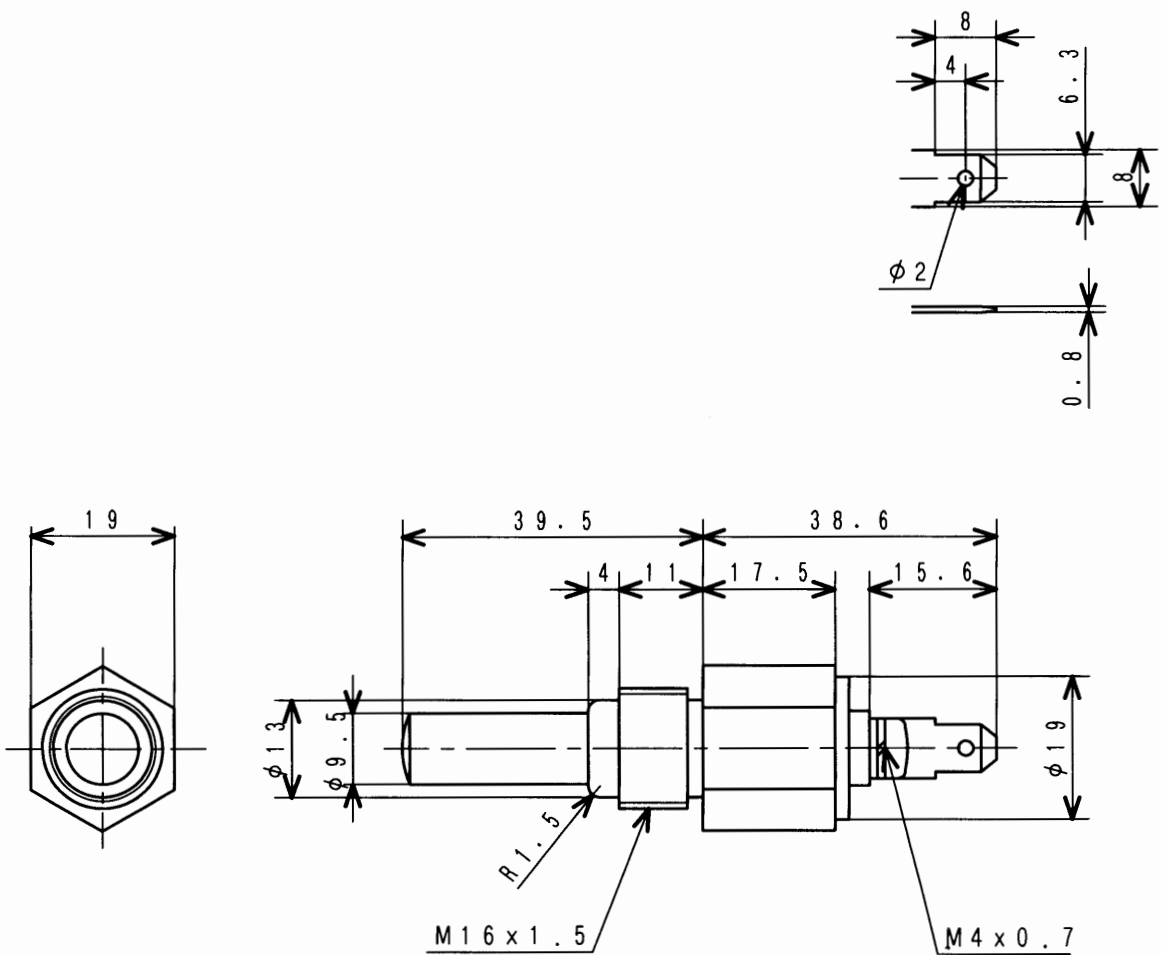
作 動 圧 力 OPERATING PRESS.	98 kPa {1.0 kgf/cm <sup>2</sup> }
接 点 容 量 CURRENT CAPACITY	12V-5W
結 線 様 式 CONNECTION	b (—○—○—)

オイルプレッシャスイッチ

SWITCH, OIL PRESSURE

31A90-00500

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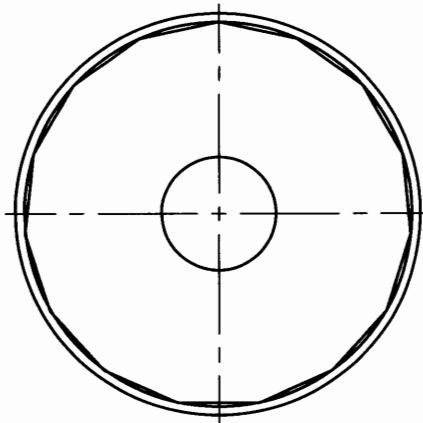
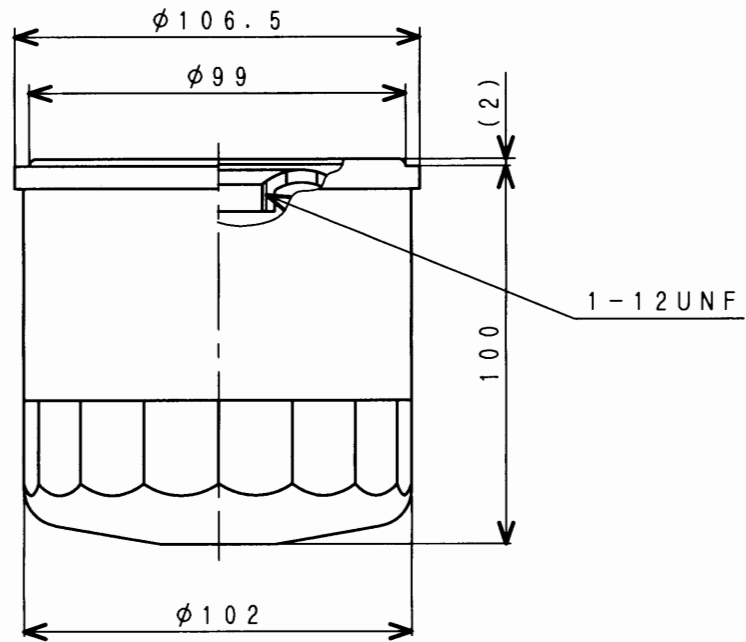


部品番号 PART No.	作動温度 OPERATING TEMP.		
MC880-900	温度下降時 DECREASE	≤ 100℃ ± 4℃	で接点開 OPEN
	温度上昇時 RISE	≥ 100℃ ± 2℃	で接点閉 CLOSE
MC880-901	温度下降時 DECREASE	≤ 105℃ ± 4℃	で接点開 OPEN
	温度上昇時 RISE	≥ 105℃ ± 2℃	で接点閉 CLOSE

定格負荷 RATED LOADED	1A以上 MIN.	0.5A以上 MIN.
定格電圧 RATED VOLT.	12V	24V

サーモスイッチ  
SWITCH, THERMO

MC880-900



仕様  
SPECIFICATIONS

濾過面積 FILTRATION AREA	0.2 m <sup>2</sup>
圧力損失 PRESSURE LOSS	29 kPa {0.3 kgf/cm <sup>2</sup> } Max. (at 80±3°C, SAE #30, 17ℓ/min.)
破壊圧力 PRESS. AT FRACTURE	2 MPa {20 kgf/cm <sup>2</sup> }
エレメント差圧強度 ELEMENT RESISTANCE TO PRESS. DIFFERENCE	686 kPa {7 kgf/cm <sup>2</sup> }
逃し弁調整圧力 RELIEF VALVE PRESSURE	98±20 kPa {1.0±0.2 kgf/cm <sup>2</sup> }

3. START ENGINE AND CHECK FOR OIL LEAKAGE.  
2. THEN TIGHTEN 3/4 TURN AFTER GASKET CONTACTS BASE.  
NOTE 1. APPLY FILM OF ENGINE OIL TO GASKET AND SCREW ON.

3. 取付け後、エンジンを始動してガスケット面からのオイル洩れを点検して下さい。  
2. 取付けはシール面にガスケットが接触してから3/4回転締付けて下さい。  
注 記 1. 取付け前、ガスケットにエンジンオイルを薄く塗布して下さい。

オイルフィルター

CARTRIDGE ASSY, OIL

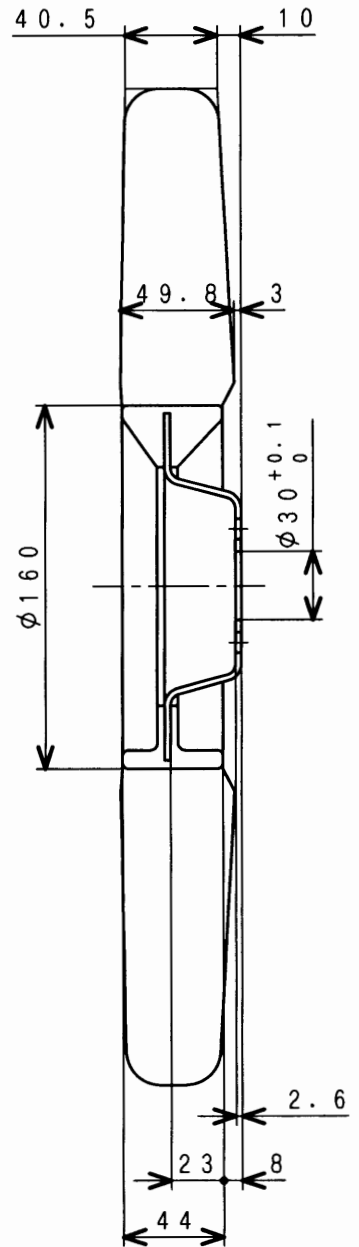
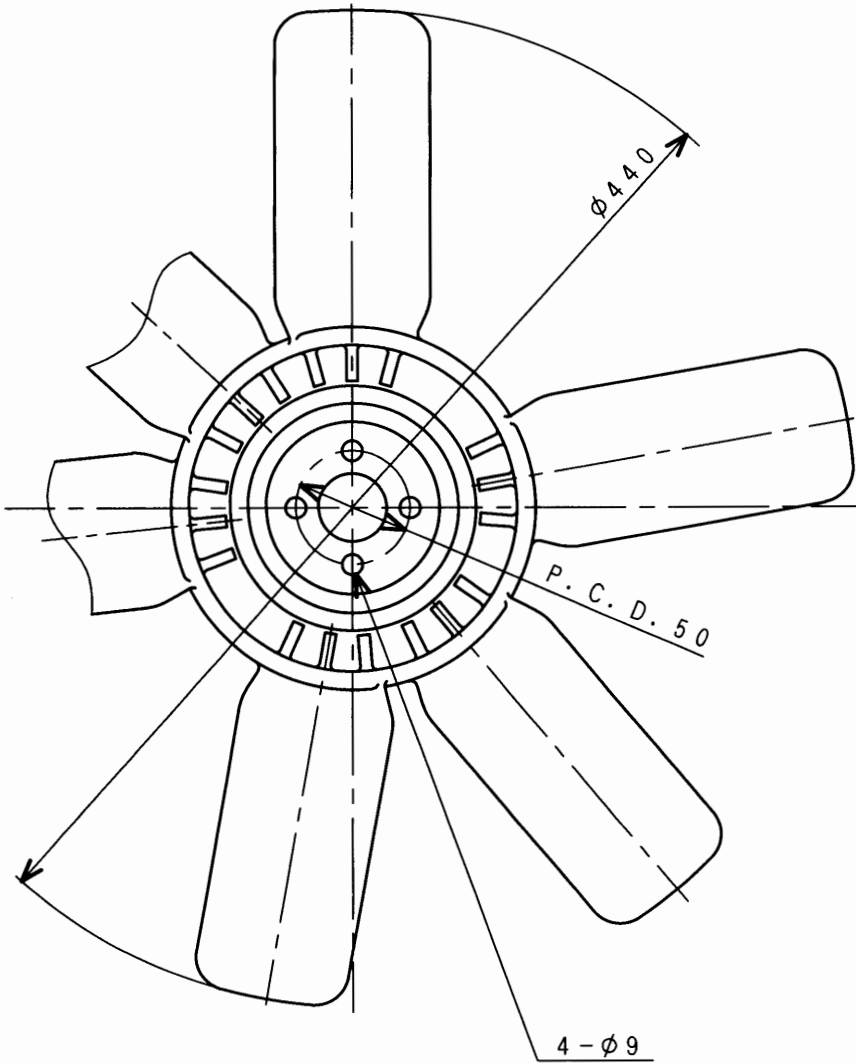
32A40-00400

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DIRECTION OF ROTATION  
回転方向



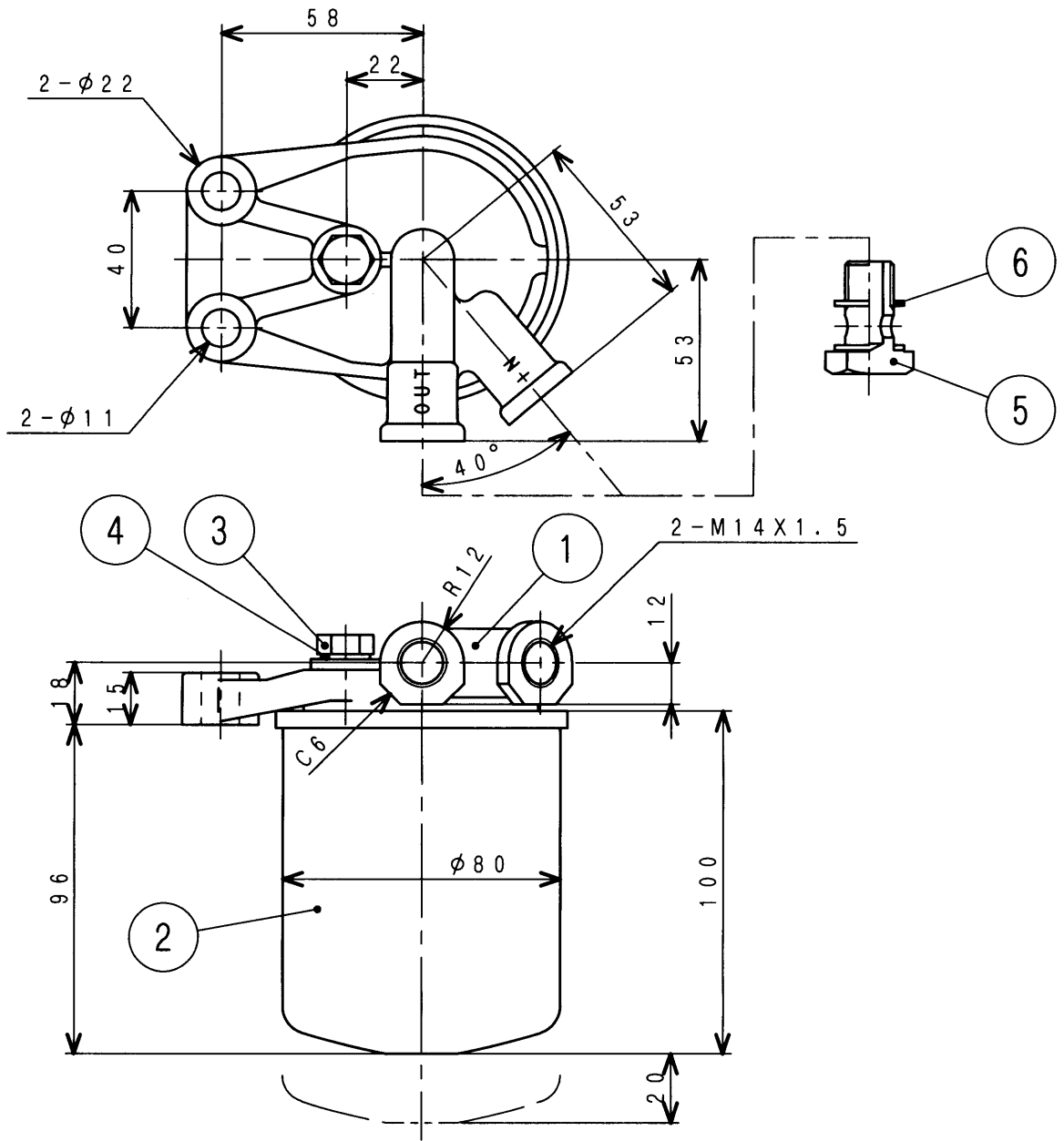
AIR FLOW  
風向き



ファン (プッシュャー)  
FAN, COOLING (6P-440)

32A48-00400

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仕 様

SPECIFICATIONS

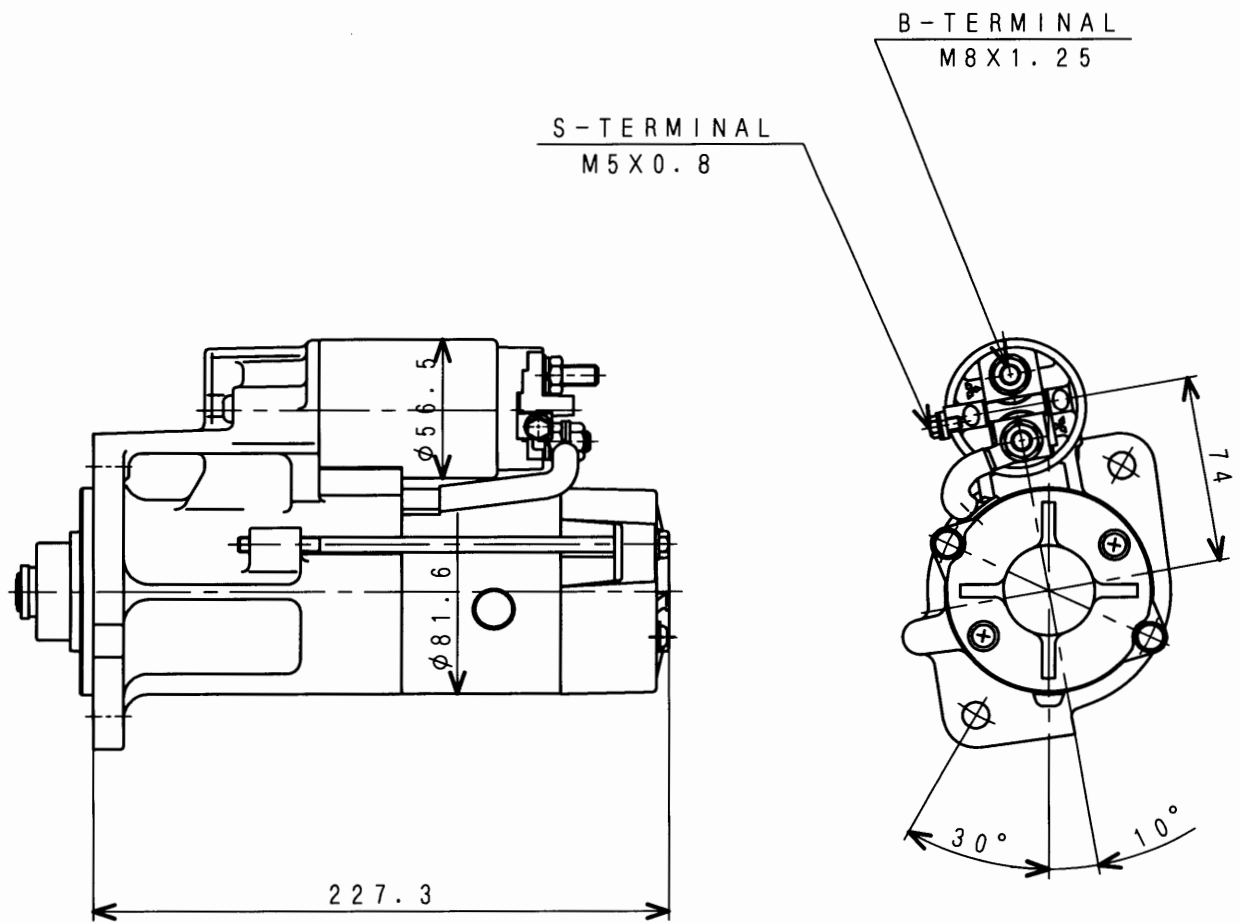
ろ過面積 FILTRATION AREA	1500 cm <sup>2</sup>
ろ過精度 FILTER MESH SIZE	6 μ
定格流量 RATED FLOW	3 l/min
圧力損失 PRESS. LOSS	6.7 kPa以下 (流量3 l/min) MAX CAPACITY
乾燥重量 WEIGHT	650 g

6	05946-01401	WASHER, SEALING	4
5	MH037-087	BOLT, EYE	2
4	05946-00801	WASHER, SEALING	1
3	MH037-084	PLUG, AIR	1
2	34462-00300	ELEMENT ASSY	1
1	34462-00201	BRACKET	1
SYM	PART No.	PART NAME	QTY

ヒュエルフィルタアッシ

FUEL FILTER ASSY

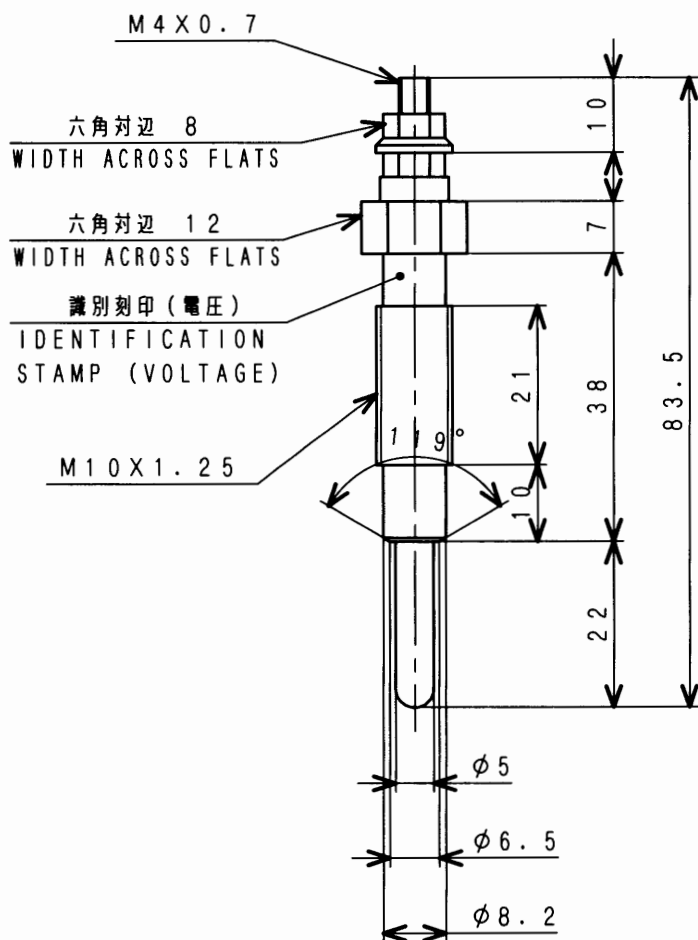
34462-00011



MODEL	PART NO.	RATED OUTPUT OF STARTER	BATTERY (REFERENCE)
S4S	32A66-20100	DC12V-2.2KW	92AH

スターター  
STARTER (DC12V-2.2kW)

32A66-20100

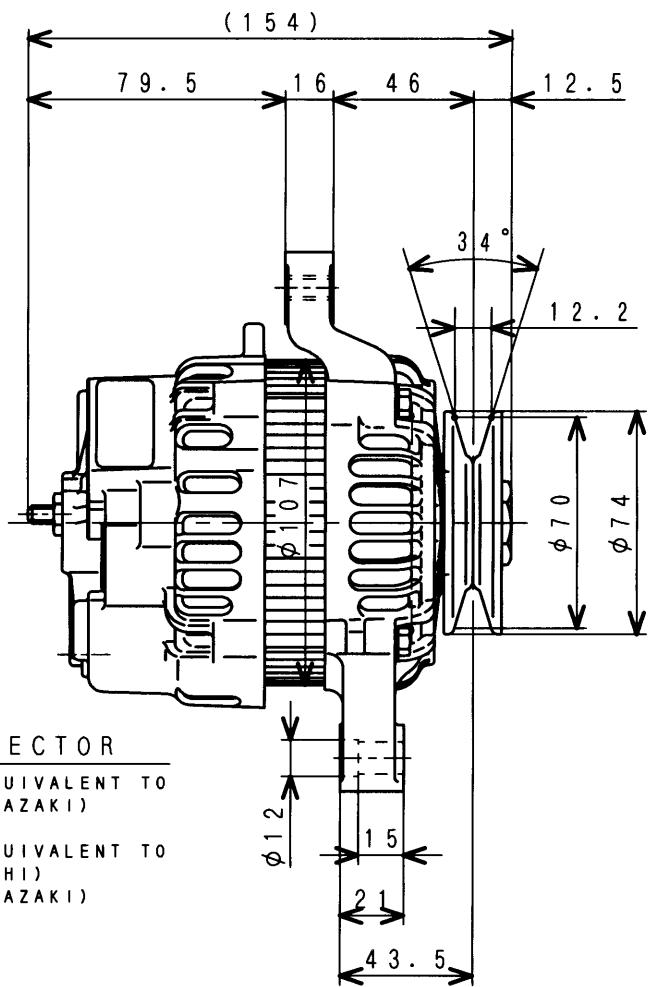
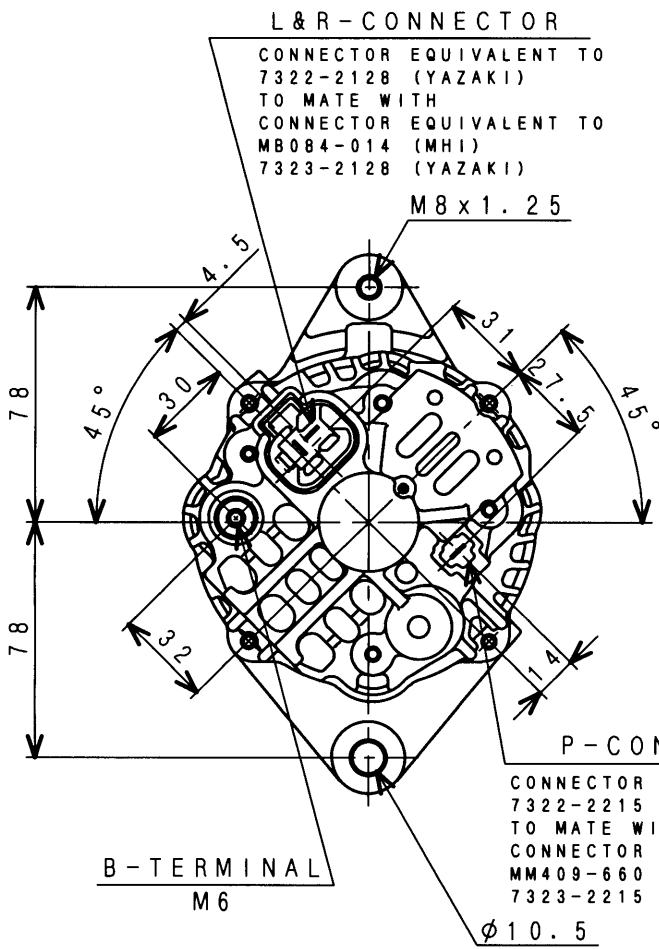


定格電圧 RATED VOLT	DC10.5V
電流値 CURRENT	定格電圧印加30秒時 AT RATED VOLTAGE FOR 30sec
	9.7±1.0A
温度上昇 TEMPERATURE	定格電圧印加800℃到達時間 (先端から5mmの位置で) TIME TO REACH 800℃ (AT RATED VOLTAGE AND 5mm POINT FROM TIP)
	9±2 sec
締付トルク TIGHTENING TORQUE	BODY (M10X1.25) : 14.7~19.6N·m
	TERMINAL (M4X0.7) : 1.0~1.5N·m

グロープラグ  
PLUG, GLOW

32A66-03102

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仕様 SPECIFICATIONS

定 格 RATING	連 続 CONTINUOUS
電池電圧 BATT. VOLT.	12V
運転時の周囲温度 AMB. TEMP. IN USE	100°C MAX.
レギュレータ性能 REG. PERFORMANCE	調整電圧 SET VOLT 14.7±0.3V
使用回転速度 SPEED IN USE	1,000~18,000rpm

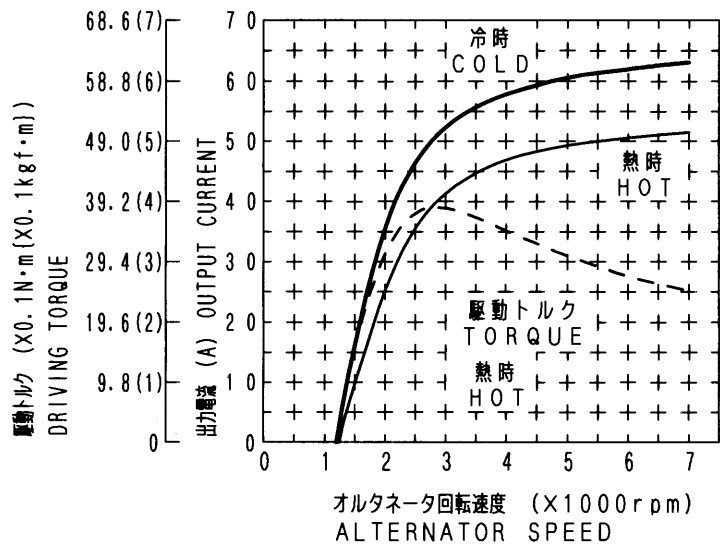
出力性能 OUTPUT PERFORMANCE  
 1. 保証出力性能 GUARANTEE 20°C

電 圧 (V) VOLTAGE	TYPE	CA0014-1	
	回転速度 SPED (rpm)	出力電圧 OUTPUT CURRENT (A) 冷 時 COLD	熱 時 HOT
13.5	1300	-	-
	2500	-	32
	5000	-	47
ヒートラン速度 TEMP. STAB. SPEED 5000rpm			

注記：キーOFF時外部ユニットを介してL端子にまわり込み電流がないこと。

NOTE: WHEN THE KEY SWITCH IS OFF, NO CURRENT FLOWS FROM OTHER UNITS TO L AND R TERMINAL PERMITTED.

2. 実力平均特性曲線 ACTUAL; AVERAGE CHARACTERISTIC CURVE

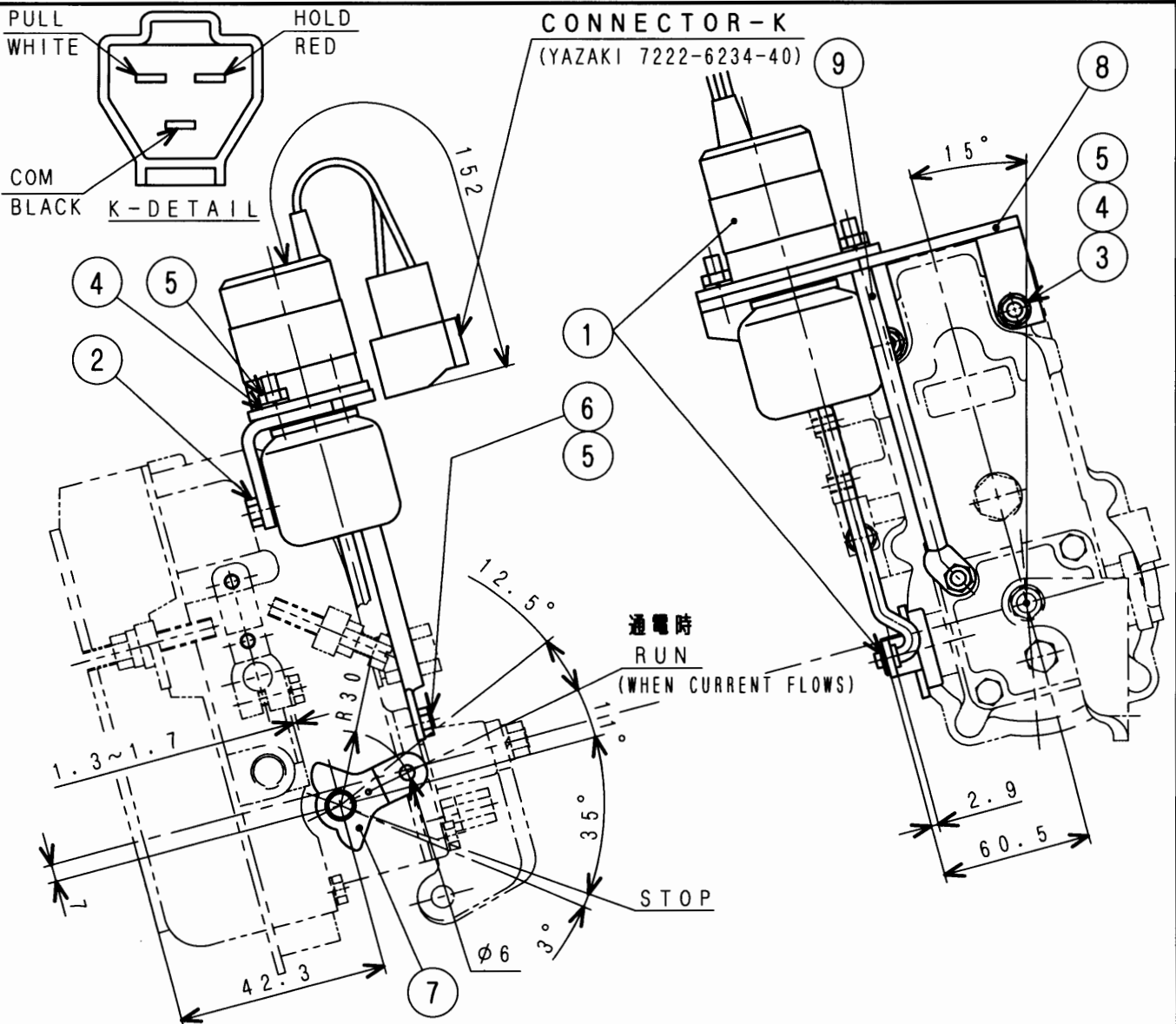


オルタネータ

ALTERNATOR (12V-50A)

32A68-00302





- 1) このソレノイドはRUN-ONタイプである。
- 2) スターターのS端子にPULL COILの配線を行わないこと。
- 3) スターターの起動前にSTOPレバーがRUNの位置にあることを確認のこと。
- 4) バッテリー条件、配線抵抗によってはソレノイドが引けない場合があり、注意のこと。
- 5) ETRソレノイド組付け後、作動確認を実施する。
- 6) 図の通り、ソレノイド通電時のストップレバーとガバナケースの隙間を確認する。

- 1) THIS SOLENOID IS A RUN-ON TYPE.
- 2) NO PERMITTED TO USE S-TERMINAL (STARTER) IN THE PULL COIL CIRCUIT.
- 3) BEFORE CLOSING STARTER CIRCUIT, STOP LEVER MUST BE ENERGIZED TO 'RUN' POSITION.

推奨併用吸引コイル タイマーリレー  
RECOMMENDATORY PULL IN COIL TIMER RELAY:31A66-06100

SYM	PART No.	PART NAME	QTY
9	32A87-05400	ROD, SUPPORT	1
8	32A87-05300	BRACKET	1
7	32A87-05700	LEVER, STOP	1
6	32A87-05600	STUD	1
5	F2300-06000	NUT	5
4	F2515-06000	WASHER, SPRING	4
3	F2500-06000	WASHER, PLAIN	2
2	34287-02603	ROD, SOLENOID	2
1	32A87-17010	SOLENOID ASSY(12V)	1

- 4) PLEASE NOTE THAT BATTERY CONDITION AND CABLE RESISTANCE AFFECT THE STOP LEVER MOVEMENT.
- 5) EXECUTE THE OPERATION CONFIRMATION WHEN YOU ASSEMBLE THE ETR SOLENOID.
- 6) CONFIRM THE SPACE BETWEEN THE STOP LEVER AND GOVERNOR CASE WHEN THE SOLENOID ENERGIZES AS SHOWN IN FIGURE.

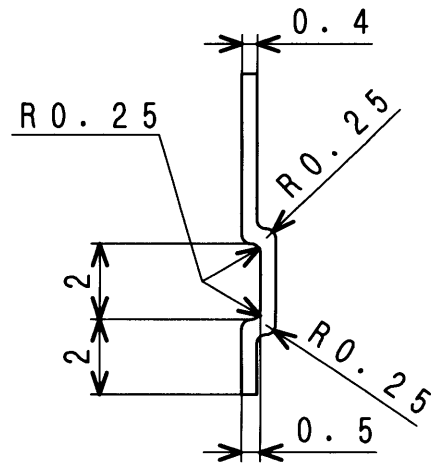
定格電圧 RATED VOLTAGE	12V
作動温度 OPERATING TEMPERATURE	-30°C~90°C
吸引電流 PULL COIL CURRENT	55A (at 20°C) (CONTINUOUS TIME: MAX. 3 SECOND)
保持電流 HOLD COIL CURRENT	1.1A (at 20°C)

ストップソレノイド

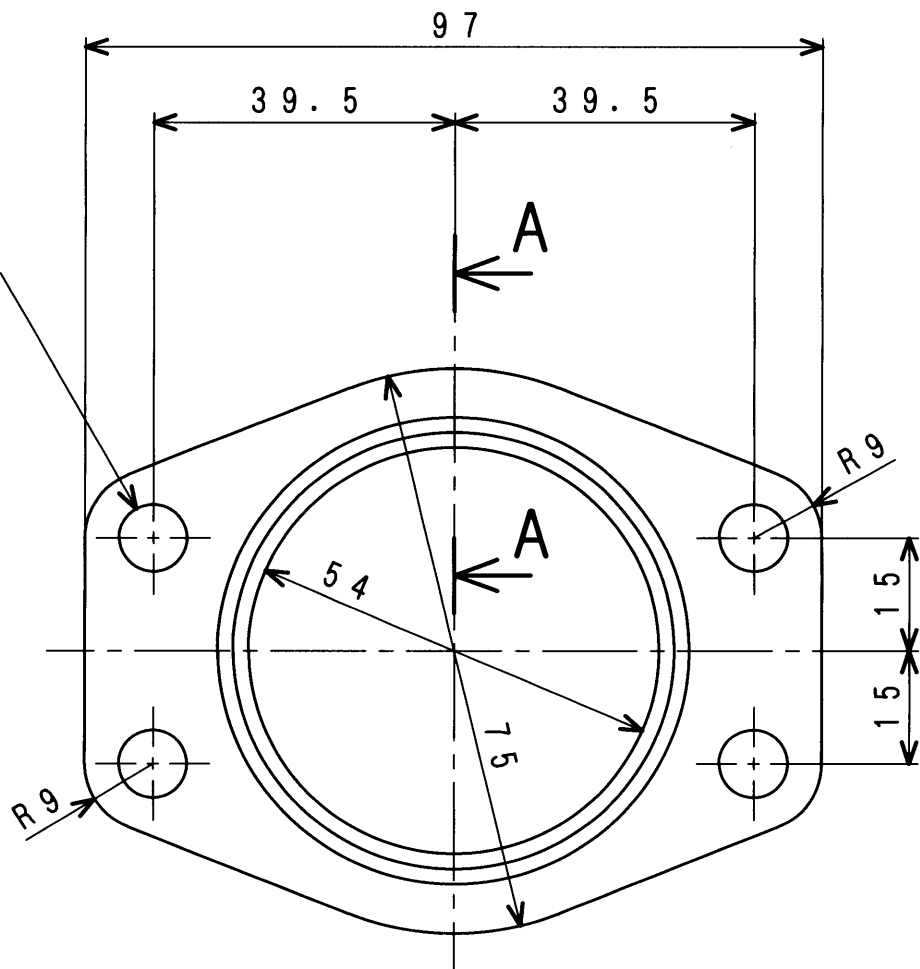
STOP SOLENOID KIT (ETR) SS

32A87-06011

A - A (5 : 1)



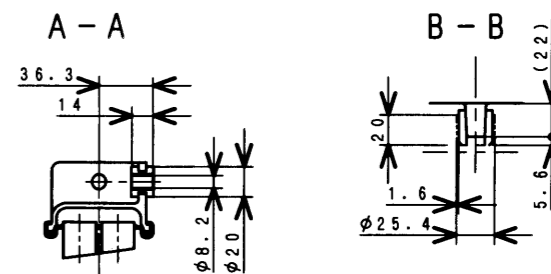
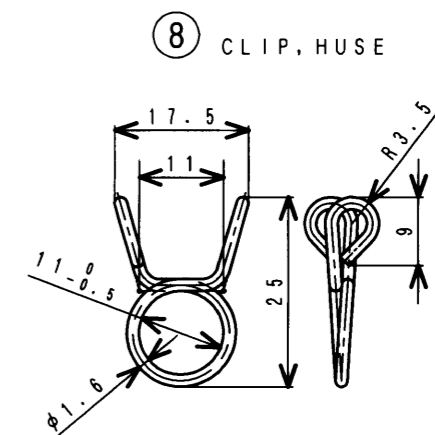
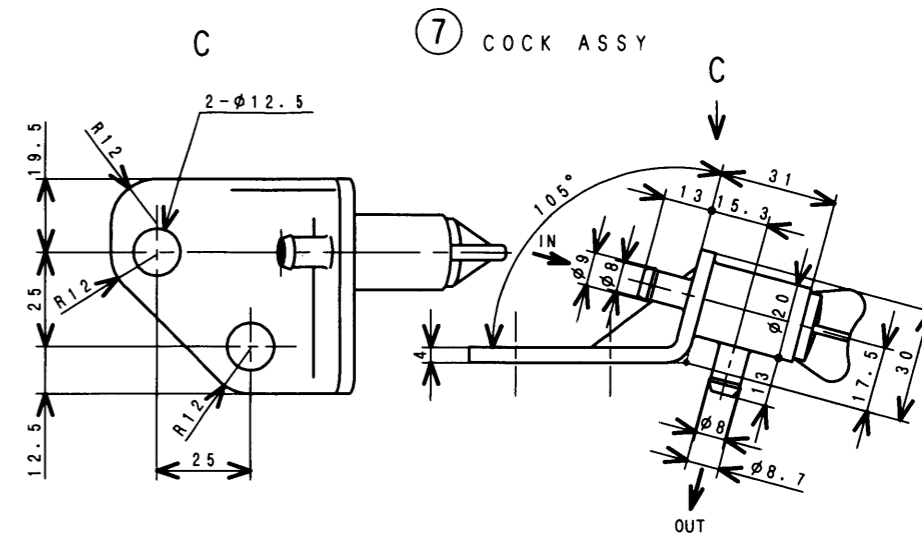
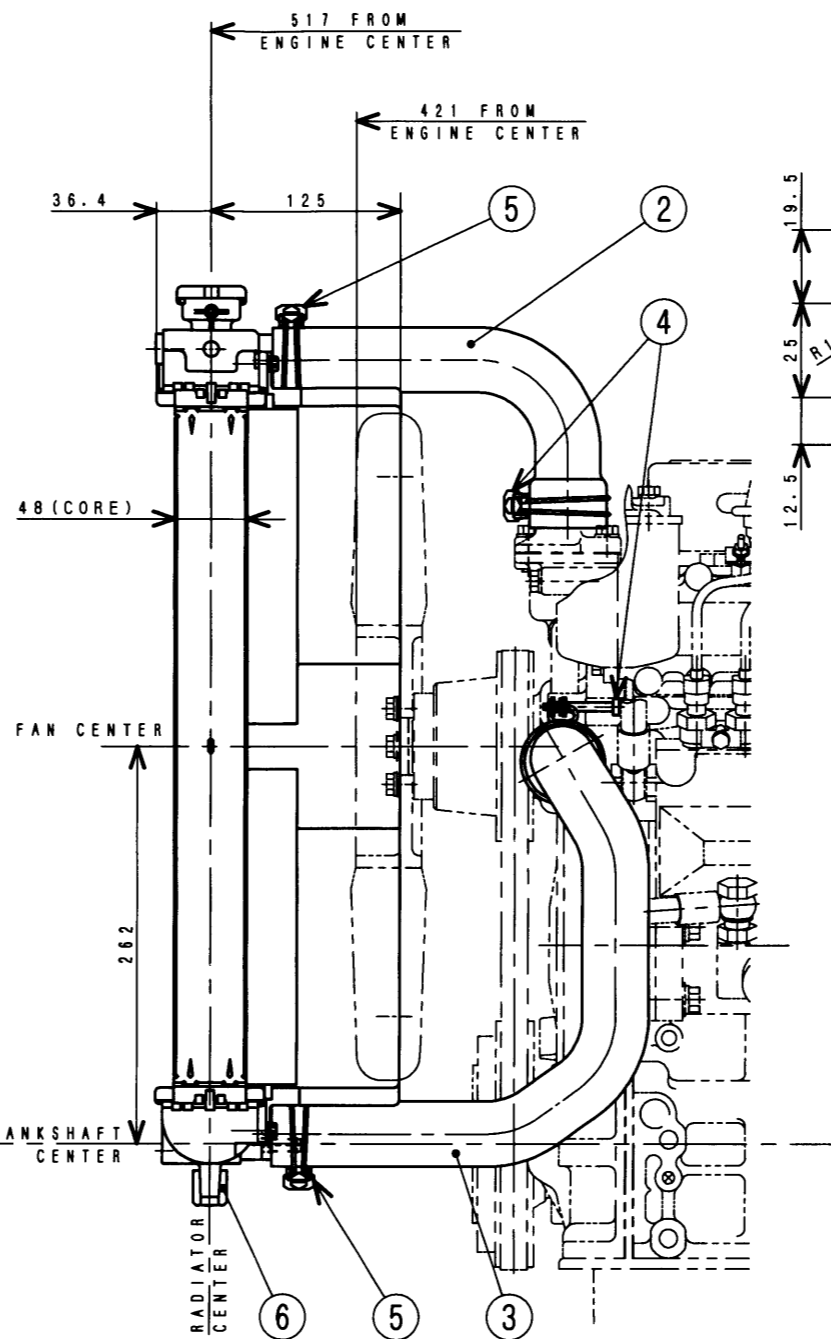
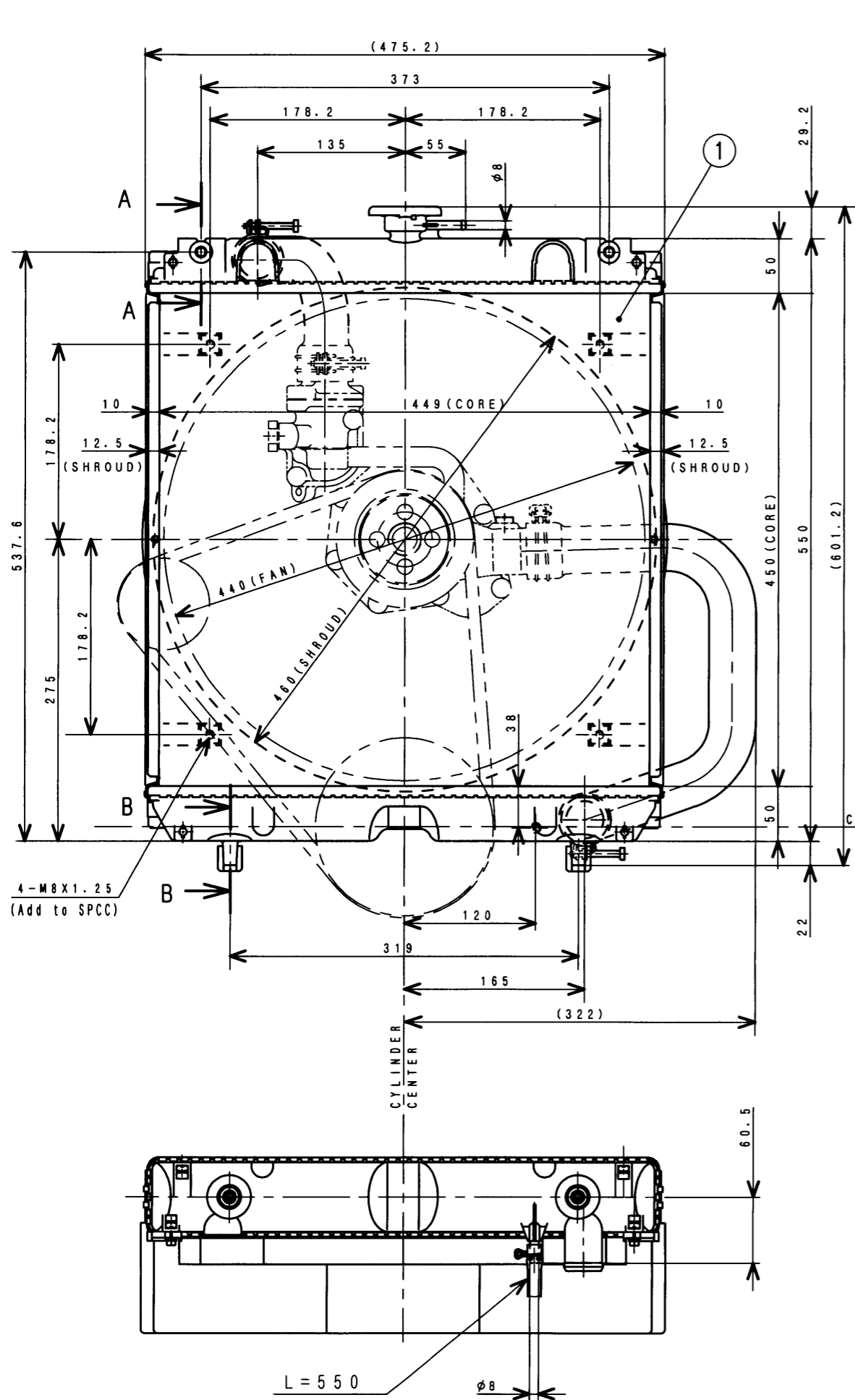
4 -  $\phi 9$   
(M8 BOLT)



エキゾースト ガスケット  
GASKET, EXHAUST

32A32-01400

MHI CONFIDENTIAL



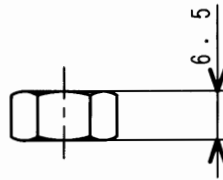
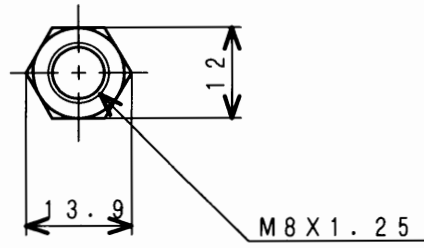
RADIATOR WEIGHT: 5.7kg  
COOLANT: APPROX 3ℓ

8	42786-03300	CLIP, HOSE	1
7	31A47-03500	COCK ASSY	1
6	31A47-03100	CUSHION	2
5	05317-01600	CLAMP	2
4	05317-01700	CLAMP	2
3	32A47-02800	HOSE, RUBBER	1
2	32A47-02700	HOSE, RUBBER	1
1	32A47-05011	RADIATOR ASSY	1
SYM	PART No.	PART NAME	QTY

ラジエタ キット  
RADIATOR KIT (S4S)

32A47-02031

MHI CONFIDENTIAL

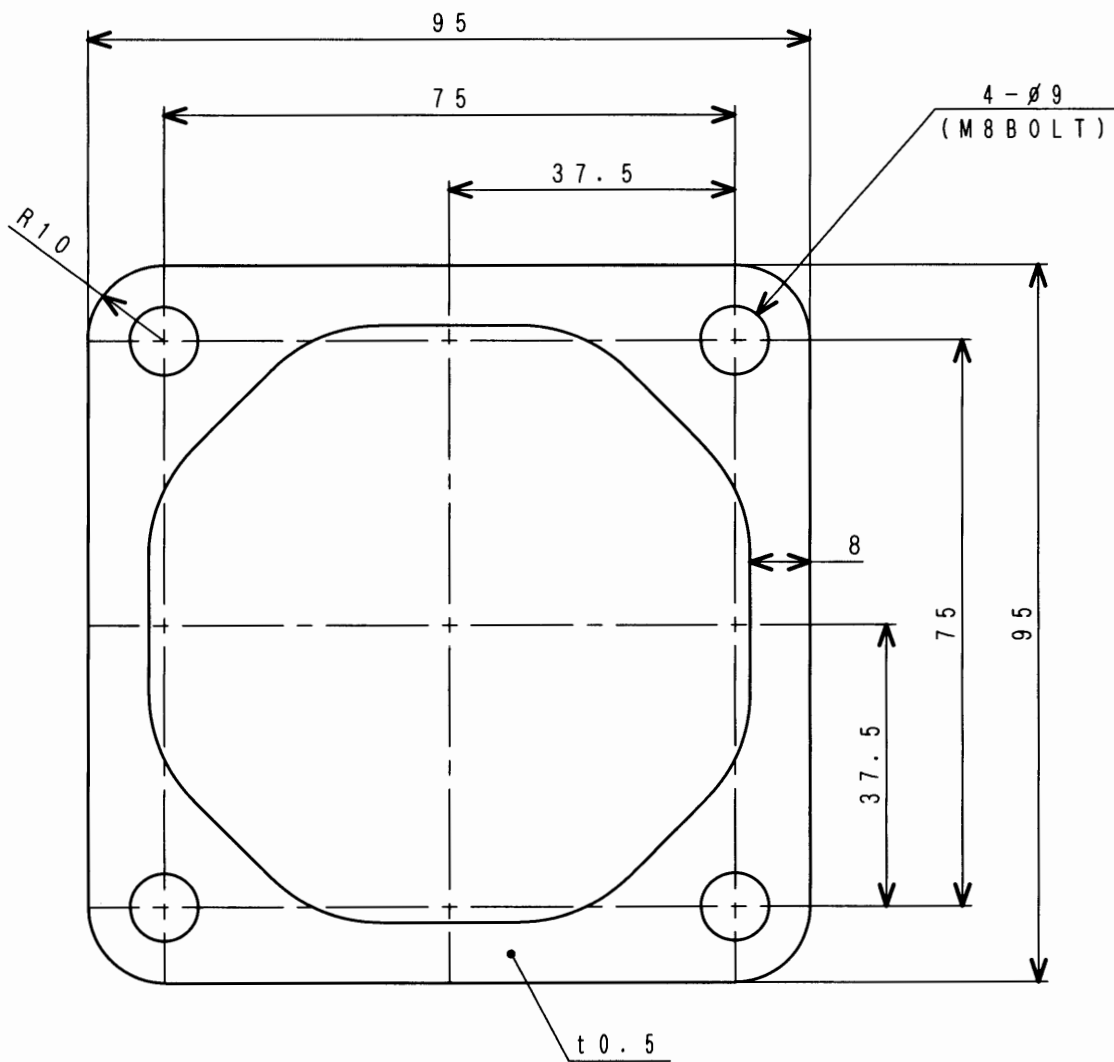


MATERIAL : 4T

ナット  
NUT

F2300-08000

MHI CONFIDENTIAL



エア-ヒータ ガスケット  
GASKET, AIR HEATER

34330-04300

MHI CONFIDENTIAL