RATIONALE

J1449 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This SAE Recommended Practice specifies graphic symbols for operator controls, gauges, tell-tales, indicators, instructions, and warning against risks in small craft and for engines and other equipment intended to be used in small craft.

2. REFERENCES

2.1 Applicable Publications

The following publication forms a part of this specification to the extent specified herein.

2.1.1 ISO Publications

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 4196   Graphical symbols—Use of arrows

ISO 7000   Graphic symbols for use on equipment—Index and synopsis

2.1.2 IEC Publication

Available from International Electrotechnical Commission, 3, rue de Verambe, P.O. Box 131, 1211 Geneva 20, Switzerland, Tel: +41-22-919-02-11, www.iec.ch.

IEC 60417   Graphical Symbols for Use on Equipment

TO PLACE A DOCUMENT ORDER:
Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/J1449_201505

2.2   Related Publications

The following publications are provided for information purposes only and are not a required part of this document.

2.2.1   ISO Publications

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 3461   Graphic symbols—General principles for presentation

ISO 3864   Safety colours and safety signs

ISO 6309   Fire protection—Safety signs

ISO 8999   Reciprocating internal combustion engines—Graphic symbols

3.   CONTENTS
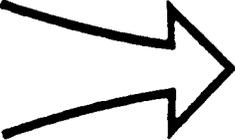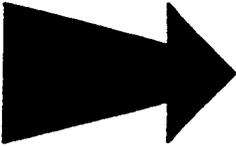
This document contains symbols for:

a.   Media

b.   Conditions

c.   Boat Components

d.   Marine Engine Components

e.   Boat Operation

f.   Engine Operation

g.   Warning, Caution, Malfunction
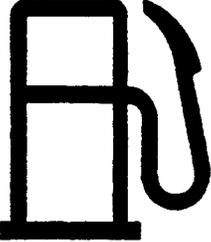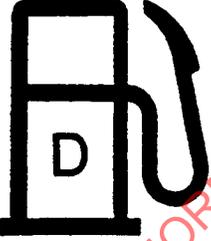
h.   Miscellaneous

4.   SYMBOL COLORS

4.1   When colors are used in symbols, they shall have the following meanings:

a.   Red—Danger or unsafe or hot

b.   Yellow or Orange—Caution

c.   Green—Safe or normal
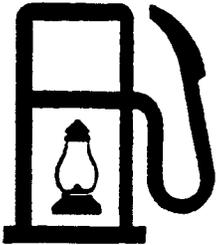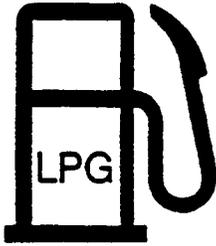
MEDIA

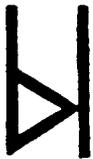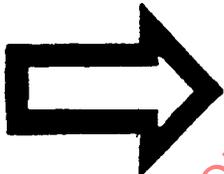| SYMBOL	NAME	APPLICATION
	Fresh Water. Fresh Water Based Coolant. ISO 7000/0536	To signify functions associated with liquid type coolant
	Air, General ISO 7000/0537	To indicate functions associated with the use of ambient air
	Intake Air (For Combustion) ISO 7000/1604	To signify functions associated with intake air
	Exhaust Gas ISO 7000/1605	To signify functions associated with exhaust gas
	Lubricating Oil ISO 7000/1056	To identify functions associated with lubricating oil

MEDIA

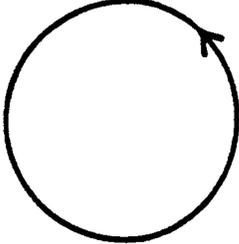| SYMBOL	NAME	APPLICATION
	Sea Water	To signify functions associated with sea water
	Waste Water Sewage	To signify functions associated with waste water or sewage
	Fuel General ISO 7000/0245	To signify the fuel quantity indicator To signify functions associated with fuel At the fuel fill to indicate a gasoline type fuel
	Diesel Fuel Variant of ISO 7000/1541	To signify functions associated with fuel At the fuel fill to indicate diesel fuel
	Unleaded Gasoline Variant of ISO 7000/0237	To signify functions associated with fuel At the fuel fill to indicate unleaded gasoline fuel

MEDIA

SYMBOL	NAME	APPLICATION
	Kerosene	To signify functions associated with kerosene At the fill to indicate kerosene type fuel
	LPG ISO 7000/2489	To signify functions associated with LPG At the fill to indicate LPG fuel

CONDITIONS

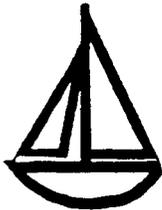| SYMBOL	NAME	APPLICATION
ISO 7000/0010	Rotational Speed	To indicate rotational speed of a shaft **other than the crankshaft** in number of revolutions
ISO 7000/0034	Temperature	To signify functions associated with temperature
ISO 7000/0159	Level	To signify a liquid level This symbol should be used in the orientation shown. When used in composite symbols to indicate fluid levels, the vertical line at the apex of the pointer may be replaced by the appropriate symbol.
ISO 7000/0251	Direction of a Function	To indicate the direction of a function, e.g., direction To signify functions associated with controls
ISO 7000/1365	Cranking	To signify functions associated with starting or cranking

CONDITIONS
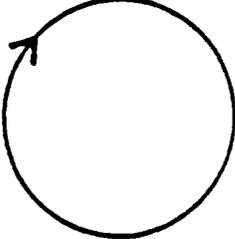
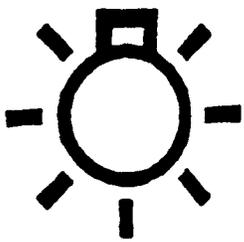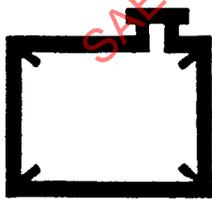| SYMBOL	NAME	APPLICATION
	Clockwise Rotation ISO 7000/0258	To indicate engine or equipment rotation in a clockwise direction
	Counter Clockwise Rotation ISO 7000/0937	To indicate engine or equipment rotation in a counterclockwise direction
kW	Crankshaft Power	To indicate power measured at the engine crankshaft
kW	Propeller-shaft Power	To indicate power measured at the propeller shaft
n/min	Engine Rotation Speed ISO 7000/1389	To indicate the number of revolutions per minute of the engine crankshaft or rotor.

CONDITIONS
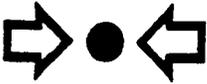
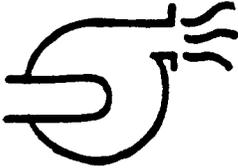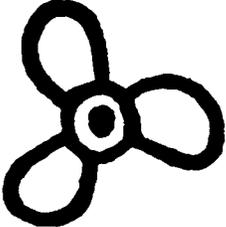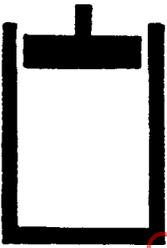| SYMBOL	NAME	APPLICATION
	Pressure IEC-60417-5028 modified per ISO 4196	To signify functions associated with pressure When used in composite symbols, the appropriate symbol is used between the arrows to indicate the medium pressurized
	Elapsed Time ISO 7000/1366	To indicate the cumulative elapsed hours of operating time
	Volume Empty ISO 7000/1563	To indicate an empty tank
	Volume Half-full ISO 7000/1564	To indicate a half full tank
	Volume Full ISO 7000/1565	To indicate a full tank
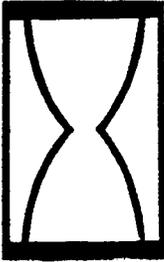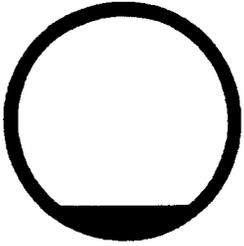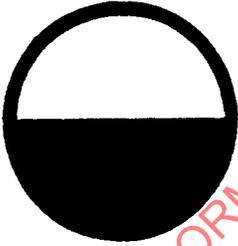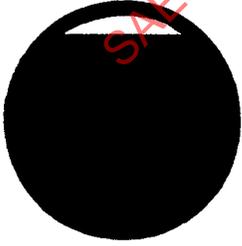
BOAT COMPONENTS

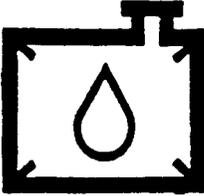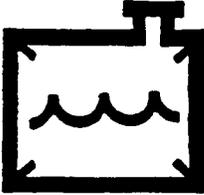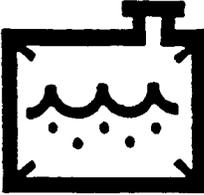| SYMBOL	NAME	APPLICATION
	Motorboat	To signify a motorboat
	Sailboat	To signify a sailboat
	Boat	To signify a boat
	Outboard Drive	To indicate an outboard drive
	Outboard Drive Tilt	To indicate the tilt control of an outboard drive

BOAT COMPONENTS

SYMBOL	NAME	APPLICATION
N (compass symbol)	Compass	To indicate a compass
(anchor symbol)	Anchor	To indicate an anchor or anchor stowage location
(light symbol)	Light ISO 7000/5012	To indicate functions associated with lights
(horn symbol)	Horn ISO 7000/0244	To indicate a horn control
(tank symbol)	Tank	To signify functions associated with liquid storage tanks

BOAT COMPONENTS
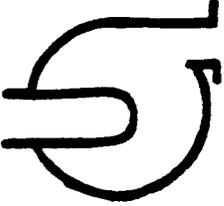
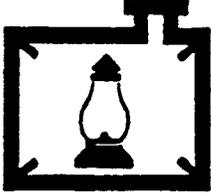| SYMBOL	NAME	APPLICATION
	Pump	To signify functions associated with pumps
	Blower	To signify functions associated with bilge blowers
	Propeller	To signify functions associated with propellers
	Hydraulic System ISO 7000/1409	To indicate functions associated with hydraulic systems
	Interior Light ISO 7000/1421	To indicate functions associated with interior lights

BOAT COMPONENTS
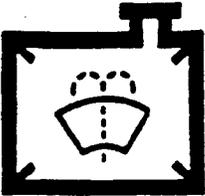
SYMBOL	NAME	APPLICATION
	Windshield Washer Tank	To indicate functions associated with windshield washer tanks
	Oil Tank	To indicate functions associated with lubricating oil tanks
	Fresh Water Tank	To indicate functions associated with fresh water tanks
	Holding Tank	To indicate functions associated with sewage or waste water holding tanks
	Diesel Fuel Tank	To indicate functions associated with diesel fuel tanks
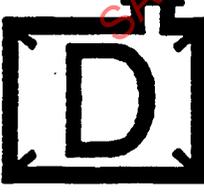
BOAT COMPONENTS
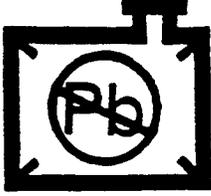
SYMBOL	NAME	APPLICATION
	Unleaded Gasoline Tank	To indicate functions associated with unleaded gasoline fuel tanks
	Kerosene Tank	To indicate functions associated with kerosene fuel tanks
	LPG Tank	To indicate functions associated with LPG fuel tanks
	Battery Power Disconnect ISO 7000/2063	To indicate location or functions associated with battery power disconnect switches
	Running Lights Under Power	To indicate functions associated with running light configurations while operating under power
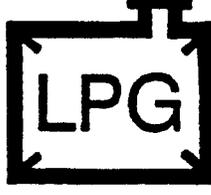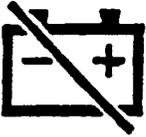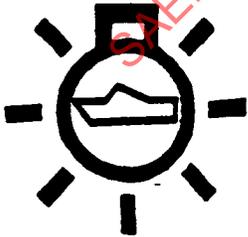
BOAT COMPONENTS
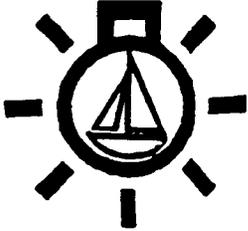
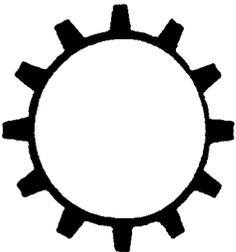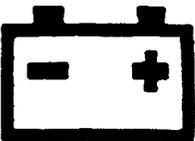| SYMBOL	NAME	APPLICATION
	Running Lights Under Sail	To indicate functions associated with running light configurations while operating under sail alone
	Compass Light	To indicate functions associated with compass lights
	Anchor Light	To indicate functions associated with anchor lights
	Windshield Wiper ISO 7000/0086	To indicate functions associated with windshield wipers
	Windshield Washer ISO 7000/0088	To indicate functions associated with windshield washers
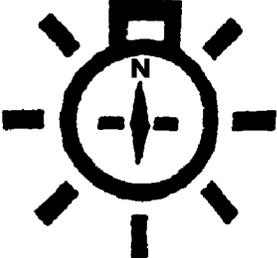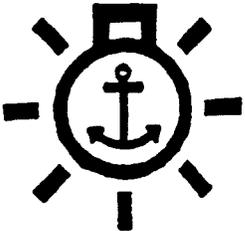
BOAT COMPONENTS

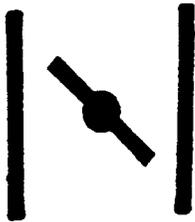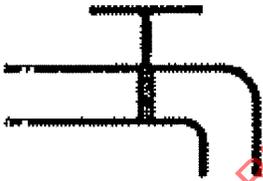| SYMBOL	NAME	APPLICATION
	Windshield Wiper and Washer ISO 7000/0087	To indicate functions associated with windshield wipers and washers

MARINE ENGINE COMPONENTS
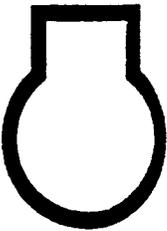
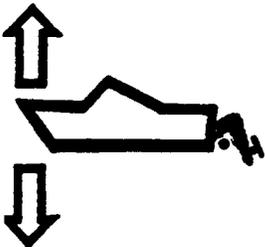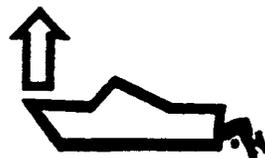| SYMBOL	NAME	APPLICATION
	Engine ISO 7000/1156	To signify functions associated with the engine
	Transmission ISO 7000/1166	To indicate functions associated with marine transmissions
	Battery ISO 7000/0247	To indicate the condition of battery charging
	Filter ISO 7000/1369	To signify functions associated with filtering
	Heat Exchanger	To indicate functions associated with heat exchangers
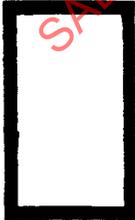
MARINE ENGINE COMPONENTS
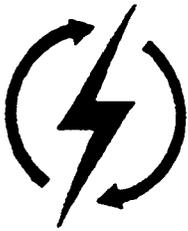
SYMBOL	NAME	APPLICATION
	Electric Generator	To indicate functions associated with engine driven generators or alternators
	Choke ISO 7000/0243	To indicate the control to operate the choke
	Ignition System	To indicate specifications for engine ignition systems
	Water Flushing Connector IEC 60417/5573	To indicate connections for flushing sea water systems with fresh water
	Lift Point ISO 7000/1368	To indicate a point at which to lift

MARINE ENGINE COMPONENTS

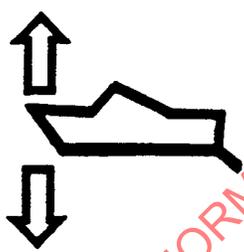| SYMBOL	NAME	APPLICATION
	Prime ISO 7000/1370	To indicate the control to operate a fuel primer

BOAT OPERATION

| SYMBOL	NAME	APPLICATION
	Propulsion System Trim	To indicate a control to vary propulsion thrust vertical angle
	Propulsion System Trim, Bow Up	To indicate a control to vary propulsion system thrust upward
	Propulsion System Trim, Bow Down	To indicate a control to vary propulsion system thrust downward
	Trim Tab Trimming Operation	To indicate a control to vary boat trim tab angle
	Trim Tab, Bow Up	To indicate a control to vary boat trim tab angle upward
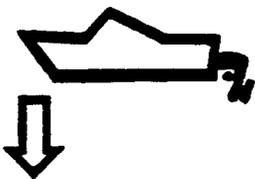
BOAT OPERATION

SYMBOL	NAME	APPLICATION
	Trim Tab, Bow Down	To indicate a control to vary boat trim tab angle downward
	Single Lever Control (Throttle and Shift)	To indicate a single level throttle and shift control When used in composite symbols the dot may be replaced by the appropriate symbol.
	Forward Neutral Reverse (Shift Only)	To indicate a transmission control providing forward, neutral, and reverse
	Lift Point or Location of Slings ISO 7000/0542	To indicate **the points at which to lift the boat or to place the slings**
	Hydraulic Oil ISO 7000/1411	To indicate hydraulic oil

BOAT OPERATION
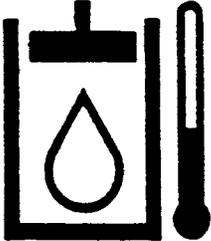
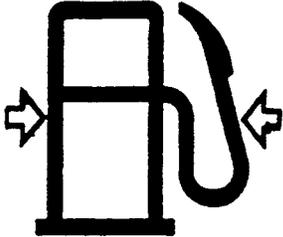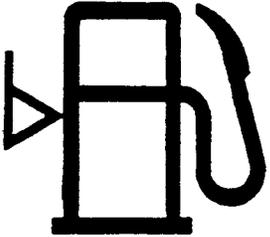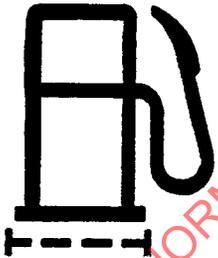| SYMBOL	NAME	APPLICATION
	Hydraulic Oil Temperature ISO 7000/1414	To indicate hydraulic oil temperature
	Hydraulic Oil Pressure ISO 7000/1413	To indicate hydraulic oil pressure
	Hydraulic Oil Filter ISO 7000/1415	To indicate a hydraulic oil filter
	Hydraulic Oil Level ISO 7000/1412	To indicate hydraulic oil level
	Hydraulic System Malfunction ISO 7000/14410	To indicate a possible hydraulic system malfunction
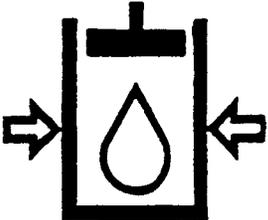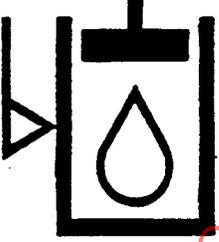
ENGINE OPERATION
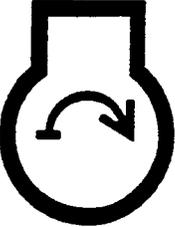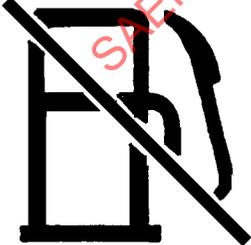
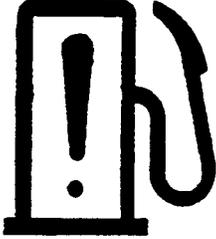| SYMBOL	NAME	APPLICATION
	Engine Cranking ISO 7000/1387	To indicate engine cranking control Recommended for use with single function controls
	Gas Injection for Starting ISO 7000/1547	To indicate the control to activate gas injection for starting
	Electrical Preheat ISO 7000/1704	To indicate a control to activate preheating of engine coolant, oil, or intake air
	Engine Malfunction ISO 7000/1371	To indicate a possible malfunction of the engine
	Engine Stop ISO 7000/1388	To indicate the engine stop control To indicate that the engine has stopped or should be stopped

ENGINE OPERATION

SYMBOL	NAME	APPLICATION
	Electrical Preheat for Diesel Engines ISO 7000/1704	To indicate the control to activate electrical preheat for diesel engines (Low temperature start aid)

ENGINE OPERATION (FUEL)
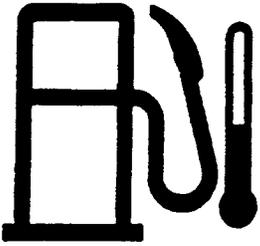
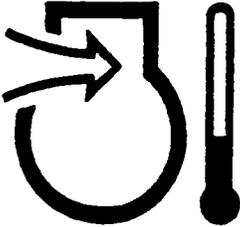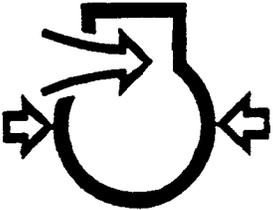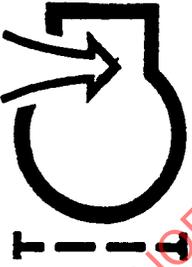| SYMBOL	NAME	APPLICATION
	Fuel Temperature ISO 7000/1394	To indicate fuel temperature
	Fuel Pressure ISO 7000/1392	To indicate fuel pressure
	Fuel Level ISO 7000/1551	To indicate fuel level
	Fuel Filter ISO 7000/1393	To indicate the fuel filter or filter condition
	Fuel Shut Off Variant of ISO 7000/1935	To indicate the control to shut off the fuel supply, not to be used as engine stop symbol.

ENGINE OPERATION (FUEL)

SYMBOL	NAME	APPLICATION
	Fuel System Malfunction ISO 7000/1391	To indicate a possible fuel system malfunction

ENGINE OPERATION (CHARGE AIR)
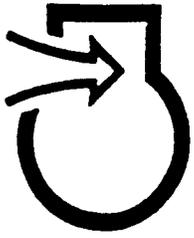
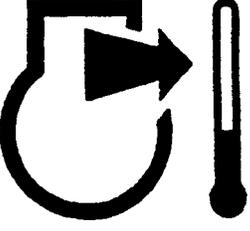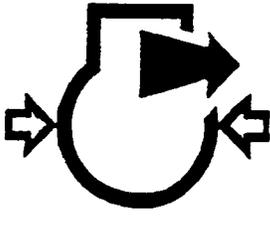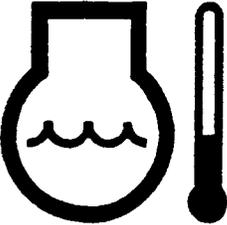| SYMBOL	NAME	APPLICATION
	Engine Inlet Air ISO 7000/1381	To indicate engine intake air
	Engine Inlet Air Temperature ISO 7000/1383	To indicate engine intake air temperature
	Engine Inlet Air Pressure ISO 7000/1382	To indicate engine intake air pressure
	Engine Inlet Air Filter ISO 7000/1170	To indicate the engine intake air filter or filter condition
	Air Cooled Charge Air Cooler ISO 7000/1544	To signify functions associated with charge air coolers Upper symbol is medium being cooled Lower symbol is cooling medium

ENGINE OPERATION (CHARGE AIR)

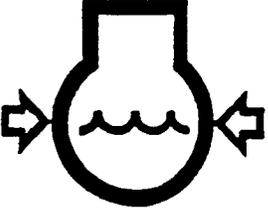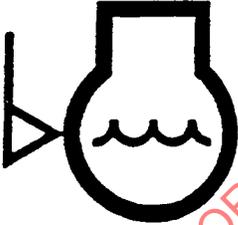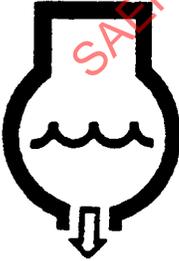| SYMBOL	NAME	APPLICATION
	Fresh Water Cooled Charge Air Cooler ISO 7000/1545	To signify functions associated with charge air coolers Upper symbol is medium being cooled Lower symbol is cooling medium

ENGINE OPERATION (EXHAUST GAS)
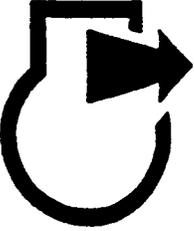
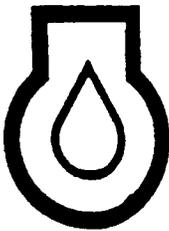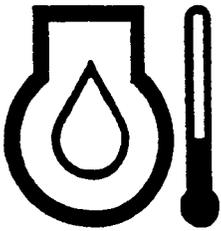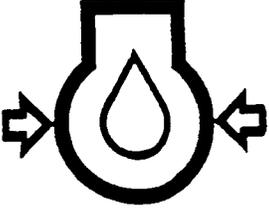| SYMBOL	NAME	APPLICATION
	Engine Exhaust Gas From Engine ISO 7000/1384	To indicate engine exhaust gas
	Engine Exhaust Gas Temperature ISO 7000/1386	To indicate engine exhaust gas temperature
	Engine Exhaust Gas Pressure ISO 7000/1385	To indicate engine exhaust gas pressure
	Engine Exhaust Coolant Temperature ISO 7000/1549	To indicate the temperature of water used to cool the engine exhaust gas

ENGINE OPERATION (LIQUID COOLANT)
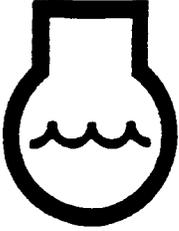
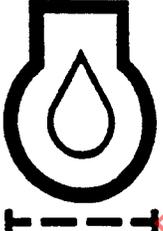| SYMBOL	NAME	APPLICATION
	Engine Coolant ISO 7000/1377	To indicate liquid engine coolant To identify the liquid engine coolant fill
	Engine Water Jacket Temperature ISO 7000/1380	To indicate the liquid engine coolant temperature
	Engine Coolant Pressure ISO 7000/1379	To indicate the liquid engine coolant pressure
	Engine Coolant Level ISO 7000/1378	To indicate engine coolant level
	Engine Water Jacket Drain	To indicate a valve or location to drain the engine water jacket

ENGINE OPERATION (LIQUID COOLANT)
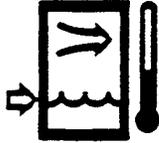
SYMBOL	NAME	APPLICATION
	Charge Air Cooler Coolant Inlet Temperature ISO 7000/1550	To indicate the liquid coolant temperature at the inlet to the charge air cooler

ENGINE OPERATION (ENGINE LUBRICATING OIL)
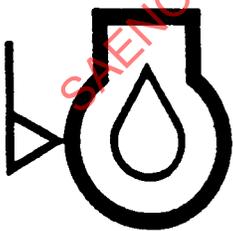
SYMBOL	NAME	APPLICATION
SF	Engine Lubricating Oil Variant (Application) of ISO 7000/1372	To indicate engine oil To identify the engine oil fill When necessary to indicate oil type or classification, that indication should appear directly below the oil symbol The indication SF for ISO-L-ESF is shown for illustration only
	Engine Lubricating Oil Temperature Variant (Application) of ISO 7000/1375	To indicate engine lubricating oil temperature
	Engine Lubricating Oil Pressure Variant (Application) of ISO 7000/1374	To indicate engine lubricating oil pressure
	Engine Lubricating Oil Filter Variant (Application) of ISO 7000/1376	To indicate the engine lubricating oil filter or filter condition
	Engine Lubricating Oil Level Variant (Application) of ISO 7000/1373	To indicate engine lubricating oil level