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JAPANESE INDUSTRIAL STANDARD

Glossary of Terms for Oil Hydraulics and Pneumatics

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Glossary of Terms for Oil Hydraulics and Pneumatics B 0142-1984

1. Scope

This Japanese Industrial Standard specifies the main terms for the oil hydraulic and pneumatic devices and systems, and those reading methods and meanings.

Remarks 1. Where other Japanese Industrial Standards have been specified for the terms to be used in the special fields of aeroplanes and others, those apply.

2. The units and numerical values given in { } in this standard are in accordance with the International System of Units (SI) and are appended for reference.

2. Classification

The terms for oil hydraulics and pneumatics shall be divided as follows:

(1) Basic terms

- (a) General
- (b) Working fluid
- (c) Flow, flow rate
- (d) Pressure
- (e) Phenomenon and characteristic
- (f) Line
- (g) Element
- (h) Others

(2) Terms concerning energy conversion

- (a) Pump
- (b) Motor
- (c) Characteristics of pump and motor
- (d) Cylinder

Applicable Standards: See page 57.

(3) Terms concerning energy control

- (a) Control and operation method in general
- (b) Control valve
- (c) Position of valving element
- (d) Pressure control valve
- (e) Flow control valve
- (f) Directional control valve
- (g) Fitting method

(4) Terms concerning control element and circuit

(5) Terms concerning other devices

- (a) Connector and fitting element
- (b) Adjustment and storage device of energy
- (c) Others

3. Terms, Reading Method and Meaning

The terms, reading method and meaning shall be as follows:

- Remarks
- 1. Where a part of terms has been appended with brackets, it shows the existence of term including the characters in brackets and term excluding the characters in brackets.
 - 2. Where not less than two terms have been appended, the term placed above shall be used preferentially.
 - 3. Where a term is appended with (hydraulic) or (pneumatic), it shows that the term is used only in either one of both fields. However, where the field using that term is clear, this indication is omitted.
 - 4. The parentheses in the term column indicate the reading method.

(1) Basic Term(a) General

No.	Term	Meaning	Equivalent English (Reference)
1101	YUATSU [GIJUTSU]	Technical style using the fluid as a medium of power transmission.	(oil) hydraulic
1102	KŪKIATSU [GIJUTSU]	Technical style using the compressed air as a medium of power transmission.	pneumatics
1103	YUATSUKAIRO	Constitution of function of the hydraulic apparatus which has been assembled by the elements of hydraulic device and others.	(oil) hydraulic circuit
1104	KŪKIATSUKAIRO	Constitution of function of pneumatic apparatus which has been assembled by the elements of pneumatic device and others.	pneumatic circuit

(b) Working Fluid

No.	Term	Meaning	Equivalent English (Reference)
1201	SADŌRYŪTAI	Fluid becoming medium of power transmission.	working fluid
1202	SADŌYU	Fluid to be used for hydraulic device or hydraulic system.	hydraulic fluid, working fluid
1203	NANNENSEISADŌYU	Fire resistant hydraulic fluid capable of preventing the danger of fire to the utmost limit.	fire resistant fluid

No.	Term	Meaning	Equivalent English (Reference)
1204	HYŌJUNKŪKI	Humid air at the temperature of 20°C, absolute atmospheric pressure of 760 mmHg {101.3 kPa} and relative humidity of 65 %. Remark: Regard the unitary volume weight of standard air as 1.2 kgf/m³. Where it is indicated in accordance with the International System of Units (SI), regard the density as 1.2 kg/m³.	standard air (standard reference atmosphere)
1205	HYŌJUNTAIKI	Atmosphere having the temperature, pressure and density given by the following formula when taking the height from the sea level as Z km. when $Z \leq 11$ km, $t = t_0 - 6.5 Z$ $\frac{P}{P_0} = (1 - 0.022 57 Z)^{5.256}$ $\frac{\rho}{\rho_0} = (1 - 0.022 57 Z)^{4.256}$ when $Z > 11$ km, $t = -56.5$ $\frac{P}{P_0} = 1.266 e^{-0.1578 Z}$ $\frac{\rho}{\rho_0} = 1.684 e^{-0.1578 Z}$ where t : temperature (°C) P : absolute pressure (kgf/cm²) {kPa} ρ : density (kgf·s²/m⁴) {kg/m³} The suffix 0 shows the value at the sea level. $t_0 = 15^\circ\text{C}$ $P_0 = 760 \text{ mmHg}$ $= 1.03 \text{ kgf/cm}^2 \{101.3 \text{ kPa}\}$ $\rho_0 = 0.125 \text{ kgf} \cdot \text{s}^2 / \text{m}^4 \{1.225 \text{ kg/m}^3\}$	standard atmosphere

No.	Term	Meaning	Equivalent English (Reference)
1206	KANZENGASU	Gas satisfying the equation of state of $Pv = RT$. where P : pressure (kgf/m ²) {Pa} v : specific volume (m ³ /kgf) {m ³ /kg} R : gas constant (m/K) {J/(kg·K)} T : temperature (K)	perfect gas
1207	HYŌJUNJŌTAI	State of air at the temperature of 20°C, the absolute pressure of 760 mmHg {101.3 kPa}, and the relative humidity of 65 %. Reference: This is named as "standard reference atmospheric condition" in ISO/DIS 5598 and is indicated by the abbreviated symbol A.N.R.	standard condition
1208	KIJUNJŌTAI	Dry gas condition at the temperature of 0°C and the absolute pressure of 760 mmHg {101.3 kPa}.	normal condition
1209	HINETSUHI	$\kappa = \frac{C_p}{C_v}$ where C_p : specific heat at constant pressure C_v : specific heat at constant volume Remark: In the case of adiabatic change, the relation $Pv^\kappa = \text{constant}$ is effected and the ratio of specific heat κ is named also "adiabatic index".	ratio of specific heat
1210	DANNETSUHENKA	Conditional change of $Pv^\kappa = \text{constant}$ in the case of taking the ratio of specific heat as κ .	adiabatic change
1211	PORITORŌPUHENKA	Conditional change of $Pv^n = \text{constant}$.	polytropic change

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No.	Term	Meaning	Equivalent English (Reference)
1212	PORITORŌPUSHISŪ	Index n at the politropic change.	politropic index, politropic exponent
1213	TŌONHENKA	Conditional change of $Pv =$ constant at the constant temperature.	isothermal change
1214	ROTEN	Temperature at which the included steam is saturated when the gas including steam is cooled at the fixed pressure as it is.	dew point

(c) Flow, Flow Rate

No.	Term	Meaning	Equivalent English (Reference)
1301	[TAISEKI] RYŪRYŌ	Volume of fluid moving per unit time.	volumetric flow (rate)
1302	SHITSURYŌ - RYŪRYŌ	Mass of fluid moving per unit time.	mass flow (rate)
1303	TEIKAKURYŪRYŌ (YUATSU)	Guaranteed flow rate specified under the fixed condition.	rated flow (rate)
1304	HAKIDASHIRYŌ (YUATSU)	Volume of fluid discharged by pump per unit time generally.	delivery, flow rate, discharge, discharge rate
1305	OSHINOKEYŌSEKI (YUATSU)	Geometrical volume displaced per one revolution by the positive displacement pump or motor.	displacement
1306	KŪKIRYŌ	The volume of air flowing per unit time converted to the standard condition.	air quantity, air capacity

No.	Term	Meaning	Equivalent English (Reference)
1307	KAATSUKARYŪ RYŌ	Flow rate indicated by converting into the volume under a certain pressure condition. Remark: This is named a flow rate under the atmospheric pressure where this has been indicated particularly under the standard condition.	pressurized flow (rate)
1308	KŪKISHŌHIRYŌ	Air quantity consumed under a certain condition by the pneumatic device or system. Remark: Convert the air consumption per unit time into the quantity under the standard condition to indicate it.	air consumption
1309	REINORUZUSŪ	Non-dimensional characteristic number shown by $Re = uD/\nu$. where u : flow velocity (m/s) D : representative length indicating the size of object (m) ν : kinematic viscosity (m^2/s)	Reynolds number
1310	ONSOKU	Velocity of sound transmitted in medium. Reference: The sound velocity transmitted in the dry air at $t(^{\circ}C)$ is shown by the following formula: $a = 331.68 \left(\frac{273 + t}{273} \right)^{\frac{1}{2}}$ where a : sound velocity (m/s) t : temperature ($^{\circ}C$)	acoustic velocity, sound velocity

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No.	Term	Meaning	Equivalent English (Reference)
1311	AONSOKUNAGARE	Flow of gas having a velocity of not more than the sound velocity.	subsonic flow
1312	RINKAIATSURYOKU HI	Ratio of the pressure at up-stream to that at down-stream at the time when the flow velocity of gas passing the nozzle and others has attained the sound velocity. Reference: When taking the pressure at up-stream side as the absolute pressure of P_H kgf/cm²{kPa} and the pressure at down-stream side as P_L kgf/cm²{kPa} similarly, the critical pressure ratio γ is shown by following formula under the standard air condition. $\gamma = \frac{P_H}{P_L} = 1.893$	critical pressure ratio
1313	SHUKURYŪ	Phenomenon in which the sectional area of jet becomes smaller than the area of opening part of orifice when the fluid becomes a jet by passing that orifice.	contraction
1314	NAGARENOKATACHI	Pattern of flow course of the fluid connecting each port at an arbitrary position of valve.	flow pattern
1315	JIYŪNAGARE	Flow free from control.	free flow
1316	SEIGYONAGARE	Controlled flow.	controlled flow
1317	INTAFURŌ	Flow caused transitional between valve and port in the midway of turnover of valve.	interflow
1318	MORE	Flow of relatively small quantity passing a place where the flow should be closed under the normal conditions or an undesirable place.	leakage



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No.	Term	Meaning	Equivalent English (Reference)
1319	DOREN (YUATSU)	Liquid returning to the tank (or manifold) from the passage (or line) of device, or phenomenon of the returning liquid.	drain
1320	DOREN (KŪKIATSU)	Water in flowing state or precipitating state in the pneumatic devices and lines, or a white turbid mixed liquid of oil and water.	drain
1321	KATTOOFU	To reduce the flow rate by the action of variable discharge control when the pressure of outlet side of pump has approached to the set pressure.	cut-off
1322	FURUKATTOOFU	Cut off state of pump in which the flow rate becomes zero.	full cut-off
1323	TEIKAKUKAITEN HAYASA (YUATSU)	Speed of revolution specified under the rated pressure.	rated speed, rated rotational frequency
1324	TEIKAKUSOKUDO (YUATSU)	Speed specified under the rated pressure.	rated speed

(d) Pressure

No.	Term	Meaning	Equivalent English (Reference)
1401	ZENATSU	Pressure at the time when intercepting the flow of fluid in equientropy.	total pressure
1402	SEIATSU	Pressure of fluid effecting a plane parallel to the stream-line.	static pressure

No.	Term	Meaning	Equivalent English (Reference)
1403	DŌATSU	Pressure shown by (total pressure) - (static pressure). When the fluid is non-compressible, this pressure is indicated by the following formula: (Case in accordance with gravitational unit system) $\dots \frac{\gamma V^2}{2g}$ (Case in accordance with international system of units) $\dots \frac{\rho}{2} V^2$ where γ : weight per unit volume (kgf/m³) ρ : density (kg/m³) V : velocity (m/s) g : acceleration of gravity (m/s²)	dynamic pressure
1404	ZETTAIATSURYOKU	Magnitude of pressure indicated by taking the perfect vacuum as a basis.	absolute pressure
1405	GĒJIATSURYOKU	Magnitude of pressure indicated by taking the atmospheric pressure as the basis.	gauge pressure
1406	YOBATSURYOKU	Pressure used for device or system to serve the convenience of nomination.	nominal pressure
1407	SHIYŌATSURYOKU	Pressure in the case where a device or a system is used actually.	working pressure range
1408	SAIKŌSHIYŌ ATSURYOKU	Maximum pressure which a device or a system can use.	maximum working pressure
1409	SAITEISHIYŌ ATSURYOKU	Minimum pressure which a device or a system can use.	minimum working pressure

No.	Term	Meaning	Equivalent English (Reference)
1410	HOSHŌTAI ATSURYOKU	Pressure which shall resist without drop in performance when returning to the maximum working pressure. Remark: This pressure shall be the value under the specified condition.	proof pressure
1411	HAKAIATSURYOKU	Pressure at which the outer wall of device is broken actually.	burst pressure
1412	SHIDŌATSURYOKU	Minimum pressure at which individual device begins the working.	breakaway pressure (breakout pressure)
1413	SAITEISADŌ ATSURYOKU	Minimum pressure able to guarantee the working of device.	minimum operating pressure
1414	SETTEIATSURYOKU	Pressure to be regulated at the pressure control valve and others.	set pressure
1415	KURAKKINGUATSU [RYOKU]	Pressure at the time when the pressure increases at a check valve, a relief valve, etc. and the valve begins to open and the flow rate of a certain quantity can be confirmed.	cracking pressure
1416	RESHĪTOATSU [RYOKU]	Pressure at the time when the pressure at the inlet side of valve falls at a check valve and a relief valve and the valve begins to close and the quantity of leakage of valve has decreased to a certain specified quantity.	reseal pressure
1417	PAIROTTOATSU	Pressure actuating pilot line.	pilot pressure
1418	ATSURYOKU NO MYAKUDŌ	Nearly periodical pressure fluctuation produced under the stationary working condition. Remove the transient pressure fluctuation.	pressure pulsation

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No.	Term	Meaning	Equivalent English (Reference)
1419	ATSURYOKUHENDŌ	Change of pressure in the device or system.	pressure fluctuation
1420	SĀJI	Transient fluctuation of the flow in the system.	surge
1421	SĀJIATSURYOKU	Pressure produced from the result of surge.	surge pressure
1422	ZANATSU	Undesirable pressure being left in the circuit system or in the device after the supply of pressure has been shut off.	residual pressure
1423	HAIATSU	Pressure actuating at the return side or exhaust side of circuit, or behind the pressure working surface.	back pressure
1424	ATSURYOKUKŌKA	Decrease of fluid pressure due to the flow.	pressure drop
1425	KATTOIN	To give load to the pressure source side by the unloading valves. That limit pressure is named "cut-in pressure".	cut-in, reloading
1426	KATTOAUTO	To let the pressure source side no-load by the unloading valves. That limit pressure is named "cut-out pressure".	cut-out, unloading
1427	TEIKAKUATSU RYOKU (YUATSU)	Pressure able to guarantee the performance under the specified condition and serving as the basis for design and use.	rated pressure
1428	SUIKOMI ATSURYOKU (YUATSU)	Pressure of liquid at the inlet of pump.	suction pressure

No.	Term	Meaning	Equivalent English (Reference)
1429	CHĀJIATSURYOKU (YUATSU)	Pressure at the time of supplementing the working fluid. Remark: This pressure is used for the closed circuit or two stage pump usually.	boost pressure, charge pressure
1430	FŪNYŪATSURYOKU (YUATSU)	Gas pressure of the accumulator before injection of liquid.	pre-charge pressure
1431	ŌBARAIDOATSU RYOKU (YUATSU)	Pressure to increase a flow rate between a certain minimum flow rate and a certain maximum flow rate at the pressure control valve.	override pressure

(e) Phenomena and Characteristics

No.	Term	Meaning	Equivalent English (Reference)
1501	KONNYŪKŪKI	Air mixed in liquid under the state of fine bubbles.	entrained air
1502	KŪKIKONNYŪ	Phenomenon of air mixing in the liquid in the state of fine bubbles or the state of liquid in which air is mixed.	aeration
1503	KYABITESHON	Phenomenon producing the bubbles including steam and included gas by the local drop of pressure of the flowing liquid.	cavitation
1504	OIRUMISUTO	Fine oil particle included in the working air.	oil mist
1505	OSEN	Phenomenon regarding the harmful substances included in the working fluid.	contamination
1506	KONTAMINĒSHON-KONTORŌRU, OSENKANRI	Control of harmful substances included in the working fluid.	contamination control

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No.	Term	Meaning	Equivalent English (Reference)
1507	ROKA	To remove the particles in the fluid by the use of a filtrating material having fine holes like wire nets or filter paper.	filtration
1508	ROKADO	Nominal designation showing the size of mixed particles to be removed by the filtrating material when the working fluid pass through the filter. Its unit is indicated by $\mu\text{m}(\frac{1}{1000}\text{mm})$.	nominal filtration rating
1509	CHATARINGU	A kind of self-oscillation phenomenon producing a relatively high sound by tapping the valve seat at the pressure reducing valve, check valve, relief valve and others.	chattering, chatter, singing
1510	RYŪTAIKOCHAKU-GENSHŌ	Phenomenon to make the working of the spool valve and others impossible because the pressure distribution to the axis becomes unbalance due to inequality of the inside flow and the spool is pressed strongly to the valve body (or sleeve) and is stucked to it.	hydraulic lock
1511	JIZĀ	Vibration having a relatively high frequency given in order to improve its characteristics by reducing the influences of friction, stickness phenomenon, etc. by the spool valve and others.	dither
1512	ATSURYOKUHEIKŌ	To keep the balance of force by the pressure of fluid.	pressure balance
1513	DEKONPURESSHON	To lessen the shock of circuit constituting a cause of damage of machine by decompressing the pressure of hydraulic cylinder gently by the press and others.	decompression

No.	Term	Meaning	Equivalent English (Reference)
1514	HAIKION	Noise made at the time when the air is exhausted from the exhaust port of solenoid valve and others.	exhaust noise
1515	TAIYŌJUMYŌ	Number of times, hours, etc. maintaining a fixed performance and resisting the use when used under the recommended conditions.	useful life
1516	ŌTŌJIKAN	Period from the time when an input signal has been added to the valve and circuit and others to the time when the output attains a certain specified value.	response time
1517	RAPPU	The state of lap or its quantity between land and port of the slide valve and others.	lap
1518	ZERORAPPU	State of lap at the slide valve and others so that the port can be closed when the valve is at the neutral point and the port opens when the valve displaces even a little and the fluid flows.	zero lap
1519	ŌBARAPPU	State of lap at the slide valve and others such that the port can open first when the valve displaces a little from the neutral point and the fluid can flow.	overlap
1520	ANDARAPPU	State of lap at the slide valve and others such that the port has been opened already when the valve is on the neutral point and the fluid can flow.	underlap

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(f) Line

No.	Term	Meaning	Equivalent English (Reference)
1601	KANRO	Pipe or its system to serve for conducting the working fluid.	line
1602	SHUKANRO	Main line including the suction line, pressure line and returning line (or exhaust line).	main line
1603	PAIROTOKANRO	Line to conduct the working fluid for letting work by the pilot method.	pilot line
1604	TAWAMIKANRO	Line having flexibility like a rubber hose.	flexible line
1605	BAIPASU[KANRO]	Passage or line diverging the whole quantity or its part of the working fluid as required.	by-path, by-pass line
1606	DORENKANRO	Line conducting the drain to a return line or a tank and others.	drain line
1607	BENTOKANRO	Line leading to the vent-port.	vent line
1608	TSŪRO	Connection passage piercing through the inside of component parts or conducting the fluid for machining or making hole as cast existing in that inside.	passage
1609	PŌTO	Opening port of passage of the working fluid.	port
1610	BENTOGUCHI	Small port to exhaust the fluid to the outside.	vent-port
1611	TSŪKIGUCHI	Port opened in the atmosphere.	breather, bleeder
1612	KŪKINUKI	Needle valve or fine pipe, etc. for removing the air sealed in the hydraulic circuit.	air-bleeder