National Institute of Advanced Industrial Science and Technology
AIST

National Metrology Institute of Japan

Test report

Test report number : R117/1995-JP1-2013-02

Specimen : Fuel dispenser for motor vehicles

Issued by : National Metrology Institute of Japan

Test address : National Metrology Institute of Japan
1-1-1 Umezono, Tsukuba 305-8563, Japan

Test specifications : OIML R118 (edition 1995)

Application : TOMINAGA MFG.CO.

Manufacturer : TOMINAGA MFG.CO.

Signature : Hiroaki Morinaka

Hiroaki MORINAKA
Chief of Legal Flow Metrology Section Fluid Flow Division

Date of isuue : : 26 August 2013

GENERAL INFORMATION CONCERNING THE PATTERN

Applicant No. :	25-001
Applicant :	TOMINAGA MFG.CO.
Manufacturer :	TOMINAGA MFG.CO.

Measuring system

Pattern designation:	HAXC6463
Low flow rate:	30 litres/min
High flow rate:	70 litres/min
Maximum flow rate:	70 litres/min
Minimum flow rate:	3 litres/min
Minimum measured quantity:	2 litres
Maximum pressure:	0.31 MPa
Minimum pressure:	0.12 MPa
Maximum unit price (number of digits):	5 digits
Maximum price to pay (number of digits):	6 digits
Temperature range:	- 20 ℃ to + 40 ℃
Liquids (or viscosity range):	Gasoline / Diesel / Kerosene
Mains power:	
Voltage:	AC100-240V
Frequency:	50Hz , 60Hz
Type of display:	LCD

Meter

Manufacturer :	TOMINAGA MFG.CO.
Pattern designation:	FM1
Pattern approval mark:	
Maximum flow rate:	70 litres/min
Minimum flow rate:	3 litres/min
Minimum measured quantity:	2 litres

Gas elimination device (integral with pump)

Manufacturer :	TOMINAGA MFG.CO.
Pattern designation:	PA6
Volume:	
Maximum flow rate:	70 litres/min
Minimum flow rate:	3 litres/min
Maximum pressure:	0.31 MPa
Minimum pressure:	0.12 MPa

Measuring transducer

Manufacturer:	TATSUNO Corporation
Pattern designation:	ZE-1945
Number of pulses per revolution	50 pulses

Calculator

Manufacturer :	TOMINAGA MFG.CO.
Pattern designation:	PB-0451 , PB-0452
Mains power:	
Voltage:	AC100-240V
Frequency:	50Hz , 60 Hz

Hose

Manufacturer:	TOGAWA RUBEER CO., LTD.
Pattern designation:	3N5/8, 3N3/4

Nozzle

Manufacturer:	TOMINAGA MFG.CO.
Pattern designation:	TNAS-520C, TNAS-520R, TNASD-520C, TNASD-520R TNAS-525C, TNAS-525R, TNASD-525C, TNASD-525R TNASW-525C, TNASW-525R 10-3/4, 10-1

Break valve

Manufacturer:	TOMINAGA MFG.CO.
Pattern designation:	Double Poppet Valve:2
Manufacturer:	
Pattern designation:	

CHECK LIST

Notes: 1 Item numbering refers to international Recommendation OIML R117 , Edition 1995(E)

2 For each test , the check list has been completed according to the example:

	+	−
if the instrument has passed the test	×	
if the instrument has failed		×
if the test is not applicable	/	/

§(R117)	Requirement	+	−	Remarks
	GENERAL PROVISIONS			
	MARKINGS			
2.19.1	Markings applied legibly and indelibly on the dial of the indicating device or on a special data plate:	×		
	· Pattern approval sign	/	/	
	· Manufacturers identification mark or trade mark designation	×		TOMINAGA MFG.CO.
	· Serial number	×		
	· Year of manufacture	×		
	· Minimum measured quantity (MMQ)	×		2L
	· Maximum flowrate (Qmax)	×		40, 60, 65, 70 L/min
	· Minimum flowrate (Qmin)	×		3L/min
	· Maximum pressure	×		0.33 MPa
	· Minimum pressure	×		0.12 MPa
	· Liquids	×		
	· Temperature range	×		Class C
	INDICATIONS			
2.9.1	Unit of volume: litre(l or L)	×		
2.9.5	Difference between volume indications of more than one indicating device ≦1 scale interval of indicating device with the greatest scale	×		
	BRANCHES AND BY-PASSES			
2.16.1	Branches downstream of meter: diversion to any receiving receptacle(s) other than that intended is	×		
	SEALING DEVICES AND STAMPING PLATE			
2.20.1	Seals easily accessible and preventing access to components which allow alteration of the measurement result without damaging the seals including the stamping plate	×		
	REQUIREMENTS FOR ANCILLARY DEVICES			
	ADJUSTMENT DEVICE			
3.1.4	Difference between consecutive values of the ratio ≦0.00 1	×		
	Adjustment by means of a by-pass of the meter impossible	×		
3.2.1.1	Reading precise, easy and unambiguous by simple juxtaposition	×		
	Decimal sign clear	×		
	VOLUME INDICATING DEVICE			
3.2.1.2	Scale interval: 1×10^n, 2×10^n or 5×10^n	×		
3.2.1.4	Continuous indicating device: MSVD ≧ volume corresponding to 2 mm on the scale, and ≧ 1/5 of scale interval	/	/	

§(R117)	Requirement	+	−	Remarks
	VOLUME INDICATING DEVICE			
3.2.1.4	Discontinuous indicating device: MSVD ≧ 2 scale intervals	×		MSVD =2×2×0.5×1/100 =0.02 MSVD ≧ 0.002
3.2.2.1	Element with graduation entirely visible (except element corresponding to the maximum range of the indicator): one revolution corresponds to 10n authorized units of volume	/	/	
3.2.2.2	Element with graduation entirely visible: one revolution of the element corresponds to scale interval of the following element	/	/	
3.2.2.3	Element with only part of graduation visible through a window (except first element) : discontinuous movement	/	/	
3.2.2.4	Advance by one figure of following element when preceding element passes from 9 to 0	/	/	
3.2.2.5	Dimension of the window for the first ele- ment ≧ 1.5 ×(distance between two graduated scale marks)	/	/	
3.2.2.6	Width of scale mark ≦ 1/4 of scale spacing	/	/	
	Apparent scale spacing ≧ 2 mm	/	/	
3.2.3	Electronic indicating device continuous display of volume during the period of measurement	×		
3.2.4.2	Zero setting device not permitting any alteration of the result	×		
3.2.4.3	No indication of any result during zeroing	×		
3.2.4.4	Continuous indicating device: residual indication after zeroing ≦ 1/2 of MSVD	/	/	
3.2.4.5	Discontinuous indicating' device: indicate zero without any	×		
	PRICE INDICATING DEVICE			
3.3.2	Unit price adjustable and indicated before measurement by a displaying device; valid for the whole transaction	×		
	Elapsed time between changing unit price and before next measurement starts: at least five seconds	×		
3.3.3	(mutatis mutandis)			
(3.2.1.1)	Reading precise, easy and unambiguous	×		
(3.2.2.4)	Advance by figure of following element when preceding element passes from 9 to 0	/	/	
(3.2.4.2)	Zero setting device not permitting any alteration of the result	×		
(3.2.4.3)	No indication of any result during zeroing	×		
	PRICE INDICATING DEVICE			
3.3.4	Monetary unit or its symbol in the immediate vicinity of the indicating device。	×		
3.3.5	Zero setting devices of price indication and volume indication: zeroing of either of them automatically involves zeroing the other	×		
3.3.6	Continuous indicating device: MSPD ≧ price corresponding to 2 mm on the scale, and ≧ price corresponding to 1/5 of scale interval	/	/	
	Discontinuous indicating device: MSPD ≧ price corresponding to 2 scale intervals	×		MSPD =2×2×0.5×1/100 =0.02 MSPD ≧ 0.002
3.3.8	Continuous indicating device: residual indication after zeroing ≦ 1/2 of MSPD	/	/	
3.3.9	Discontinuous indicating device: indicate zero without any ambiguity	×		

§(R117)	Requirement	+	−	Remarks
	PRINTING DEVICE			
3.4.1	Printed volume scale interval: 1×10n, 2×10n or 5×10n and ≦ MSVD, and smallest scale interval of indicating device	×		
3.4.2	Unit of volume: litre (l or L) Figures, unit or symbol, (and decimal sign) of volume printed on	×		
3.4.3	If connected to more than one measuring system: print identification	×		
3.4.4	If repetition of printing: copies are marked clearly	×		
3.4.5	If volume determination by difference between two printed values: withdrawal of ticket during measurement impossible	/	/	
3.4.6	Zeroing device of printer and volume indicator: zeroing of one of them involves zeroing the other	/	/	
3.4.7	Figures monetary unit or symbol, (and decimal sign) of price printed on ticket	×		
3.4.8	Printed price scale interval: 1×10^n, 2×10^n or 5×10^n monetary unit, and ≦ MSPD	×		
	PRE-SETTING DEVICE			
3.6.2	If several independent controls: scale interval corresponding to one control equals range of control of the next lower order	×		
3.6.4	Figures of pre-setting display clearly distin-guishable from those of volume indicator	×		
3.6.5	Indication of the selected quantity during de-livery remains unaltered or returns progressively to zero	×		
3.6.6	Difference between pre-set volume and indicated volume ≦ MSVD	×		
3.6.7	Unit of pre-set volume same as that of volume indicator	×		
	Marking of unit of volume or its symbol on pre-setting mechanism	×		
3.6.8	Scale interval of pre-setting device ≧ scale interval of volume indicator	×		
3.6.10	(mutatis mutandis for price pre-setting devices)			
(3.6.2)	If several independent controls: scale interval corresponding to one control equals range of control of the next lower order	×		
(3.6.4)	Figures of pre-setting display clearly distinguishable from those of price indicator	×		
(3.6.5)	Indication of the selected quantity during delivery remains unaltered or returns progressively to zero	×		
(3.6.6)	Difference between pre-set price and indicated price ≦ MSPD	×		
(3.6.7)	Unit of pre-set price same as that of price indicator	×		
	Marking of monetary unit or its symbol on pre-setting mechanism	×		
(3.6.8)	Scale interval of pre-setting device ≧ scale interval of price	×		
	SPECIFIC REQUIREMENTS FOR MEASURING SYSTEMS EQUIPPED WITH ELECTRONIC DEVICES			
	CHECKING FACILITIES FOR MEASUREMENT TRANSDUCER			
4.3.2.1	When each pulse represents elementary volume, at least security level B defined by ISO 6551	×		
	Checking facilities of type P	×		
	Checking interval not exceeding the duration of measurement of amount of liquid equal to MSVD	×		
	Possibility of testing the operation of checking facilities during pattern approval and verification	×		

§(R117)	Requirement	+	−	Remarks
	CHECKING FACILITIES FOR CALCULATION			
4.3.3.1	Checking facilities for operation of type P or I	×		
	Checking interval for type I at each delivery	×		
4.3.3.2	Checking facilities for validity of calculation of type P	×		
	Existence of a means for controlling continuity	×		
	CHECKING FACILITIES FOR INDICATING DEVICE			
4.3.4.1	Checking facilities for operation of type P or I if indication can be reconstituted	×		
4.3.4.2	Tests "all displaying" - "all blanking" - "all zeros" test with duration of each sequence ≧ 0.75s	×		
4.3.4.3	Possibility of testing the operation of checking facilities during verification	×		
	CHECKING FACILITIES FOR PRINTING DEVICE			
4.3.5	Checking facilities of type I or P Checking includes presence of paper and of electronic control circuits Possibility of testing the operation of checking facilities during pattern approval and verification Where action is a warning: given on or by the printing device	×		
	OTHER SPECIFIC REQUIREMENTS FOR FUEL DISPENSERS			
5.1.1	Ratio between maximum flowrate and minimum flowrate: at least ten	×		
5.1.2	If integral pump: gas elimination device placed immediately upstream of the meterinlet	×		
5.1.3	If no integral pump: check that the installation schemes provide for necessary securities	×		
5.1.4	Device for resetting the volume indicator to zero present	×		
	Height of figures of volume indicator with zero setting device ≧ 10 mm	×		
	If price indicator, presence of zero setting device	×		
5.1.5	Next delivery inhibited until nozzle(s) replaced and indicator reset to zero	×		
5.1.6	When maximum flowrate (Qmax) ≦ 3.6 m^3/h, MMQ ≦ 5 L	×		MMQ= 2 L
5.1.8	Fuel dispenser interruptible	×		
5.1.9	Minimum duration of operation of display after power failure ≧ 15 min continuously and automatically, or ≧ 5 min in one or several periods controlled manually during 1 h	×		
	Delivery interrupted by power failure: impossible to continue delivery if power failure has lasted more than 15 s	×		
5.1.10	Delay time between measurement value and indicated values ≦ 500 ms	×		≦ 250ms
5.1.12	Hidden volume at the beginning of the delivery ≦ 2×MSVD	×		0.04=2×0.02
	Hidden price at the beginning of the delivery ≦ 2×MSPD	×		

CONCLUSION OF TESTS

Application No. :25-001 Date : 2013/8/20

No.	Test description	+	-	Remark
1	Accuracy	×		
2	Minimum mesured quantity	×		
3	Flow interruption	×		
4	Gas elimination device	×		
5	Variation in the internal volume of hose	×		
6	Endurance test	×		
7	Dry heat (non-condensing)	×		
8	Cold	×		
21	Damp heat, cyclic (condensing)	×		
22	Power voltage variations	×		
23	Short-time power reductions	×		
24	Electrical bursts	×		
25	Electrostatic discharges	×		
26	Electromagnetic susceptibility	×		

Notes :

+	-	
×		if the instrument has passed the test
	×	if the instrument has failed
/	/	if the test is not applicable

Remarks :

Observer :

TEST REPORT

Symbols, units and equations:

P_u Unit price (¥/L)
t Time (s)
Q Flowrate of liquid (L/min)
V_i Volume indication of dispenser (L)
P_i Price indication (or printed if not fitted with a price indicator) of dispenser (¥)
P_c Calculated price (¥)
V_n Volume indication of test measure or computed volume from simulated pulses (L)
T Temperature of liquid in the test measure (℃)
T_r Reference temperature of test measure (℃)
T_m Temperature of liquid passing through the meter (℃)
E_v Error of volume indication (%)
E_p Error of price indication (¥)
Q_a Flowrate of air (L/min)
V_a Volume of air (L)
α Cubic expansion coefficient of test liquid due to temperature ($℃^{-1}$)
β Cubic expansion coefficient of test measure due to temperature ($℃^{-1}$)
V_{nc} Volume of test measure, compensated for deviation from reference temperature (L)
V_{mc} Volume passing through the meter compensated for deviation from reference temperature and pressure (L)
$\bar{E}$ Mean value of error of indication (% or ¥)
n Number of tests at the same condition

$P_c = V_i \times P_u$
$E_v = (V_i - V_n) / V_n \times 100$ V_n may be replaced by V_{nc}, if appropriate
$E_p = P_i \times P_c$
$Q = (V_i \times 60) / t$
$V_{nc} = V_n \times [1+\beta(T-T_r)]$
$\bar{E} = [E(1)+E(2)+\ldots+E(n)] / n$
Range = Maximum error — minimum error (% or Yen)

Note: If significant differences are recorded between the temperature of the liquid in the meter and the test measure, a correction on the liquid volume passing though the meter is computed as follows:

$V_{mc} = V_{nc} \times [1+\alpha(T_m-T)]$
and in this case V_{nc} is to be replaced by V_{mc} in the whole text.

If β is not known, the following values can be used.

Material	β ($℃^{-1}$) (uncertainty: 5×10^{-6} $℃^{-1}$)
Borosilica glass	10×10^{-6}
Glass	27×10^{-6}
Mild steel	33×10^{-6}
Stainless steel	51×10^{-6}
Copper, Brass	53×10^{-6}
Aluminium	69×10^{-6}

1 Accuracy (Page 1)

Application No: 25-001 Date: 2013/7/2 Signature: Y.Fujimoto, Y.Miyazawa

Liquid: Gasoline Viscosity: 0.90 mPa.s

Q(1) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
40.0	123	50.18	6172	50.160	0.037	24.5	-0.1	6172.14	50.15	**+0.07**	0.5	-0.14	2.46
40.0	123	50.13	6166	50.105	0.037	23.5	-0.1	6165.99	50.09	**+0.08**	0.5	+0.01	2.46
40.0	123	50.24	6180	50.217	0.037	23.2	-0.1	6179.52	50.20	**+0.08**	0.5	+0.48	2.46
E_v	**+0.08 %**		**Range**	**0.01 %**		E_p	**+0.12**						

Test measures used: No.98-5
β: 0.000048
Reference temperature: 15.0 ℃

Ambient conditions
Temperature: 28.3 ℃ Humidity: 45.5 %RH Pressure: 1011.2 hPa

Q(2) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
23.8	123	50.11	6164	50.085	0.037	23.4	-0.1	6163.53	50.07	**+0.08**	0.5	+0.47	2.46
23.8	123	50.09	6161	50.051	0.037	23.6	-0.1	6161.07	50.04	**+0.11**	0.5	-0.07	2.46
23.8	123	50.10	6162	50.066	0.037	23.6	-0.1	6162.30	50.05	**+0.10**	0.5	-0.30	2.46
E_v	**+0.10 %**		**Range**	**0.03 %**		E_p	**+0.03**						

Test measures used: No.98-5
β: 0.000048
Reference temperature: 15.0 ℃

Ambient conditions
Temperature: 28.0 ℃ Humidity: 50.0 %RH Pressure: 1011.0 hPa

Q(3) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
14.2	123	50.00	6150	49.996	0.037	24.0	-0.1	6150.00	49.98	**+0.04**	0.5	0.00	2.46
14.2	123	50.09	6161	50.057	0.037	24.2	-0.1	6161.07	50.04	**+0.10**	0.5	-0.07	2.46
14.2	123	50.07	6159	50.038	0.037	24.4	-0.1	6158.61	50.02	**+0.09**	0.5	+0.39	2.46
E_v	**+0.08 %**		**Range**	**0.06 %**		E_p	**+0.11**						

Test measures used: No.98-5
β: 0.000048
Reference temperature: 15.0 ℃

Ambient conditions
Temperature: 27.5 ℃ Humidity: 48.8 %RH Pressure: 1010.9 hPa

1 Accuracy (Page 2)

Application No: 25-001 Date: 2013/7/2 Signature: Y.Fujimoto, Y.Miyazawa

Liquid: Gasoline Viscosity: 0.86 mPa.s

Q(4) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{mc} L	E_v %	mpe %	E_p ¥	MSPD ¥
8.5	123	10.06	1237	10.045	0.001	26.1	-0.1	1237.38	10.05	**+0.11**	0.5	-0.38	2.46
8.5	123	10.03	1234	10.025	0.001	26.2	-0.1	1233.69	10.03	**+0.01**	0.5	+0.31	2.46
8.5	123	10.02	1232	10.014	0.001	26.4	-0.1	1232.46	10.02	**+0.01**	0.5	-0.46	2.46
E_v	**+0.04 %**		**Range**	**0.10 %**		E_p	**-0.18**						

Test measures used: No.98-3

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 28.6 ℃ Humidity: 50.0 %RH Pressure: 1010.6 hPa

Q(5) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{mc} L	E_v %	mpe %	E_p ¥	MSPD ¥
5.0	123	10.02	1232	10.023	0.001	26.6	-0.1	1232.46	10.03	**-0.08**	0.5	-0.46	2.46
5.0	123	10.04	1235	10.025	0.001	26.8	-0.1	1234.92	10.03	**+0.10**	0.5	+0.08	2.46
5.0	123	10.02	1232	10.015	0.001	27.0	-0.1	1232.46	10.02	**0.00**	0.5	-0.46	2.46
E_v	**+0.01 %**		**Range**	**0.18 %**		E_p	**-0.28**						

Test measures used: No.98-3

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 28.5 ℃ Humidity: 48.1 %RH Pressure: 1010.5 hPa

Q(6) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{mc} L	E_v %	mpe %	E_p ¥	MSPD ¥
3.0	123	10.02	1232	10.014	0.001	25.5	-0.1	1232.46	10.02	**+0.02**	0.5	-0.46	2.46
3.0	123	10.01	1231	10.008	0.001	26.8	-0.1	1231.23	10.01	**-0.03**	0.5	-0.23	2.46
3.0	123	10.03	1234	10.017	0.001	27.6	-0.1	1233.69	10.02	**+0.08**	0.5	+0.31	2.46
E_v	**+0.02 %**		**Range**	**0.11 %**		E_p	**-0.13**						

Test measures used: No.98-3

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 29.3 ℃ Humidity: 45.8 %RH Pressure: 1009.8 hPa

1 Accuracy (Page 3)

Application No: 25-001 Date: 2013/7/1 Signature: T.Ito, M.Sugaya

Liquid: Deisel Viscosity: 3.73 mPa.s

Q(1) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
70.0	123	100.18	12322	99.943	0.063	22.6	-0.1	12322.14	99.92	**+0.26**	0.5	-0.14	2.46
70.0	123	100.33	12341	100.114	0.063	22.7	-0.1	12340.59	100.09	**+0.24**	0.5	+0.41	2.46
70.0	123	100.36	12344	100.140	0.063	22.3	-0.1	12344.28	100.11	**+0.25**	0.5	-0.28	2.46
E_v	**+0.25 %**		**Range**	**0.02 %**		E_p	**0.00**						

Test measures used: No.98-6

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 26.8 ℃ Humidity: 50.5 %RH Pressure: 1010.57 hPa

Q(2) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
37.3	123	100.01	12301	99.733	0.063	22.6	-0.1	12301.23	99.71	**+0.30**	0.5	-0.23	2.46
37.3	123	100.09	12311	99.796	0.063	22.8	-0.1	12311.07	99.77	**+0.32**	0.5	-0.07	2.46
37.3	123	100.16	12320	99.868	0.063	23.0	-0.1	12319.68	99.84	**+0.32**	0.5	+0.32	2.46
E_v	**+0.31 %**		**Range**	**0.02 %**		E_p	**+0.01**						

Test measures used: No.98-6

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 27.4 ℃ Humidity: 43.8 %RH Pressure: 1010.57 hPa

Q(3) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
19.9	123	19.96	2455	19.895	0.010	26.5	-0.1	2455.08	19.90	**+0.32**	0.5	-0.08	2.46
19.9	123	20.06	2467	20.000	0.010	26.2	-0.1	2467.38	20.00	**+0.29**	0.5	-0.38	2.46
19.9	123	19.91	2449	19.857	0.010	25.8	-0.1	2448.93	19.86	**+0.27**	0.5	+0.07	2.46
E_v	**+0.29 %**		**Range**	**0.05 %**		E_p	**-0.13**						

Test measures used: No.98-4

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 29.3 ℃ Humidity: 39.5 %RH Pressure: 1010.57 hPa

1 Accuracy (Page 4)

Application No: 25-001 Date: 2013/7/1 Signature: T.Ito, M.Sugaya

Liquid: Deisel Viscosity: 3.38 mPa.s

Q(4) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
10.6	123	20.00	2460	19.936	0.010	25.1	-0.1	2460.00	19.94	**+0.32**	0.5	0.00	2.46
10.6	123	19.97	2456	19.911	0.010	25.7	-0.1	2456.31	19.91	**+0.30**	0.5	-0.31	2.46
10.6	123	20.02	2462	19.959	0.010	26.1	-0.1	2462.46	19.96	**+0.30**	0.5	-0.46	2.46
E_v	**+0.31 %**		**Range**	**0.02 %**		**E_p**	**-0.26**						

Test measures used: No.98-4

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 29.0 ℃ Humidity: 43.0 %RH Pressure: 1010.57 hPa

Q(5) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
5.6	123	10.01	1231	9.973	0.001	25.7	-0.1	1231.23	9.98	**+0.33**	0.5	-0.23	2.46
5.6	123	10.02	1232	9.982	0.001	26.5	-0.1	1232.46	9.99	**+0.33**	0.5	-0.46	2.46
5.6	123	9.95	1224	9.907	0.001	27.2	-0.1	1223.85	9.91	**+0.38**	0.5	+0.15	2.46
E_v	**+0.35 %**		**Range**	**0.05 %**		**E_p**	**-0.18**						

Test measures used: No.98-3

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 25.8 ℃ Humidity: 59.2 %RH Pressure: 1010.57 hPa

Q(6) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
3.0	123	10.01	1231	9.972	0.001	27.6	-0.1	1231.23	9.98	**+0.33**	0.5	-0.23	2.46
3.0	123	10.00	1230	9.959	0.001	28.4	-0.1	1230.00	9.96	**+0.36**	0.5	0.00	2.46
3.0	123	10.01	1231	9.970	0.001	29.1	-0.1	1231.23	9.98	**+0.34**	0.5	-0.23	2.46
E_v	**+0.34 %**		**Range**	**0.03 %**		**E_p**	**-0.15**						

Test measures used: No.98-3

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 25.6 ℃ Humidity: 59.1 %RH Pressure: 1010.57 hPa

2 Minimum measured quantity

Application No: 25-001 Date: 2013/7/1 Signature: T.Ito, M.Sugaya

Liquied Gasoline Viscosity: 0.90 mPa.s

Q(1) L/min	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %
40.0	2.010	2.007	23.8	-0.1	0.000	2.007	**+0.15**	0.5
40.0	2.000	1.999	23.8	-0.1	0.000	1.999	**+0.05**	0.5
40.0	2.010	2.012	24.1	-0.1	0.000	2.012	**-0.10**	0.5
						E_v	**+0.03**	**%**

Test measures used: No.98-1

β: 0.000048

Reference temperature: 15 ℃

Ambient conditions

Temperature: 26.3 ℃
Humidity: 54.0 %RH
Pressure: 1010.0 hPa

Application No: 25-001 Date: 2013/7/1 Signature: Ito, Fujimoto, Miyazawa

Liquied Gasoline Viscosity: 0.89 mPa.s

Q(6) L/min	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %
3.0	1.980	1.977	24.5	-0.1	0.000	1.978	**+0.10**	0.5
3.0	2.010	2.007	24.7	-0.1	0.000	2.008	**+0.10**	0.5
3.0	2.000	2.002	25.0	-0.1	0.000	2.003	**-0.15**	0.5
						E_v	**-0.03**	**%**

Test measures used: No.98-1

β: 0.000048

Reference temperature: 15 ℃

Ambient conditions

Temperature: 26.7 ℃
Humidity: 52.8 %RH
Pressure: 1010.0 hPa

3 Flow interroption

Application No: 25-001 Date: 2013/6/18 Signature: Y.Fujimoto, M.Sugaya

Liquid: Gasoline Viscosity: 0.92 mPa.s

Q(1) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	T ℃	T_s ℃	E_s L	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
40.0	123.0	50.150	6168	50.173	22.7	-0.1	+0.037	6168.45	50.155	**-0.01**	0.5	-0.45	2.46
40.0	123.0	50.100	6162	50.094	22.8	-0.1	+0.037	6162.30	50.076	**+0.05**	0.5	-0.30	2.46
40.0	123.0	50.300	6187	50.293	22.8	-0.1	+0.037	6186.90	50.275	**+0.05**	0.5	+0.10	2.46
E_v	**0.03 %**		E_p	**-0.22 %**									

Test measures used: No.98-5

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 16.5 ℃ Humidity: 60.0 %RH Pressure: 1013.2 hPa

Application No: 25-001 Date: 2013/6/19 Signature: Ito, Fujimoto, Miyazawa

Liquid: Deisel Viscosity: 4.00 mPa.s

Q(1) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	T ℃	T_s ℃	E_s L	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
70.0	123.0	100.390	12348	100.161	21.5	-0.1	+0.063	12347.97	100.130	**+0.26**	0.5	+0.03	2.46
70.0	123.0	100.460	12357	100.233	21.5	-0.1	+0.063	12356.58	100.202	**+0.26**	0.5	+0.42	2.46
70.0	123.0	100.340	12342	100.106	21.5	-0.1	+0.063	12341.82	100.075	**+0.26**	0.5	+0.18	2.46
E_v	**0.26 %**		E_p	**0.30 %**									

Test measures used: No.98-6

β: 0.000048

Reference temperature: 15.0 ℃

Ambient conditions

Temperature: 25.0 ℃ Humidity: 90.5 %RH Pressure: 990.0 hPa

4 Gas elimination device (Page 1)

Application No: 25-001 Date: 2013/6/18 Signature: Y.Fujimoto, M.Sugaya

Liquid: Gasolin Viscosity: 0.92 mPa.s 22.3

V_a L	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %	V_d/V_n V_a/V_{nc} %	Air bubble (yes or no)
0.00	50.15	50.143	22.0	-0.1	+0.037	50.123	**+0.05**	0.50	0.00	no
0.00	50.10	50.090	22.1	-0.1	+0.037	50.070	**+0.06**	0.50	0.00	no
0.00	50.09	50.082	22.3	-0.1	+0.037	50.063	**+0.05**	0.50	0.00	no

Ambient conditions
Temperature: 32.6 ℃ Humidity: 55.3 %RH Pressure: 995.4 hPa
Remarks:

Test measures used: No.98-5
β: 0.000048
Reference temperature: 15 ℃

Gas meter used: FD007
Suction height: 1.5 m
Diameter: 25.0 mm
Length: 4.6 m

V_a L	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %	V_d/V_n V_a/V_{nc} %	Air bubble (yes or no)
4.00	50.15	50.150	23.2	-0.1	+0.037	50.133	**+0.03**	0.50	4.00	no
8.00	50.49	50.482	23.2	-0.1	+0.037	50.465	**+0.05**	0.50	7.90	no
12.00	50.06	50.047	23.4	-0.1	+0.037	50.030	**+0.06**	0.50	12.00	no
16.00	50.03	50.013	18.3	-0.1	+0.037	49.996	**+0.07**	0.50	16.00	no
20.00	49.86	49.833	23.2	-0.1	+0.037	49.816	**+0.09**	0.50	20.10	no

Ambient conditions
Temperature: 30.2 ℃ Humidity: 62.4 %RH Pressure: 995.0 hPa
Remarks:

4 Gas elimination device (Page 2)

Application No: 25-001 Date: 2013/6/19 Signature: T.Ito, Y.Fujimoto, Y.Miyazawa

Liquid: Deisel Viscosity: 4.00 mPa.s 21.5

V_a L	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %	V_a/V_n V_a/V_{nc} %	Air bubble (yes or no)
0.00	100.210	99.976	21.5	-0.1	+0.063	99.945	**+0.27**	0.50	0.00	no
0.00	100.400	100.174	21.4	-0.1	+0.063	100.142	**+0.26**	0.50	0.00	no
0.00	100.120	99.890	21.4	-0.1	+0.063	99.858	**+0.26**	0.50	0.00	no

Ambient conditions
Temperature: 25.7 ℃ Humidity: 88.4 %RH Pressure: 990.0 hPa
Remarks:

Test measures used: No.98-6
β: 0.000048
Reference temperature: 15 ℃

Gas meter used: FD007
Suction height: 1.5 m
Diameter: 25.0 mm
Length: 4.6 m

V_a L	V_i L	V_n L	T ℃	T_s ℃	E_s L	V_{nc} L	E_v %	mpe %	V_a/V_n V_a/V_{nc} %	Air bubble (yes or no)
4.00	100.370	100.138	22.8	-0.1	+0.063	100.113	**+0.26**	0.50	4.00	no
8.00	100.050	99.818	22.3	-0.1	+0.063	99.790	**+0.26**	0.50	8.00	no
12.00	100.070	99.821	22.1	-0.1	+0.063	99.792	**+0.28**	0.50	12.00	no
16.00	100.190	99.940	18.3	-0.1	+0.063	99.912	**+0.28**	0.50	16.00	no
20.00	100.280	100.032	22.2	-0.1	+0.063	100.004	**+0.28**	0.50	20.00	no

Ambient conditions
Temperature: 27.6 ℃ Humidity: 77.3 %RH Pressure: 990.1 hPa
Remarks:

5 variation in the internal volume of hose

Application No: 25-001 Date: 2013/8/13 Signature: Fujimoto

X	Y	Y-X	Scale division mL	Variation mL
33.0	41.6	8.6	2	8.6
41.6	50.8	9.2		9.2

Mean value of variation	Without hose reel	MSVD
8.9 mL	20 mL	
	With hose reel	2×MSVD
	- mL	

Model of hose: 3N3/4
Length: 4.72 m
Inner diameter: 19.0 mm
Maximum operating 0.31 MPa

Ambient conditions
Temperature: 22.6 ℃
Humidity: 50.7 %RH
Pressure: 1006.4 hPa

6 Endurance test (Page 1)

Application No: 25-001 Signature: T.Ito, M.Sugaya

Date of accuracy test before endurance test:	2013/7/5	
Liquid:	Gasoline	
Viscosity:	0.88	mPs.s
Volume per delivery:	262197	L
Total time of endurance test:	100.0	h
Total volume per meter:	262197.0	L
Resetting between deliveries:	-	
Number of stops:	-	
Change of grade:	-	
Date of accuracy test after endurance test:	2013/7/29	

The liquid used for this test was gasoline for industrial purpose.

6 Endurance test (Page 2)

Application No: 25-001 Date: 2013/7/29 Signature: T.Ito, M.Sugaya

Liquid: Gasoline Viscosity: 0.90 mPa.s 23.6

Q(1) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
40.0	123	50.04	6155	50.001	0.037	23.2	-0.1	6154.92	49.96	**+0.15**	0.5	+0.08	2.46
40.0	123	50.04	6155	49.991	0.037	23.3	-0.1	6154.92	49.95	**+0.17**	0.5	+0.08	2.46
40.0	123	50.13	6166	50.097	0.037	23.3	-0.1	6165.99	50.06	**+0.14**	0.5	+0.01	2.46
E_v	**+0.15 %**		**Range**	**0.03 %**		E_p	**+0.06**						

easures used: No.98-5
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 25.4 ℃ Humidity: 85.4 %RH Pressure: 1001.0 hPa

Q(2) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
23.8	123	50.13	6166	50.077	0.037	23.6	-0.1	6165.99	50.04	**+0.18**	0.5	+0.01	2.46
23.8	123	49.98	6148	49.923	0.037	23.6	-0.1	6147.54	49.89	**+0.19**	0.5	+0.46	2.46
23.8	123	50.07	6159	50.020	0.037	23.6	-0.1	6158.61	49.98	**+0.17**	0.5	+0.39	2.46
E_v	**+0.18 %**		**Range**	**0.02 %**		E_p	**+0.29**						

easures used: No.98-5
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 24.5 ℃ Humidity: 90.2 %RH Pressure: 1000.1 hPa

Q(3) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
14.2	123	50.23	6178	50.179	0.037	23.8	-0.1	6178.29	50.14	**+0.18**	0.5	-0.29	2.46
14.2	123	50.06	6157	50.008	0.037	23.9	-0.1	6157.38	49.97	**+0.18**	0.5	-0.38	2.46
14.2	123	50.07	6159	50.020	0.037	23.7	-0.1	6158.61	49.98	**+0.17**	0.5	+0.39	2.46
E_v	**+0.18 %**		**Range**	**0.01 %**		E_p	**-0.09**						

easures used: No.98-5
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 24.3 ℃ Humidity: 90.4 %RH Pressure: 1000.7 hPa

6 Endurance test (Page 3)

Application No: 25-001 Date: 2013/7/29 Signature: T.Ito, M.Sugaya

Liquid: Gasoline Viscosity: 0.86 mPa.s 26.1

Q(4) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
8.5	123	10.01	1231	9.989	0.001	25.8	-0.1	1231.23	9.99	**+0.22**	0.5	-0.23	2.46
8.5	123	10.03	1234	10.012	0.001	25.8	-0.1	1233.69	10.01	**+0.19**	0.5	+0.31	2.46
8.5	123	10.03	1234	10.009	0.001	26.2	-0.1	1233.69	10.01	**+0.22**	0.5	+0.31	2.46
E_v	**+0.21 %**		**Range**	**0.03 %**		E_p	**+0.13**						

easures used: No.98-3
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 26.6 ℃ Humidity: 83.8 %RH Pressure: 999.2 hPa

Q(5) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
5.0	123	9.99	1229	9.970	0.001	26.1	-0.1	1228.77	9.97	**+0.21**	0.5	+0.23	2.46
5.0	123	10.01	1231	9.992	0.001	26.2	-0.1	1231.23	9.99	**+0.19**	0.5	-0.23	2.46
5.0	123	10.02	1232	10.000	0.001	26.2	-0.1	1232.46	10.00	**+0.21**	0.5	-0.46	2.46
E_v	**+0.20 %**		**Range**	**0.02 %**		E_p	**-0.15**						

easures used: No.98-3
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 26.5 ℃ Humidity: 84.9 %RH Pressure: 999.0 hPa

Q(6) L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	E_s L	T ℃	E_T ℃	P_c ¥	V_{nc} L	E_v %	mpe %	E_p ¥	MSPD ¥
3.0	123	9.99	1229	9.973	0.001	26.2	-0.1	1228.77	9.97	**+0.18**	0.5	+0.23	2.46
3.0	123	9.98	1228	9.964	0.001	26.3	-0.1	1227.54	9.96	**+0.17**	0.5	+0.46	2.46
3.0	123	10.01	1231	9.995	0.001	26.2	-0.1	1231.23	9.99	**+0.16**	0.5	-0.23	2.46
E_v	**+0.17 %**		**Range**	**0.02 %**		E_p	**+0.15**						

easures used: No.98-3
β: 0.000048
temperature: 15.0

Ambient conditions
Temperature: 26.1 ℃ Humidity: 86.2 %RH Pressure: 999.0 hPa

7 Dry heat (non condensing)

Application No: 25-001 Date: 2013/6/25 Signature: Fujimoto

Test condition	Q L/min	P_u ¥/L	V_i L	P_i ¥	V_u L	P_c ¥	E_v %	mpe %	E_p ¥	MSPD ¥
20℃	70.0	123	100.07	12309	100.07	12308.6	0.00	0.5	+0.39	6.15
55℃	70.0	123	100.63	12377	100.62	12377.5	+0.01	0.5	-0.49	6.15
20℃	70.0	123	100.07	12309	100.07	12308.6	0.00	0.5	+0.39	6.15

Ambient conditions (20℃):
Temperature: 22.9 ℃ Humidity: 52.9 %RH Pressure: 1005.4 hPa
Ambient conditions (55℃):
Temperature: 23.6 ℃ Humidity: 52.5 %RH Pressure: 1005.0 hPa
Ambient conditions (20℃):
Temperature: 23.8 ℃ Humidity: 52.5 %RH Pressure: 1004.7 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)

8 Cold

Application No: 25-001 Date: 13/06/27-28 Signature: Fujimoto, Ito

Test condition	Q L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	mpe %	E_p ¥	MSPD ¥
20℃	701.0	123	100.66	12381	100.66	12381	0.00	0.5	0.00	6.15
-25℃	701.0	123	100.27	12333	100.27	12333	0.00	0.5	0.00	6.15
20℃	701.0	123	107.46	13218	107.46	13218	0.00	0.5	0.00	6.15

Ambient conditions (20℃):
Temperature: 23.1 ℃ Humidity: 50.7 %RH Pressure: 1001.3 hPa
Ambient conditions (-25℃):
Temperature: 22.9 ℃ Humidity: 49.9 %RH Pressure: 1006.2 hPa
Ambient conditions (20℃):
Temperature: 23.3 ℃ Humidity: 50.8 %RH Pressure: 1004.9 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)

9 Damp heat, cyclic (condensing)

Application No: 25-001 Date: 2013/06/27-7/1 Signature: Fujimoto

Test condition	Q(6) L/min L/min	P_u ¥	V_i L	H_i %	P_i ¥	V_n L	P_c ¥	E_v %	mpe %	E_p ¥	MSPD ¥
20℃ 50%RH	70	123	107.46	47.6	13218	107.46	13217.58	0.00	0.5	+0.42	6.15
Damp heat, cyclic (24 hours × 2 cycles)											
20℃ 50%RH	70	123	101.07	48.2	12432	101.07	12431.61	0.00	0.5	+0.39	6.15

H_i:Relative humidity indication

Ambient conditions
Temperature: 23.4 ℃ Humidity: 50.4 %RH Pressure: 1011.0 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)

10 Power voltage variation

Application No: 25-001 Date: 2013/7/4 Signature: sugaya

Test condition	U_i V	Q L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	mpe %	E_p ¥	MSPD ¥
U	100.0	80.0	123	100.980	12421	100.98	12421	**0.00**	0.5	0.00	6.15
1.1 U	264.0	80.0	123	100.040	12305	100.00	12305	**+0.04**	0.5	0.00	6.15
0.85 U	85.0	80.0	123	100.160	12320	100.12	12320	**+0.04**	0.5	0.00	6.15

U : Mains voltage

U_i: Indicated mains voltage

Ambient conditions

Temperature: 27.4 ℃ Humidity: 64.9 %RH Pressure: 1000.9 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)
Power circuit: No.
Voltage:

11 Short-time power reductions

Application No: 25-001 Date: 2013/7/4 Signature: sugaya,fujimoto

Test condition	Q L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	S.F. %	E_p ¥	MSPD ¥	Checking facility	
No reduction	80.0	123	80.150	9858	80.15	9858.0	0.00	**0.00**	0.00	6.15	-	
100% reduction 1/2 cycle, 10 yimes	80.0	123	89.260	10979	89.23	10979.0	+0.03	**0.03**	0.00	6.15	yes	~~No~~
50% reduction 1 cycle, 10 yimes	80.0	123	89.060	10954	89.06	10954.0	0.00	**0.00**	0.00	6.15	yes	~~No~~

Ambient conditions

Temperature: 27.1 ℃ Humidity: 62 %RH Pressure: 999.7 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)

12 Electrical bursts

Application No: 25-001 Date: 2013/7/4 Signature: sugaya,fujimoto

Test condition	Q L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	S.F. %	E_p ¥.	MSPD ¥	Checking facility	
Noiseless	70.0	123	100.160	12320	100.12	12320	+0.04	**0.00**	0.00	6.15	-	
L1, Positive	70.0	123	74.290	9138	74.25	9138	+0.05	**0.01**	0.00	6.15	yes	~~No~~
L1, Negative	70.0	123	73.020	8981	72.98	8981	+0.05	**0.01**	0.00	6.15	yes	~~No~~
L2, Positive	70.0	123	71.770	8828	71.73	8828	+0.06	**0.02**	0.00	6.15	yes	~~No~~
L2, Negative	70.0	123	73.980	9100	73.95	9100	+0.04	**0.00**	0.00	6.15	yes	~~No~~
PE, Positive	70.0	123	74.290	9138	74.25	9138	+0.05	**0.01**	0.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.910	9087	73.88	9091	+0.04	**0.00**	-4.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.750	9071	73.75	9071	0.00	**0.04**	0.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.640	9054	73.57	9058	+0.10	**0.06**	-4.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.680	9063	73.68	9063	0.00	**0.04**	0.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.640	9058	73.61	9058	+0.04	**0.00**	0.00	6.15	yes	~~No~~
PE, Negative	70.0	123	74.030	9106	73.99	9106	+0.05	**0.01**	0.00	6.15	yes	~~No~~
PE, Negative	70.0	123	73.570	9049	73.53	9049	+0.05	**0.01**	0.00	6.15	yes	~~No~~
L1+L2+PE, Positive	70.0	123	74.220	9129	74.18	9129	+0.05	**0.01**	0.00	6.15	yes	~~No~~
L1+L2+PE, Negative	70.0	123	75.290	9261	75.25	9261	+0.05	**0.01**	0.00	6.15	yes	~~No~~

Line 1: Phase/Neutral
Line 2: Phase/Neutral

Ambient conditions
Temperature: 27.3 ℃ Humidity: 59.5 %RH Pressure: 1000.7 hPa

Remarks: Simurator used in this test
Simurator manufacturer:TOMINAGA
mechanical type(0.01L/P)

13 Electostatic discharge (Page 1)

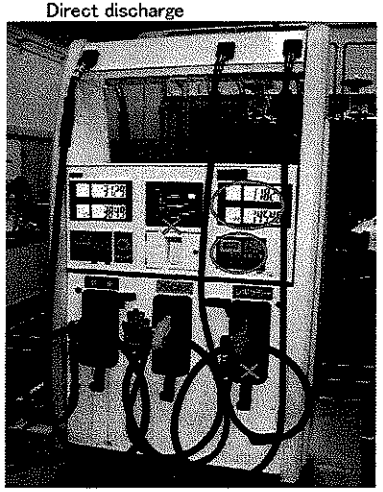
Application No: 25-001 Date: 2013/8/12 Signature: Fujimoto

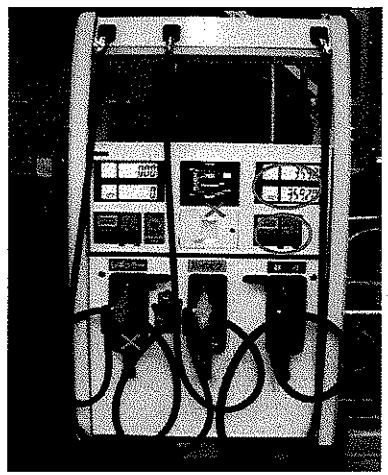
Test Condition				Q L/min	P_u ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	S.F. %	E_p ¥	MSPD ¥	Checking facility	
Non-dischatge				70	123	100.10	12312	100.10	12312	0.00	**0.00**	0.00	6.15	yes	~~No~~
Discharged point	Front	Contact discharge	+	70	123	104.91	12904	104.91	12904	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	104.98	12913	104.98	12913	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Back		+	70	123	104.91	12904	104.91	12904	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	104.65	12872	104.65	12872	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Right (Nozzle boot)		+	70	123	104.86	12898	104.86	12898	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	104.91	12904	104.91	12904	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Left (Nozzle boot)		+	70	123	107.14	13178	107.13	13178	+0.01	**0.01**	0.00	6.15	yes	~~No~~
			-	70	123	105.48	12974	105.48	12974	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Top		+	70	123	107.50	13223	107.51	13223	-0.01	**0.01**	0.00	6.15	yes	~~No~~
			-	70	123	107.60	13235	107.60	13235	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Front	Air discharge	+	70	123	116.00	14268	116.00	14268	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	118.49	14574	118.49	14574	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Back		+	70	123	116.67	14350	116.66	14350	+0.01	**0.01**	0.00	6.15	yes	~~No~~
			-	70	123	115.29	14181	115.29	14181	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Front(1)	Indirect discharge	+	70	123	108.71	13371	108.71	13371	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	109.96	13525	109.96	13525	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Right(2)		+	70	123	105.54	12981	105.54	12981	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	105.79	13012	105.78	13012	+0.01	**0.01**	0.00	6.15	yes	~~No~~
	Back(3)		+	70	123	106.08	13048	106.08	13048	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	106.71	13125	106.71	13125	0.00	**0.00**	0.00	6.15	yes	~~No~~
	Left(4)		+	70	123	105.22	12942	105.22	12942	0.00	**0.00**	0.00	6.15	yes	~~No~~
			-	70	123	106.37	13084	106.37	13084	0.00	**0.00**	0.00	6.15	yes	~~No~~

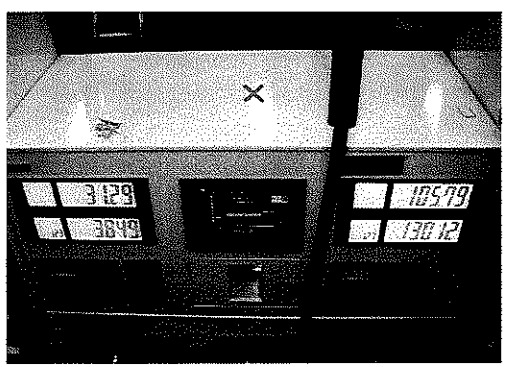
Ambient conditions
Temperature: 22.3 ℃ Humidity: 50.2 %RH Pressure: 1006.2 hPa

13 Electostatic discharge (Page 2)

Direct discharge



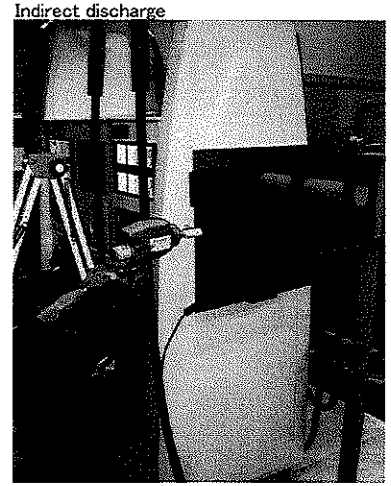




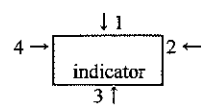
× :Contact discharges

○ :Air discharges

Indirect discharge



↓ facing EUT



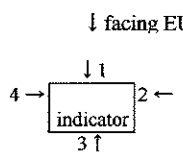
14 Electromagnetic susceptibility (Page 1)

Application No: 25-001 Date: 2013/7/2 Signature: ITO

Test condition		S.V. decade/s	Q L/min	P_a ¥/L	V_i L	P_i ¥	V_n L	P_c ¥	E_v %	S.F. %	E_p ¥	MSPD ¥	Checking facility	
Noiseless		0	70	123	101.07	12432	101.07	12432	0.00	**0.00**	0.00	6.15	yes	~~No~~
Front	V	1.5×10-3	70	123	3517.370	432637	3517.37	432637	0.00	**0.00**	0.00	6.15	yes	~~No~~
	H	1.5×10-3	70	123	3574.440	439656	3574.44	439656	0.00	**0.00**	0.00	6.15	yes	~~No~~
Right	V	1.5×10-3	70	123	3581.080	440473	3581.08	440473	0.00	**0.00**	0.00	6.15	yes	~~No~~
	H	1.5×10-3	70	123	3727.230	458449	3727.23	458449	0.00	**0.00**	0.00	6.15	yes	~~No~~
Left	V	1.5×10-3	70	123	3796.690	466993	3796.69	466993	0.00	**0.00**	0.00	6.15	yes	~~No~~
	H	1.5×10-3	70	123	3547.020	436283	3547.02	436283	0.00	**0.00**	0.00	6.15	yes	~~No~~
Back	V	1.5×10-3	70	123	3488.080	429034	3488.08	429034	0.00	**0.00**	0.00	6.15	yes	~~No~~
	H	1.5×10-3	70	123	3805.070	468024	3805.07	468024	0.00	**0.00**	0.00	6.15	yes	~~No~~

Ambient conditions
Temperature: 29.3 ℃ Humidity: 44.7 %RH Pressure: 1010.6 hPa

S.V.: Sweep Velocity
F.S.: Field Strength
V: Vertical
H: Horizontal



14 Electromagnetic susceptibility(Page 2)