

# Streamine

# Fuel Systems for LPG and Natural Gas Engines

Fuelock Filters







Regulators & Vaporizers









**W**oodward

Product Catalog

# Streamline

Woodward's Streamline™ fuel system products are easy to select and easy to use. A broad selection of Streamline mixers, carburetors, regulators, vaporizors, and fuelocks cover a wide range of gaseous engine applications, from 50 to 400 horsepower.

#### **Mixers & Carburetors**

Streamline<sup>TM</sup> mixers are a simple, air-valve design that draws fuel into the mixer consistently across the engine operating range, from cranking to full load. That consistency assures reliable starts, smooth off-idle progression and repeatable performance even under extreme operating conditions.

With the engine stopped, fuel is sealed off within the carburetor as well as the converter and fuelock, giving a triple seal for safety. The mixer is completely self-contained. It requires no linkage or idle vacuum line to the intake manifold, and allows tremendous installation flexibility. We can add throttle body and air horn to provide you with a complete carburetor assembly, such as the N-CA55-500, N-CA100 and N-CA125 Series carburetors.

#### **Fuelock Filters**

Streamline<sup>TM</sup> N-VFF30 Series fuelock filters are used with high-pressure LPG vapor or liquid withdrawal systems where dependable fuel shut off is required. The vacuum-operated lockoffs are designed for minimal engine vacuum activation, and the integrated filter removes foreign materials from the fuel.

## **Regulators & Vaporizers**

Streamline<sup>™</sup> regulators and vaporizers are available in a range of sizes and types to cover most propane and natural gas fuel control requirements.





# WOODWARD Fuel System Products

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#### **Typical LPG Fuel System** (Items highlighted in **boldface blue** are shown on the diagram)

**Vacuum Fuelock Filter** The Streamline carburetion system starts with the vacuum fuelock filter (VFF). When a slight vacuum signal from the engine (2" of water column [W.C].) is sensed by the VFF, the fuel is allowed to flow through a tenmicron **filter** to the pressure regulator/vaporizer. When the vacuum ceases, a spring force pushes on a lever and the **valve operating pin** closes against the orifice, thus shutting-off the fuel flow. Therefore, the vacuum fuelock filter has two primary functions: (1) it prevents dirty fuel from reaching the carburetor and (2) it shuts off the fuel flow automatically, regardless of the ignition being on or off.

**Pressure Regulator/Vaporizer** Streamline pressure regulators are categorized as two-stage, negative pressure, regulator/vaporizers because they:

- 1. Reduce fuel pressure in two stages,
- 2. Meter the fuel output in relation to a negative pressure signal (vacuum) from the carburetors, and
- 3. Convert the fuel from a liquid to a vapor.

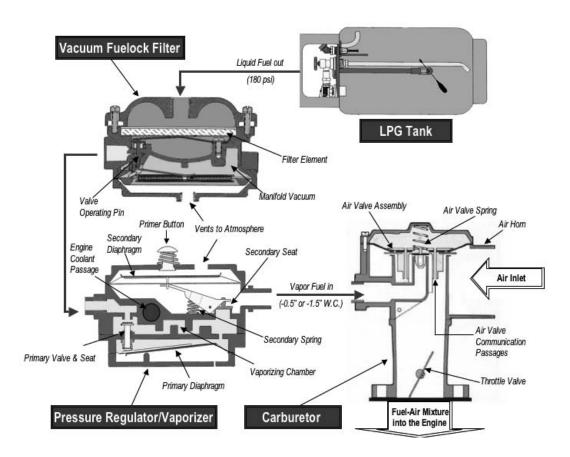
The negative pressure signal from the carburetor acts upon the **secondary diaphragm**, allowing atmospheric pressure from the upper side to move the diaphragm down. This causes the **secondary seat** to open; thus allowing fuel to progress from the primary chamber of the regulator to the secondary chamber. To assist in engine start-up, some regulator models have a **primer button**. These regulators use **engine coolant** to assist in vaporizing the fuel via a heat transfer process that occurs in the **vaporizing chamber**.

**Carburetors** The air valve carburetors consist of a mixer, throttle body and an optional **air horn**. The air horn enables the connection of an air hose or air filter assembly. The **throttle valve** controls delivery of the air-fuel mixture into the engine intake manifold based on the operator's command (foot pedal).

The air and fuel are mixed at controlled amounts in the mixer. The **air valve spring** pushes the **air valve assembly** closed until vacuum from the engine causes the spring to compress and release fuel. The vacuum signal is transmitted to the air valve assembly via the **communication passages** on the air valve assembly. The greater the vacuum draw from the engine, the more the air valve spring is compressed and allows a larger amount of fuel to flow and mix with the air. The air valve spring begins to compress in the presence of 6" W.C. of vacuum, and the maximum spring displacement will occur with 24" W.C. of vacuum.

The air-fuel metering device, or mixer, is completely self-contained. It requires no linkage or idle vacuum line from the engine intake manifold. This construction allows for great flexibility in the assembly and service of Streamline carburetors. The mixer has a replaceable **air valve assembly**.

Fuel systems using air valve carburetors provide triple safety seals. When the engine is stopped, fuel cannot pass the air valve because the air valve spring holds the air valve closed. At the same time, neither the pressure regulator nor the vacuum fuelock filter allows the fuel flow as there is no vacuum signal from the engine.



#### CARBURETOR & REGULATOR SELECTION CHART

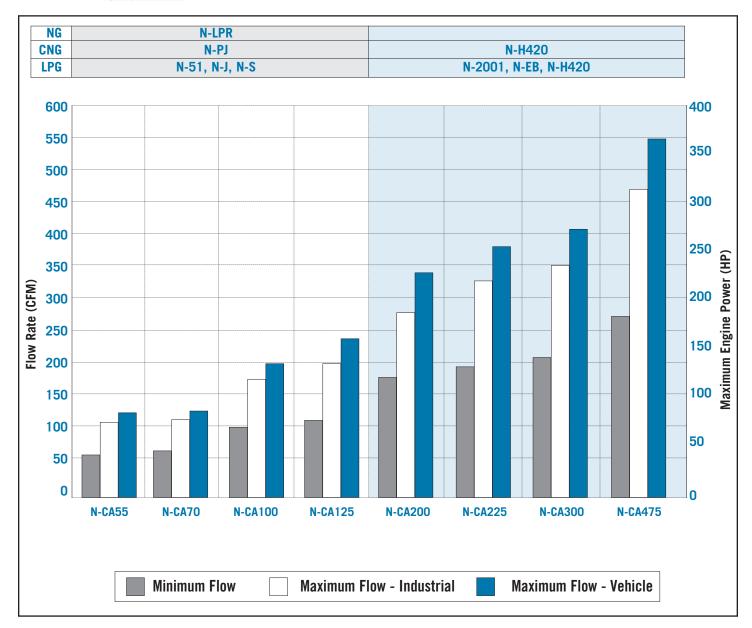
The chart below shows the Streamline carburetors and regulators that are available for specific applications. Simply match your engine's flow rate (CFM) and/or horsepower (HP) to the model of carburetor and regulator that best suits your needs.

Carburetor models are listed at the bottom of the chart under each set of vertical bars. Regulators, shown at the top of the chart, are listed according to fuel type: natural gas (NG), compressed natural gas (CNG) and liquified petroleum gas (LPG). Regulator models N-LPR, N-PJ, N-51, N-J, and N-S can be used with carburetors shown in the white area (left side of chart). Regulator models N-H420, N-2001, N-EB, and N-H420 can be used with carburetors shown in the blue area (right side of chart).

For Example: If an industrial engine has 200 CFM of air flow and runs on CNG, then the recommended carburetor would be Model N-CA200 and the recommended regulator would be Model N-H420. Or, referencing horsepower, a 300 HP industrial engine running on LPG would use carburetor Model N-CA-475 and any of the regulator Models N-2001, N-EB, or N-H420.

Note that this chart should be used for reference only. To determine the ideal fuel system components for your engine, contact a Streamline application engineer.

### **Sineamline** CARBURETOR AND REGULATOR SELECTION REFERENCE CHART



## Model N-VFF30 Series Vacuum Fuelock Filter — 325 HP Parts Description, Installation & Operation

**GENERAL** The N-VFF30 is a vacuum operated lockoff designed for low engine vacuum activation. It also contains a filter to remove foreign materials from the fuel. It is used with high pressure LPG vapor or liquid withdrawal, where dependable fuel shut-off is required. It can be used for many mobile powered applications, such as forklifts, floor buffers or pressure washers.

**WARNING!** The N-VFF30 should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

**Special Note in regards to NFPA Pamphlet 58:** For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** The N-VFF30 is a dedicated vacuum operated fuelock designed to shut-off and release fuel. When engine vacuum ceases, a spring force causes the valve seat to close, shutting off the fuel. **It is important to remember that fuel should not flow to the engine when it is not in operation.** A properly installed N-VFF30 requires approximately 2 inches of water vacuum to start the opening sequence.

**INSTALLATION** The N-VFF30 should be mounted between the fuel supply and the vaporizer/regulator and be connected to an available manifold vacuum source.

**SERVICE** The N-VFF30 should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.



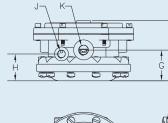


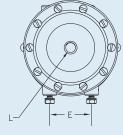
- Fuel lock and filter in one unit
- Low (2" W.C.) vacuum signal activation
- Liquid or vapor fuel
- Rated to 312 psi maximum inlet pressure

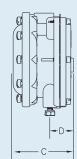
#### **FUELOCK SPECIFICATIONS**

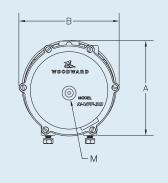
A. Overall Height 4 1/2 " (108.7 mm)
B. Overall Width 4½" (114.3 mm)
C. Overall Depth
D. Front of Fuelock to Center of
Mounting Hole
E. Mounting Holes Center to Center1%" (47.6 mm)
F. Mounting Hole Diameter
G. Back of Fuelock to Center of Fuel Outlet
H. Back of Fuelock to Center of
Vacuum Port 1½" (31.6 mm)
J. Air Valve Vacuum Port NPT $\frac{1}{6}$ " (3.2 mm)
K. Fuel Outlet NPT ¼" (6.35 mm)
L. Fuel Inlet NPT

M. Vent ..... Accepts 1/8" (3.2 mm) NPT









Item	Part No.	Description	Qty.
1*	N00-6443	N-S1-59, Screw, 8-32 x 5/8" SEMS	6 (RK 2)
2	N00-4525	N-C1-37, Cover, Diaphragm	1
3*	N00-4723A	N-AD1-26, DIAPHRAGM ASSEMBLY, SILICON	IE 1
4	N00-6404	N-S1-7, Screw 8-32 x 1/4"	2
5	N00-5016	N-F3-2, Fulcrum	1
6	N00-5654	N-L1-39, Lever, Valve Opening	1
7	N00-4230A	N-AB1-34, Body Assembly	1
8	N00-6402	N-S1-5, Screw, 1/4-20 x 5/8" SEMS	2
9*	N00-7511	N-W1-42, WASHER, SEAL RETAINING	1
10*	N00-6735-1	N-S3-42, SEAL, O-RING	1
11*	N00-5908	N-P1-15, PIN, VALVE OPERATING	1
12*	N00-6806	N-S4-18, SEAT, VALVE	1
13	N00-6623	N-S2-40, Spring, Valve	1
14	N00-6408	N-S1-12, Screw, 8-32 x 5/16" SEMS	1
15*	N00-7003	N-S7-3, SCREEN, FILTER BACKUP	1
16*	N00-4910	FILTER PAD	1
17*	N00-5260	N-G1-89, GASKET, FILTER COVER	1
18*	N00-4910A	FILTER PAD AND GASKET	1
19	N00-4526	N-C1-38, Cover, Filter	1
20*	N00-6478	N-S1-10, SCREW, 12-24 X 3/4" SEMS	7 (RK 2)

<sup>\*</sup> Indicates Repair Kit Components

**REPAIR KITS:** (Components shown in blue)

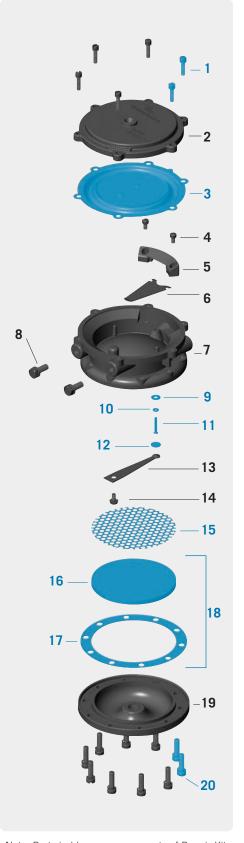
NOO-6321A N-RKVFF30-2, Repair Kit with Silicone Diaphragm

NOO-4910A Item 18, Filter Pad and Gasket only

#### **ORDERING INFO**

				Check	UL
Part No.	Model No.	Diaphragm	Primer	Valve	Listed
N00-0124A	N-VFF30-2 *	Silicone			•
N00-0125A	N-VFF30-2	Silicone			•
N00-0126A	N-VFF30-2-3	Silicone		•	•
N00-0128A	N-VFF30-2-4	Silicone	•	•	•
N00-0129A	N-VFF30-2-5	Silicone	•		•

<sup>(\*)</sup> Blank Cover



Note: Parts in blue are components of Repair Kit (N-RKVFF30-2).

### Inline LP-Gas Filter Shut-off Valve, 12V



Part No.	Description
N3-0342	1/4" (6.4 mm) NPT Female Inlet,
	1/4" (6.4 mm) Male Outlet
N3-0344-1A	Repair Kit

### Dual Fuel Gasoline Inline Solenoid, 12V



Part No.	Description
N3-0225-4	1/8" (3.2 mm) NPT Female Inlet and Outlet, Self-Grounded

### Inline LP-Gas Multi-fuel Shut-off with Magnet



Part No.	Description
N3-0343	1/4" (6.4 mm) NPT Female Inlet,
	1/4" (6.4 mm) Male Outlet
N3-0343-1	Repair Kit

#### LP-Gas Multi-fuel Shut-off Solenoid Valve, 12V



Part No.	Description
N3-0173-1	1/4" (6.4 mm) NPT Female Inlet, 1/4" (6.4 mm) Male Outlet

#### LP-Gas Electric Filter Shut-off Solenoid Valve



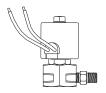
Part No.	Description
N3-0239	Use with N3-0083-1 Vacuum Switch
	(see Control Components section)
N3-0220-1	Repair Kit

### LP-Gas Multi-fuel Shut-off Solenoid Valve, 90°



Part No.	Description
N3-0164-2	1/4" (6.4 mm) NPT Female Inlet & Outlet
N3-0362	3/8" (9.5 mm) NPT Female Inlet & Outlet
N3-0183	1/2" (12.7 mm) NPT Female Inlet & Outlet

### LP-Gas Multi-fuel Shut-off Solenoid Valve, 180°, 12V



Part No.	Description
N3-0165-2	1/4" (6.4 mm) NPT Female Inlet & Outlet
N3-0148	3/4" (19.1 mm) NPT Female Inlet & Outlet
	(Low Pres.)

#### Model N-LPR Series Regulator - 25 HP

**GENERAL** The N-LPR is designed for sensitivity and simple operation. It is used with low pressure gaseous fuels, where dependable starting is required. Because of its extreme sensitivity, the N-LPR offers excellent results in most remote starting applications (standby power generators, etc.) if installed and maintained properly. Suitable for engines up to 25 HP

**WARNING!** The N-LPR should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

**Special Note in regards to NFPA Pamphlet 58:** For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** The N-LPR is an automatic zero regulator. The engine creates a vacuum which acts through the outlet of the N-LPR on the diaphragm. Atmospheric pressure then forces the diaphragm toward the vacuum, depressing the lever and pulling the valve seat away from the orifice which allows fuel to flow as long as the demand persists. When the vacuum ceases, a spring force pushes on the lever and forces the seat valve against the orifice shutting off the fuel flow. **It is important to remember that fuel should not flow through the N-LPR when the engine is not running.** A properly adjusted N-LPR requires a vacuum of less than 0.35" of water column to start the opening sequence. Due to this sensitivity, most installations do not need priming to start unless low cranking speed or restricted and lengthy piping are required.

If priming is necessary and a manual primer is installed, use only 1 or 2 second bursts of fuel and immediately start the engine.

If there is a choke on the carburetor, do not use it as this will probably cause flooding and hard starting.

**INSTALLATION** The N-LPR should be mounted as close to the carburetor as possible with the outlet on top (the arrow on the cover pointing up) and the diaphragm in a vertical position. This helps to minimize the effects of gravity on diaphragm travel. The unit should also be placed for easy access to the primer if provided.

There are two sets of mounting holes provided. Either set of mounts will adequately support the N-LPR. The bottom set of holes has a 1-3/4" (44.5 mm) bolt spacing. The mounting bosses on cover are spaced 5-3/4" (146.1 mm) apart for use with 5/16" (7.9 mm) bolts.

Before installing the fuel supply line, be sure that the gas pressure is no more than the maximum inlet pressure shown on the front of the N-LPR. If the pressure is greater, leakage could result in a fire hazard and/or hard starting. The piping to the inlet should be of sufficient size to allow full fuel flow to the N-LPR. This is very important in natural gas installations, as any restrictions can affect engine performance.

If a solenoid is used ahead of the N-LPR in the low pressure line, it should have an orifice at least 7/16" (11.1 mm) in diameter.

Flexible piping to the inlet should be used to prevent cracking from vibration if the N-LPR is mounted on the engine or other vibrating surface.

**SERVICE** The N-LPR should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

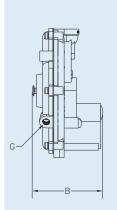


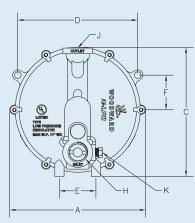


- Sensitive, low pressure vapor regulator with precise break-off setting
- 11" W.C. (6 oz.) maximum inlet pressure

#### **REGULATOR SPECIFICATIONS**

A. Overall Width
B. Overall Depth
C. Overall Height 6½" (165.1 mm)
D, E. Mounting Holes 5¾"; 1¾"
Center to Center (146.1mm; 44.5 mm)
F. Mounting Holes
Distance from Center 1 <sup>21</sup> / <sub>32</sub> " (42.1 mm)
G. Air Vent NPT
H. Vapor Fuel Inlet NPT%" (19.1 mm)
J. Vapor Fuel Outlet NPT %" (9.5 mm)
K. Test Port NPT





Item	Part No.	Description	Qty.
1*	N-C11-1	CAP, ADJ. SCREW, TR	1
2	N-S2-18	Screw, Lock, Adj. Spring	1
3	N-S2-11-LPR	Screw, Pressure Adjustment	1
4	N-J1-3	Jet	1
5*	N-W1-6	SEAL, JET	1
6*	N-S3-14	SPRING	1
7	N2-1011	Plug, 1/8 NPT, Slotted Head	1
8	N-B1-3-LPR	Standard Body	1
9*	N-S5-1	SEAT	1
10*	N-W1-5-LPR	WASHER, SEAT BACKUP	1
11	N-L1-5A	Lever Assembly	1
12	N-P1-11-LPR	Pin, Lever Fulcrum	1
13	N-S10-11	Screw, #4-40 x 1/4" Pan Head	2
14	N-P1-12	Pin, Connector	1
15*	N-D1-7A	DIAPHRAGM ASSEMBLY, SILICONE	1
16	N00-7505	N-W1-27, Washer, Primer	1
17	N-C1-7-LPR	Cover, Back	1
18	N-S2-21-LPR	Spring, Primer	1
19	N-R11-2	Pin, Primer	1
20*	N00-6400	SCREW, 10-24 X 5/8" SLOTTED FILISTER HEAD WITH SPLIT LOCKWASHER, SEMS	6 (RK4)

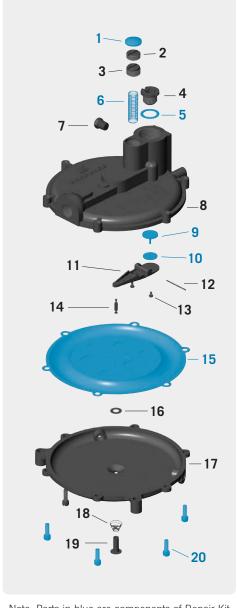
<sup>\*</sup> Indicates Repair Kit Components

**REPAIR KIT:** (Components shown in blue)

**N-RK-LPR** Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

	Maximum	Tamper-		UL
Part No.	Inlet Pressure	Resistant	Primer	Listed
N-LPR-1A	11" WC (6 oz.)	•		•
N-LPR-2A	11" WC (6 oz.)		•	•
N-LPR-3A	11" WC (6 oz.)	•	•	•
N-LPR-4A	11" WC (6 oz.)			•



Note: Parts in blue are components of Repair Kit (N-RK-LPR).

#### Model N-51 - 25 HP Parts Description, Installation & Operation

**GENERAL** The N-51 is designed for sensitivity and simple operation. It is used with high pressure propane vapor in applications up to 25 HP. Because of its compactness, it offers excellent results in most mobile equipment applications.

**WARNING!** The N-51 should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.<sup>1</sup>

**OPERATION** LP-gas vapor enters the primary chamber and is then reduced from the tank pressure to about 4 psi.<sup>2</sup> As negative pressure is transmitted from the carburetor to the regulator, the regulator will allow fuel to be drawn into the carburetor. Some N-51 models are equipped with an idle circuit that allows for adjustment of the fuel mixture at low engine speeds. Some regulators are equipped with a primer button. Correctly installed regulator should not require priming. If priming is required, a maximum duration of only 1 second should be used.

**INSTALLATION** The N-51 should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

**SERVICE** The N-51 should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish you a list of repair facilities or provide service information.

#### ORDERING INFO

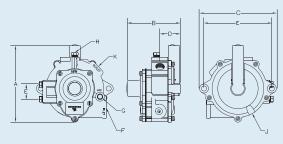
	ldle	Vacuum		No. Of	UL
Part No.	Circuit	Lockoff	Primer	<b>Mounting Ears</b>	Listed*
N-51A	•	•		2	•
N-51A-C	•	•		1	•
N-51-1A		•	•	2	•
N-51-1A-C		•	•	1	•
N-51-2A	•	•	•	2	•
N-51-2A-C	•	•	•	1	•
N-51-3A			•	2	
N-51-3A-C			•	1	
N-51-4A				2	
N-51-4A-C				1	
N-51-5A	•			2	
N-51-5A-C	•			1	
N-51-6A	•		•	2	
N-51-6A-C	•		•	1	



- LP vapor withdrawal regulator
- Primary pressure setting may be specified to meet engine displacement requirements
- Adjustable idle circuit with internal lock off available
- Ideal for indoor mobile maintenance equipment applications

#### **REGULATOR SPECIFICATIONS**

Α	. Overall Height5%" (136.5mm)
В	3. Overall Depth
С	c. Overall Width 5%" (136.5mm)
D	D. Back of Regulator to Center of Vapor Fuel Inlet/Outlet 1% (33.3mm)
Ε	Mounting Holes Center 4.73"; 1.024" To Center (2) Locations (120mm; 26mm)
F	Fuel Inlet NPT
G	G. Vacuum Port NPT ½" (3.2 mm)
H	H. Primary Test Port NPT ¼" (3.2mm)
J	. Vent/Balance Line N/A
K	Vapor Fuel Outlet NPT %" (9.5mm)



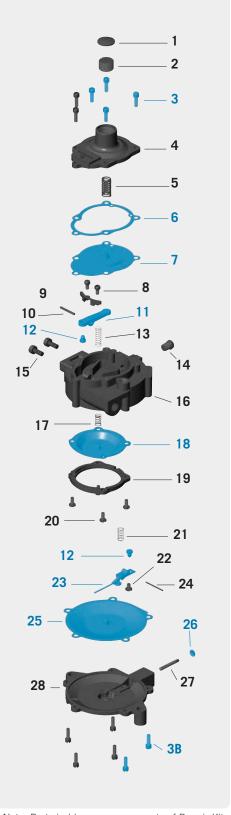
Item	Part No.	Description	Qty.
1	N-C2-3	Cap, Tamper Resistant	1
2	N-R2-2	Retainer, Spring	1
3* 3B*	N-S2-5 N-S2-5T	SCREW, COVER, 10-32 X 5/8" SEMS SCREW, COVER, 10-32 X 5/8" TAMPER RESISTANT	6 (RK 4) 4 (RK 2)
4	N-C1-4-1	Cover, Primary	1
5	N-S3-8	Spring, Primary	1
6*	N-G1-3	GASKET, PRIMARY	1
7*	N-D1-6A	DIAPHRAGM ASSEMBLY, PRIMARY	1
8	N-S2-4	Screw, Lever Bridge, 10-32 x 5/16" SLFH	2
9	N-B2-1	Bridge, Primary Lever	1
10	N-P1-5	Pin, Primary Lever	1
11*	N-L1-2	LEVER, PRIMARY	1
12*	N-V1-4	VALVE, SECONDARY SEAT	2
13	N-S3-7	Spring, Primary Lever	1
14	N00-6104	Plug, 1/8" NPT, Hex Head	1
15	N00-6402	Screw, 1/4-20 x 9/16" SEMS	2
16	N-B1-2A	Body Assembly	1
17	N-S3-9	Spring, Vacuum Lock	1
18*	N-D1-4A	DIAPHRAGM ASSEMBLY, VACUUM LOCK	1
19	N-R3-1	Ring, Vacuum Lock	1
20	N-S2-6	Screw, Vacuum Lock Ring, 10-32 x 3/8" Slotted Pan Head	4
21	N-S3-12-2	Spring, Secondary Lever	1
22	N-S2-10	Screw, Secondary Lever, 10-32 x 1/4" Slotted Pan Head	2
23*	N-L1-3A	LEVER ASSEMBLY, SECONDARY	1
24	N-P1-10	Pin, Secondary Lever	1
25*	N-D1-5A	DIAPHRAGM ASSEMBLY, SECONDARY	1
26*	N-C2-2	CAP, TAMPER RESISTANT FOR IDLE SCREW	1
27	N-S2-8	Screw, Idle Adjustment (Part of Item 28)	1
28	N-C1-5A N-C1-5A-1 N-C1-5A-C N-C1-5A-1C	Cover Assembly, Secondary Cover Assembly, Sec., with Primer Cover Assembly, Sec., One Mounting Ear Cover Assembly, Sec., w/ Primer, One Mou	1 Inting Ear

<sup>\*</sup> Indicates Repair Kit Components

#### **REPAIR KIT:** (Components shown in blue) N-RK-51A

Notes:

<sup>2.</sup> Alternate primary pressure settings are available to meet engine displacement requirements, ranging from 2.5 psi to 4.5 psi, in 0.5 psi increments. To order primary pressure other than 4.0 psi add as a suffix to the part number. Ex. N-51A-C-3.0



Note: Parts in blue are components of Repair Kit (N-RK-51A).

<sup>1.</sup> Although some N-51 models are equipped with an internal lockoff to override the idle circuit, this is not considered a positive shut-off valve per NFPA pamphlet 58.

#### Model N-PJ (CNG) - 100 HP Parts Description, Installation & Operation

**GENERAL** The N-PJ type regulator is a two-stage positive pressure regulator for CNG applications up to 100 HP output.

WARNING! The N-PJ should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**IMPORTANT NOTE:** The N-PJ is rated to 312 psi inlet pressure. In CNG applications (where tank pressure may exceed 3000 psi) a separate high-pressure regulator must be installed between the tank and the N-PJ to reduce the incoming pressure below 312 psi.

**OPERATION** The low pressure N-JP regulator is a positive pressure output, two-stage regulator. The unit reduces the compressed natural gas received from the high pressure regulator to an outlet pressure slightly above atmospheric pressure.

**INSTALLATION** The N-PJ should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

**SERVICE** The N-PJ should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

#### **ORDERING INFO**

Part No.	Description
N00-0027A	N-PJ, CNG Regulator, Silicone Diaphragm

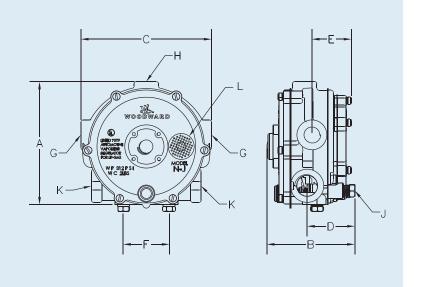




- Positive pressure regulator for natural gas, CNG and LP applications
- Rated to 312 psi maximum inlet pressure

REGULATOR SPECIFICATIONS
A. Overall Height 4%" (111.1 mm)
B. Overall Depth 3 <sup>13</sup> / <sub>16</sub> " (96.8 mm)
C. Overall Width4½" (117.5 mm)
D. Back of Regulator to Center of Vapor Fuel Outlet 1 1 1 1 1 1 1 1 1
E. Back of Regulator to Center of Water Outlet
F. Mounting Holes Center to Center
G. Coolant Inlet & Outlet NPT 3/6" (9.5 mm)
H. Vapor Fuel Inlet NPT ½" (6.4 mm)
J. Primary Test Port NPT ½" (3.2 mm)
K. Vapor Fuel Outlet NPT ½" (12.7 mm)

L. Vent/Balance Line Connect NPT . . 1/8" (3.2 mm)

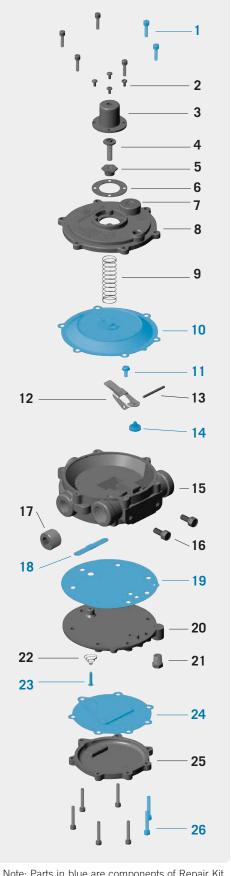


Item	Part No.	Description	Qty.
1*	N00-6443	N-S1-59, SCREW, 8-32 X 5/8" SEMS	6 (RK2)
2	N00-6416	N-S1-22, Screw, 6-32 x 1/4" SEMS	4
3	N-C2-4	Cap, Spring Retainer	1
4	N-S2-9	Screw, Spring Retainer	1
5	N-N1-1	Nut, Spring Housing	1
6	N00-5255	Gasket, Spring Retainer	1
7	N00-7004	N-S7-4, Screen, Atmospheric Vent	1
8	N00-4523-2	N-AC1-34-3, Cover Assembly, Secondary	1
9	N-S3-6	Spring, Positive Pressure	1
10*	N00-4733A	N-AD1-26-2, DIAPHRAGM ASSEMBLY, SILICO	NE 1
11*	N00-6434	N-S1-42, SCREW 8-32 X 3/8" SEMS	1
12	N00-5651	N-L1-37, Lever, Secondary Regulator	1
13	N00-5904	N-P1-8, Pin, Secondary Fulcrum	1
14*	N00-6812	N-S4-27, SEAT, SECONDARY REGULATOR	1
15	N00-4229A	N-AB1-33, Body Assembly	1
16	N00-6402	N-S1-5, Screw, 1/4-20 x 5/8" SEMS	2
17	N00-6105	N-P3-14, Plug 1/2" NPT	1
18*	N00-6804	N-S4-16, SEAT, PRIMARY REGULATOR	1
19*	N00-5256	N-G1-85, GASKET, BODY TO PLATE	1
20	N00-6009	N-P2-26, Plate, Converter Body Cover	1
21	N00-6104	N-P3-13, Plug, 1/8" Pipe, Hex Head	1
22	N00-6711	N-S3-15, Spring, Primary Valve	1
23*	N00-5907	N-P1-14, PIN, PRIMARY VALVE	1
24*	N00-4717A	N-AD1-22, DIAPHRAGM ASSEMBLY, PRIMARY	Y 1
25	N00-4521	N-C1-33, Cover, Primary Regulator	1
26*	N00-6406	N-S1-10, SCREW, 8-32 X 1" SEMS	7 (RK2)

<sup>\*</sup> Indicates Repair Kit Components

**REPAIR KIT:** (Components shown in blue)

N00-6315A N-RK-PJ, Repair Kit with Silicone Diaphragm



Note: Parts in blue are components of Repair Kit (N-RK-PJ).

#### Model N-H420-NG Parts Description, Installation & Operation

**GENERAL** The N-H420-NG regulator is designed for use with stationary engines fueled by natural gas, or in on-highway applications fueled by compressed natural gas (CNG).

**WARNING!** The N-H420-NG should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

**Special Note in regards to NFPA Pamphlet 58:** For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoidactuated configurations.

**IMPORTANT NOTE:** The N-H420-NG is rated to 250 psi inlet pressure. In CNG applications (where tank pressure may exceed 3000 psi) a separate high-pressure regulator must be installed between the tank and the N-H420-NG to reduce the incoming pressure below 250 psi.

**OPERATION** Natural gas enters the regulator primary chamber and the pressure of the incoming gas is reduced to approximately 1.5 psi.

The zero governor N-H420-NG will not pass fuel without a vacuum signal from the carburetor. Its orange secondary spring (N-S3-3) requires approximately -0.5" of water column to initiate fuel flow.

The positive pressure N-H420-NG works well in venturi applications where the vacuum signal to the regulator outlet may be weak at low engine speeds. It will flow fuel at a volumetric rate of approximately 1 CFM with the outlet at atmospheric pressure. Flow is interrupted when approximately 8 inches of water backpressure is developed at the outlet.

**INSTALLATION** The N-H420-NG should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

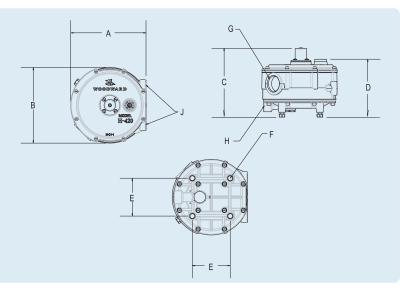
**SERVICE** The N-H420-NG should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.



- Mounts vertically or horizontally
- Positive pressure version flows fuel at 1.0 CFM with outlet at atmospheric pressure
- Zero governor version with orange secondary spring initiates fuel flow at -0.5 inches of water column

#### REGULATOR SPECIFICATIONS

A. Overall Width 5 1/10" (144.8 mm)
B. Overall Length51/10" (144.8 mm)
C. Depth (N-H420-SNGA)4%" (124.5 mm)
D. Depth (N-H420-SONGA) 4% (124.5 mm)
E. Mounting Holes Center to Center
F. Mounting Screws (4) <sup>1</sup> / <sub>4</sub> -20 x <sup>5</sup> / <sub>8</sub> "
G. Fuel Outlet NPT1" (25.4 mm)
H. Fuel Inlet NPT ½" 6.4 mm)
J. Coolant Inlet and Outlet NPT 3/8" (9.5 mm)



Item	Part No.	Description	Qty.
1	N00-6416	Screw - N-S1-22, 6-32 X 1/4" (N-H420-SNGA only)	4
2	N-C2-4	Cap – Spring Retainer (N-H420-SNGA only)	1
3	N-S2-9	Screw – Spring Adjust (N-H420-SNGA only)	1
4	N-N1-1	NUT – Spring Adjust (N-H420-SNGA only)	1
5	N00-6443	SCREW - N-S1-59 COVER, 8-32 X 5/8" SEMS 8 (F	RK 4)
6	N00-5255	Gasket – N-G1-84, Spring Cap (N-H420-SNGA only	y) 1
7	N00-7004	Screen – Secondary Vent	1
8	N-C1-1-1	Cover – Secondary (N-H420-SNGA only)	1
	N-C1-1	Cover – Secondary (N-H420-SONGA only)	1
9	N-S3-6	Spring – Positive Pressure (N-H420-SNGA only)	1
10*	N-D1-2A	DIAPHRAGM ASSEMBLY, SECONDARY, SILICONE	1
11	N00-6443	Screw - N-S1-59 Cover, 8-32 X 5/8" SEMS	8
12	N-P1-2	Pin – Secondary Lever Fulcrum	1
13	N-L1-1	Lever – Secondary	1
14*	N-V1-1A	VALVE – SECONDARY	1
15	N-S3-3	Spring, Secondary Orange (N-H420-SONGA only)	1
16	N-C1-2	Cover – Primary Diaphragm	1
17	N-S3-4	Spring – Primary Regulator	2
18*	N-D1-3A	DIAPHRAGM ASSEMBLY, PRIMARY	1
19	N00-6104	Fitting – 1/8" NPT Hex Pipe Plug	1
20	N-B1-1CA	Body – Sub-Assembly	1
21	N-P1-3	Pin – Primary Valve Operating	1
22*	N-G1-1	GASKET – GAS & WATER CHAMBER	1
23	N-C1-3	Cover – Gas & Water Chamber	1
24	N-V1-2A	VALVE – PRIMARY	1
25	N-S3-5	Spring – Primary Seat	1
26	N-01-1	O-RING – LP-GAS INLET	1
27	N-P3-2	Plug – LP-GAS Inlet	1
28*	N00-6400	SCREW - N-S1-3, COVER, 10/24 X 5/8" SEMS 12 (F	RK 2)
29	N00-6402	Screw – 1/4-20 UNC-2A X 5/8" Hex	4

<sup>\*</sup> Indicates Repair Kit Components

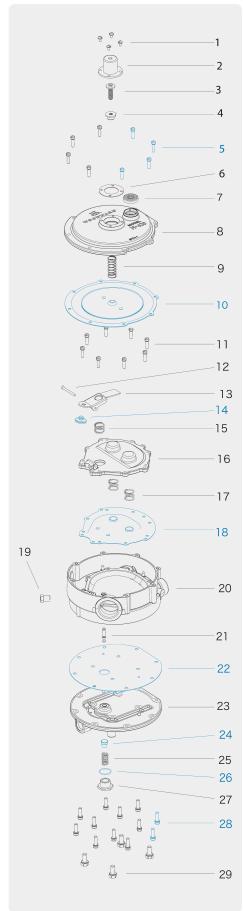
**REPAIR KIT:** (Components shown in blue)

N-RKH420SA Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
N-H420-SNGA	Natural Gas Regulator, Adjustable
	Positive Pressure
N-H420-SONGA	Natural Gas Regulator, Zero Governor
	w/ Orange Spring (-0.5" WC)

Note: Parts in blue are components of Repair Kit (N-RKH420SA).



#### Model N-J - 100 HP Parts Description, Installation & Operation

**GENERAL** The N-J type regulator is an LPG liquid withdrawal high pressure regulator. This regulator provides excellent fuel delivery with liquid-cooled engines up to 100 HP.

WARNING! The N-J should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** Liquid propane enters the regulator and then is vaporized using heat from the engine's coolant. Tank pressure is reduced to approx. 1.5 psi. As negative pressure is transmitted from the carburetor to the regulator, the regulator releases propane vapor to the carburetor. Some regulators are equipped with a primer button. Correctly installed regulator should not require priming. If priming is required, a maximum duration of only 1 second should be used.

**INSTALLATION** The N-J should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

**SERVICE** The N-J should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

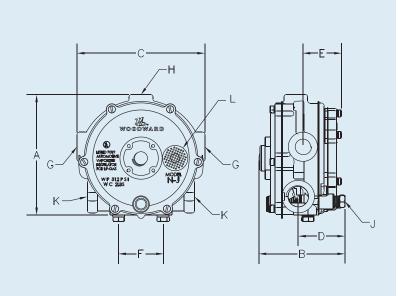




- Propane liquid withdrawal vaporizing regulator
- For liquid-cooled engines up to 100 HP
- Ideal for mobile industrial equipment applications
- Rated to 312 psi maximum inlet pressure

#### DECILIATOR SPECIFICATIONS

REGULATUR SPECIFICATIONS
A. Overall Height 4%" (111.1 mm)
B. Overall Depth 3" (76.2 mm)
C. Overall Width4%" (117.5 mm)
D. Back of Regulator to Center of Vapor Fuel Outlet 1%" (41.3 mm)
E. Back of Regulator to Center of Water Outlet
F. Mounting Holes Center to Center 1%" (41.3 mm)
G. Coolant Inlet & Outlet NPT %" (9.5 mm)
H. Liquid Fuel Inlet NPT ¼" (6.4 mm)
J. Primary Test Port NPT %" (3.2 mm)
K. Vapor Fuel Outlet NPT ½" (12.7 mm)
L. Vent/Balance Line Connect NPT ½" (3.2 mm)



Item	Part No.	Description	Qty.
1*	N00-6443	N-S1-59, SCREW, 8-32 X 5/8" SEMS	6 (RK2)
2	N00-7004	N-S7-4, Screen, Atmospheric Vent (Part of Item 3)	1
3	N00-4523A	N-AC1-34, Cover Assembly, Secondary: (N-C1-34, N-S2-21, N-W1-27, N-S7-4)	1
4	N00-7505	N-W1-27, Washer, Hand Primer (Part of Item 3)	1
5*	N00-4722A	N-AD1-26, DIAPHRAGM ASSEMBLY, SECONDARY, SILICONE	1
6*	N00-6434	N-S1-42, SCREW, 8-32 X 3/8" SEMS	1
7	N00-5651A	N-AL1-37, Lever Assembly, Secondary Reg	ulator 1
8	N00-5904	N-P1-8, Pin, Secondary, Fulcrum	1
9*	N00-6812	N-S4-27, SEAT, SECONDARY REGULATOR	1
10*	N00-6618**	N-S2-35, SPRING, BLUE SECONDARY	1
	N00-6621**	N-S2-38, SPRING, ORANGE SECONDARY	1
11	N00-4229A	N-AB1-33, Body Assembly	1
12	N00-6402	N-S1-5, Screw 1/4-20 x 5/8" SEMS	2
13	N00-6105	N-P3-14, Plug 1/2 NPT	1
14*	N00-6804	N-S4-16, SEAT, PRIMARY REGULATOR	1
15*	N00-5256	N-G1-85, Gasket, Body to Plate	1
16	N00-6009	N-P2-26, Plate, Converter Body Cover	1
17	N00-6104	N-P3-13, Plug 1/8" Pipe, Hex Head	1
18	N00-6711	N-S2-36, Spring, Primary Valve	1
19*	N00-5907	N-P1-14, PIN, PRIMARY VALVE	1
20*	N00-4717A	N-AD1-22, DIAPHRAGM ASSEMBLY, PRIMARY	Y 1
21	N00-4521	N-C1-33, Cover, Primary Regulator	1
22*	N00-6406	N-S1-10, SCREW, 8-32 X 1" SEMS	7 (RK2)

<sup>\*</sup> Indicates Repair Kit Components

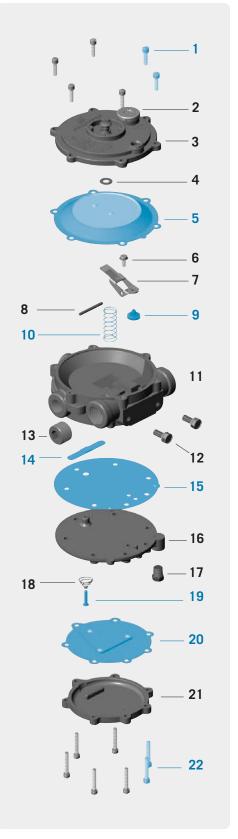
**REPAIR KIT:** (Components shown in blue)

N00-6313A N-RK-J-2, Repair Kit with Silicone Diaphragm Blue and Orange Secondary Springs

#### **ORDERING INFO**

		Vacuum				Check	Inline	UL
Part No.	Model No.	H20	Spring	Diaphragm	Primer	Valve	Filter	Listed <sup>†</sup>
N00-0005A	N-JB-2	1.5	Blue	Silicone				•
N00-0009A	N-JB-2	1.5	Blue	Silicone		•		
N00-0010A	N-J0-2*	1.5	Blue	Silicone				•
N00-0014A	N-J0-2	0.5	Orange	Silicone				•
N00-0024A	N-JO-C734	0.5	Orange	Silicone	•	•		•
N00-0040A	N-JB-L549	1.5	Blue	Silicone	•		•	•
(*) Blank Cover								

Note: While only certain parts are available for purchase, all parts are listed for reference purposes.



Note: Parts in blue are components of Repair Kit (N-RK-J-2).

<sup>\*\*</sup> Two outlet fuel flow initiation pressures are available. Orange secondary spring (N00-6621) requires approximately -0.5" of water column to initiate fuel flow. Blue secondary spring (NO0-6618) requires approximately -1.5" of water column.

<sup>&</sup>lt;sup>†</sup> See ordering info chart for U.L. Listed models.

#### N-2001 Vaporizer/Regulator for LPG-fueled engine -150 HP

**GENERAL** The N-2001 two-stage regulator is an LPG liquid withdrawal high-pressure regulator with an integrated heat exchanger vaporizer. It provides excellent fuel delivery with liquid-cooled engines up to 150 HP.

WARNING! The N-2001 should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** Liquid propane enters the regulator primary chamber and is vaporized using heat from the engine's coolant. Tank pressure is reduced to approximately 1.5 psi. As negative pressure is transmitted from the carburetor to the regulator, the secondary diaphragm depresses the secondary lever and the regulator releases propane vapor to the carburetor. The red secondary spring (N-S11-10) requires approximately -1.0" of water column to initiate fuel flow.

**INSTALLATION** The N-2001 should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow. If mounted horizontally, the secondary cover must face up.

**SERVICE** The N-2001 should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

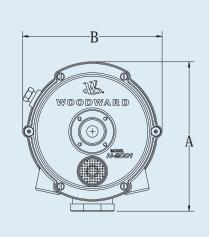


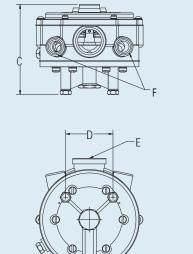


- Mounts vertically or horizontally
- Designed for use in closed-loop certified systems
- Propane liquid withdrawal vaporizing regulator
- Internally vented (primary diaphragm is referenced to sedondary chamber pressure)
- For liquid-cooled engines up to 150 HP
- Designed for use in closed-loop certified systems of mobile industrial equipment
- Rated to 312 psi maximum inlet pressure

#### **REGULATOR SPECIFICATIONS**

A. Overall Height $5 \%$ (132.1 mm)
B. Overall Width 4 $\!\%$ " (121.9 mm)
C. Overall Depth 4" (101.6 mm)
D. Mounting Holes Center to Center 2½0" (53.3 mm)
E. Fuel Outlet NPT $\frac{1}{2}$ " (12.7 mm)
F. Coolant Inlet and Outlet NPT $.$ . $^1\!\!/^{\!\!\!\!4}$ (6.4 mm)
G. Fuel Inlet NPT





Part	Order No.	Description	Qty.
1*	N00-6443	N-S1-59, COVER SCREW, 8-32 X 5/8" SEMS	4 (RK 2)
2*	1031-1158	T-15, 8-32 X 5/8" TORX TAMPER RESISTANT	2
3*	1012-939	LOCK WASHER, #8 INTERNAL TOOTH	2
4	N-C10-1-1	Secondary Cover	1
5*	N-D10-1A	SECONDARY DIAPHRAGM ASSEMBLY	1
6	N-S10-2	Pan Head Screw, #10-24 x 1/4" w/Star Washe	r 1
7	N-L10-3	Secondary Lever	1
8*	N-V1-1A	SECONDARY VALVE	1
9	N-P10-1	Secondary Lever Fulcrum Pin	1
10*	N-S11-10	RED SECONDARY SPRING	1
11	N-L10-1	Pilot Valve Lever	1
12	N-P10-1-1	Pilot Valve Lever Fulcrum Pin	1
13	N-S10-10	Internal Hex Head Set Screw, #8-32 x 1/4"	1
14*	N00-6413	N-S1-19, COVER SCREW, 12-24 X 5/8" SEMS	6 (RK 2)
15	N-C10-3	Primary Diaphragm Cover	1
16	N-S11-1	Primary Regulator Spring	2
17*	N-D10-2A	PRIMARY DIAPHRAGM ASSEMBLY	1
18	N00-6104	Fitting, 1/8 NPT Hex Pipe Plug	1
19	N-B10-1A	Body Assembly	1
20*	N-010-4	BODY SEAL O-RING	1
21*	N-G10-1-1	BODY GASKET	1
22	N-P11-1-1	Regulator Back Plate	1
23*	N-010-1	PRIMARY SEAL O-RING	1
24*	N-V10-1	PRIMARY REGULATOR VALVE	1
25*	N00-6413	N-S1-19, COVER SCREW, 12-24 X 5/8" SEMS	6 (RK 2)
26*	N-01-1	INLET SEAL O-RING	1
27	N-P3-2	Inlet Plug	1
28	N00-6402	Screw, 1/4-20 UNC-2A X 5/8" Hex Head, SEM	S 2

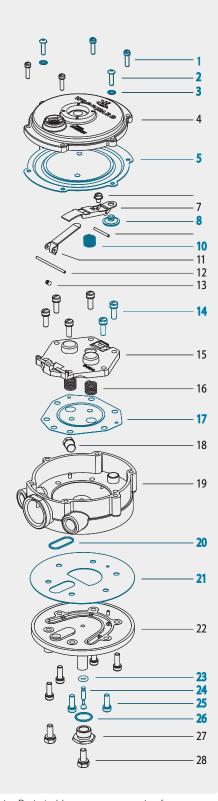
<sup>\*</sup> Indicates repair kit components

**REPAIR KIT** (Components shown in blue)

**N-RK2001-RSA** Repair Kit w/ Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
N-2001-RSA	N-2001 Regulator, Red Spring, w/
	Silicone Diaphragm (U.L. Listed)



Note: Parts in blue are components of Repair Kit (N-RK2001-RSA)

#### Model N-EB-2 Series Regulators For LP-Gas – 400 HP Parts Description, Installation & Operation

**GENERAL** The N-E regulator is an LPG liquid withdrawal high pressure regulator. This regulator provides excellent fuel delivery with liquid-cooled engines up to 400 HP.

WARNING! The N-E should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** Inside the N-E regulator, liquid propane enters the regulator and then is vaporized using heat from the engine's coolant. Tank pressure is reduced to approximately 1.5 psi. As negative pressure is transmitted from the carburetor to the regulator, the regulator releases propane vapor to the carburetor. N-E regulators are equipped with a primer button. A correctly installed regulator should not require priming. If priming is required, a maximum duration of only 1 second should be used.

**INSTALLATION** The N-E should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

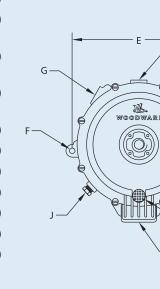
**SERVICE** The N-E should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

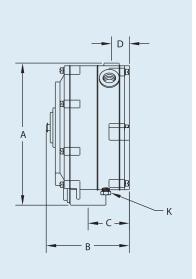
## streamline.



- Propane liquid withdrawal vaporizing regulator
- For liquid-cooled engines up to 400 HP
- -1.5" W.C. fuel initiation (break-off) pressure
- Rated to 312 psi maximum inlet pressure

REGULATOR SPECIFICATIONS
A. Overall Height
B. Overall Depth 4" (101.6 mm)
C. Back of Converter to Center of Vapor Fuel Outlet 2" (50.8 mm)
D. Back of Converter to Center of Water Outlet
E. Mounting Holes, Center-to-Center 6%" (168.3 mm)
F. Mounting Hole Diameter ½" (7.1 mm)
G. Coolant Inlet & Outlet NPT %" (9.5 mm)
H. LPG Fuel Inlet NPT ¼" (6.4 mm)
J. Secondary Accessory Port NPT ½" (3.2 mm)
K. Primary Test Port NPT %" (3.2 mm)
L. Vapor Fuel Outlet NPT 1" (25.4 mm)
M. Vent/Balance Line Connection NPT//" (3.2 mm)





Item	Part No.	Description	Qty.
1*	N00-6400	N-S1-3, SCREW, 10-24 X 5/8" SEMS 8 (R	K3)
2	N00-7002	N-S7-1, Screen, Atmospheric Vent	1
3	N00-4509	N-ACI-22-1, Cover Assembly, Secondary: with Primer Button	1
4	N00-7505	N-W1-27, Washer, Hand Primer	1
5*	N00-4718A	N-AD1-23, DIAPHRAGM ASSEMBLY, SECONDARY, SILICONE: N-D1-23, N-P22-14, N-P2-14 (2), N-L2-1, N-R2-3 (2)	1
6*	N00-5681	N-L1-86A, LEVER, SILICONE	1
7	N00-5903	N-P1-7, Pin, Secondary Lever Fulcrum	1
8	N00-6610**	N-S2-22, Spring, Secondary Regulator, (Blue)	1
		-1.5" W.C.	
9*	N00-6820	N-S4-37, SEAT, SECONDARY	1
10*	N00-6431	N-S1-39, SCREW, 12-24 X 7/8" SEMS 7 (R	K2)
11*	N00-6432	N-S1-40, SCREW, 10-24 X 3/8" SEMS	2
12	N00-4506	N-C1-20, Cover, Primary Diaphragm	1
13	N00-6604	N-S2-13, Spring, Primary Regulator	2
14*	N00-4709A	N-AD1-15, DIAPHRAGM ASSEMBLY, PRIMARY: N-D1-15, N-P2-16, N-P2-17, N-R2-3 (3)	1
15*	N00-5906	N-P1-11, PIN, PRIMARY VALVE	2
16	N00-4216	N-AB1-20, Body, Regulator: N-B1-20, N-J1-13	1
17	N00-6104	N-P3-13, Plug, 1/8" Pipe, Hex Head	2
18*	N00-5225	N-G1-37, GASKET, REGULATOR BODY	1
19*	N00-5015	N-F3-1, SPONGE	1
20*	N00-6801	N-S4-7, SEAT, PRIMARY	1
21	N00-4212	N-AB1-19-1, Body Assembly, Heat Exchanger:	1
		N-B1-19-1, N-J1-9	
22*	N00-5224	N-G1-35, GASKET, HEAT EXCHANGER COVER	1
23	N00-4507	N-C1-21, Cover, Heat Exchanger	1
24*	N00-6400	N-S1-3 SCREW, 10-24 X 5/8" SEMS 6 (R	K3)

<sup>\*</sup> Indicates Repair Kit Components

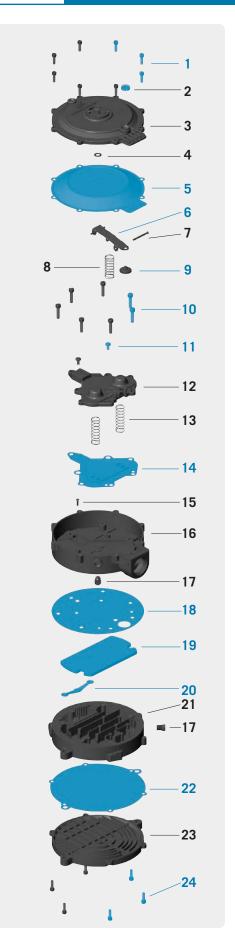
**REPAIR KIT:** (Components shown in blue)

N00-6301A N-RK-E-2, Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
N00-0001A	N-EB-2 Regulator w/ Silicone Diaphragm
	Silicone Diapriragini

Note: Parts in blue are components of Repair Kit (N-RK-E-2).



Note: While only certain parts are available for purchase, all parts are listed for reference purposes.

<sup>\*\*</sup> Blue secondary spring (N00-6610) requires approximately negative 1.5 inches of water outlet fuel flow initiation pressure.

#### Model N-H420 Regulator – 400 HP Parts Description, Installation & Operation

**GENERAL** The N-H420 two-stage regulator is an LPG liquid withdrawal high pressure regulator with a heat exchanger that will vaporize enough fuel for up to 400 HP engines.

WARNING! The N-H420 should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** With the N-H420's improved vaporization characteristics, liquid propane enters the regulator and then is vaporized using heat from the engine's coolant. Tank pressure is reduced to approximately 1.5 psi. As negative pressure is transmitted from the carburetor to the regulator, the regulator releases propane vapor to the carburetor. Some regulators are equipped with a primer button. Correctly installed regulator should not require priming. If priming is required, a maximum duration of only 1 second should be used.

**INSTALLATION** The N-H420 should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

**SERVICE** The N-H420 should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, we will furnish a list of repair facilities or provide service information.





- Propane liquid withdrawal vaporizing regulator
- For liquid-cooled engines up to 400 HP
- Compact, low-profile design
- Rated to 312 psi maximum inlet pressure

#### **REGULATOR SPECIFICATIONS**

A. Overall Width . . . . . . . . . . 5 11/16" (144.5 mm)

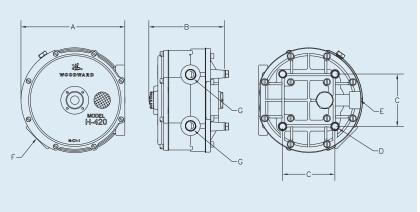
B. Overall Depth ......... 4½" (104.8 mm)

C. Mounting Holes Center to Center 21/8" x 21/8" (73 mm x 73 mm)

D. Mounting Hole Diameter . . . . . . . . ¼"-20 (4)

F. Fuel Outlet NPT . . . . . . . . . 1" (25.4 mm)

G. Coolant Inlet and Outlet NPT . . . 3/8" (9.5 mm)



Item	Part No.	Description	Qty.
1*	N00-6443	COVER SCREW, 8-32 X 5/8"	8 (RK4)
2	N00-7004	Screen, Secondary	1
3	N-C1-1A	Cover Assembly, Secondary	1
4*	N-D1-2A	DIAPHRAGM ASSEMBLY, SECONDARY, SILIC	ONE 1
5	N00-6443	Cover Screw, 8-32 x 5/8"	8
6	N-P1-2	Pin, Secondary Lever Fulcrum	1
7	N-L1-1	Lever, Secondary	1
8*	N-V1-1A	VALVE, SECONDARY	1
9	N-S3-2	Spring, Secondary (Blue)**	1
10	N-S3-3	Spring, Secondary (Orange)**	1
11	N-C1-2	Cover, Primary Diaphragm	1
12	N-S3-4	Spring, Primary Regulator	2
13*	N-D1-3A	DIAPHRAGM ASSEMBLY, PRIMARY	1
14	N-B1-1A	Body Assembly	1
15	N00-6104	Plug, 1/8" Pipe	1
16	N-P1-3	Pin, Primary Valve Operating	1
17*	N-G1-1	GASKET, GAS & WATER CHAMBER	1
18	N-C1-3	Cover, Gas & Water Chamber	1
19*	N00-6400	COVER SCREW, 10-24 X 5/8"	12 (RK2)
20	N00-6402	Mounting Screw, 1/4"-20 x 5/8"	4
21*	N-V1-2A	VALVE, PRIMARY REGULATOR	1
22	N-S3-5	Spring, Valve Closing	1
23*	N-01-1	O-RING, LP-GAS INLET	1
24	N-P3-2	Plug, LP-Gas Inlet	1

<sup>\*</sup> Indicates Repair Kit Components

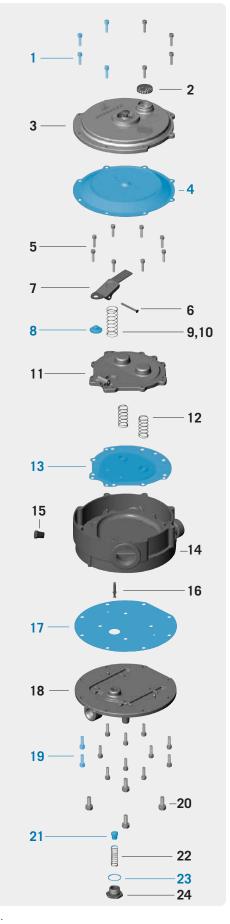
**REPAIR KIT:** (Components shown in blue)

N-RKH420SA Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
N-H420-SA	N-H420 Regulator, Blue Spring with Silicone Diaphragm (UL Listed)
N-H420-0SA	N-H420 Regulator, Orange Spring with Silicone Diaphragm (UL Listed)

Note: Parts in blue are components of Repair Kit (N-RKH420SA).



Note: While only certain parts are available for individual purchase, all parts are listed for reference purposes.

<sup>\*\*</sup> Two outlet fuel flow initiation pressures are available. Orange secondary spring (N-S3-3) requires approximately negative 0.5 inches of water pressure to initiate fuel flow. Blue secondary spring (N-S3-2) requires approximately negative 1.5 inches of water pressure.

#### Model N-H420 Turbo Parts Description, Installation & Operation

**GENERAL** The N-H420 Turbo two-stage regulator is an LPG liquid withdrawal high-pressure regulator with an integrated heat exchanger vaporizer.

WARNING! The N-H420 Turbo should be installed and maintained per these instructions and all applicable federal. state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** Liquid propane enters the regulator primary chamber and is vaporized using heat from the engine's coolant. Tank pressure is reduced to 38-54 inches of water—approximately 1.5 psi. The idle outlet pressure is pre-set to positive  $0.4 \pm 0.1$ inch of water at 1.0 CFM with no boost applied. Turbo boost pressure up to 15 psi may be applied at the hose barb fitting on the cover to maintain the  $0.4 \pm 0.1$  inch of water pressure differential across the secondary diaphragm during turbocharging. The primary diaphragm is referenced to the secondary chamber, so primary pressure is always equal to outlet pressure plus 38-54 inches of water. Schrader valves mounted in the primary and secondary chambers and a thermocouple transducer (for sensing secondary gas temperature) allow for quick diagnostics. and may be used in the fuel system closed-loop control strategy.

INSTALLATION The N-H420 Turbo should be mounted as close to the carburetor mixer/venturi as possible, with the fuel outlet placed in the lowest position for best flow.

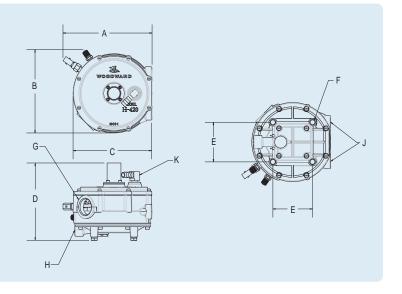
**SERVICE** The N-H420 Turbo should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.



- Mounts vertically or horizontally
- Boost pressure up to 15 psi
- Pre-set positive 0.4 ± 0.1 inches of water idle outlet pressure at 1.0 CFM (with no boost applied)
- Designed for use in closed-loop systems
- Built to withstand extreme vibration conditions

#### **REGULATOR SPECIFICATIONS**

A. Overall Width 6½" (165.1 mm)
B. Overall Length 6½ (154.9 mm)
C. Body Width51/10" (144.8 mm)
D. Overall Depth 53/4" (142.2 mm)
E. Mounting Holes Center to Center2 $^{22}/_{5}$ " (73.2 mm)
F. Mounting Screws (4) $\frac{1}{4}$ -20 x $\frac{5}{8}$ "
G. Fuel Outlet NPT1" (25.4 mm)
H. Fuel Inlet NPT
J. Coolant Inlet and Outlet NPT 3/4" (9.5 mm)
K. Hose Barb



Item	Part No.	Description	Qty.
1	1036-611	Screw – Socket Head Cap #6	4
2	N-C2-3	CAP – Tamper-Resistant	1
3	3381-1010	Screw – Locking, Spring Adjust	1
4	5352-1000	Screw – Spring Adjust	1
5	4250-1051	Cap – Spring Adjust	1
6	N00-5255-P	Gasket – Cap Spring Retainer	1
7*	N00-6443	SCREW - N-S1-59 COVER, 8-32 X 5/8" SEMS	8
8	N-S3-2-P	Spring – Secondary, Model N-H420 Turbo	1
9	N2-1039	Fitting – 1/8 NPT X 3/8" Hose	1
10	N-C1-1-1	Cover – Secondary	1
11*	6612-1010	DIAPHRAGM – ASSEMBLY, SECONDARY	1
12	N00-6443	Screw - N-S1-59 cover, 8-32 X 5/8" SEMS	8
13	5300-1015	Lever – Secondary	1
14*	N-V1-1A	VALVE – SECONDARY	1
15	N-S3-2-P	Spring - Secondary, Model N-H420 Turbo	1
16	1002-727	Pin – Dowel	1
17	3550-1173	Cover – Primary Diaphragm	1
18	N-S3-4	Spring – Primary Regulator	2
19*	N-D1-3A	DIAPHRAGM – ASSEMBLY, PRIMARY	1
20	1310-913	Valve – Schrader 1/8" NPT	1
21	6913-007	Transducer – Temperature	1
22	1310-913	Valve – Schrader 1/8" NPT	1
23	4030-1056	Body – Sub-Assembly	1
24	N-P1-3	Pin – Primary Valve Operating	1
25*	N-G1-1	GASKET – GAS & WATER CHAMBER	1
26	N-C1-3	Cover – Gas & Water Chamber	1
27*	N00-6400	SCREW - N-S1-3, COVER, 10/24 X 5/8" SEMS	12
28	N00-6402	Screw - 1/4-20 UNC-2A X 5/8" Hex	4
29*	N-V1-2A	VALVE – PRIMARY	1
30	N-S3-5	Spring – Primary Seat	1
31*	N-01-1	O-RING — LP-GAS INLET	1
32	N-P3-2	Plug – LP-Gas Inlet	

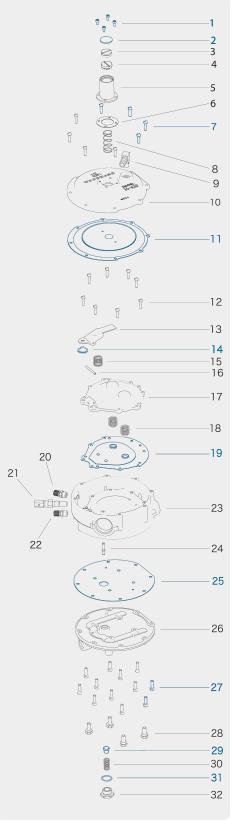
<sup>\*</sup> Indicates Repair Kit Components

**REPAIR KIT:** (Components shown in blue)

**5233-1005-RK** Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
5233-1005	N-H420 Regulator, Positive Pressure,
	with 15 psi Boost



Note: Parts in blue are components of Repair Kit (5233-1005-RK).

#### Model N-S Regulator – 100 HP Parts Description, Installation & Operation

**GENERAL** The N-S type regulator is an LPG liquid withdrawal two-stage vaporizer/regulator. This regulator provides excellent fuel delivery with liquid-cooled engines up to 100 HP.

**WARNING!** The N-S should be installed and maintained per these instructions and all applicable federal, state, and local laws and codes.

Special Note in regards to NFPA Pamphlet 58: For indoor applications by NFPA definition, a regulator is not considered a positive shut-off valve. An approved automatic shut-off device is required to be installed. This will shut off the fuel supply should the engine fail while unattended. Shut-off devices come in vacuum- or solenoid-actuated configurations.

**OPERATION** Liquid propane enters the regulator and then is vaporized using heat from the engine's coolant. Tank pressure is reduced to approximately 1.5 psi. As negative pressure is transmitted from the carburetor to the regulator, the regulator releases propane vapor to the carburetor.

**INSTALLATION** The N-S should be mounted as close to the carburetor as possible, with the fuel outlet placed in the lowest position for best flow.

**SERVICE** The N-S should be periodically checked for leakage. If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish a list of repair facilities or provide service information.

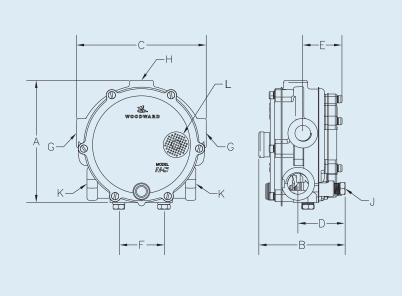
## anilme ani



- Propane liquid withdrawal vaporizing regulator
- For liquid-cooled engines up to 100 HP
- New primary seat design
- Improved safety characteristics
- Ideal for mobile industrial equipment applications
- Rated to 312 psi maximum inlet pressure

#### DECILIATOR SPECIFICATIONS

REGULATUR SPECIFICATIONS
A. Overall Height 4 1/2" (111.1 mm)
B. Overall Depth
C. Overall Width 45/8" (117.5 mm)
D. Back of Regulator to Center of
Vapor Fuel Outlet 1%" (41.3 mm)
E. Back of Regulator to Center of
Water Outlet
F. Mounting Holes
Center to Center
G. Coolant Inlet & Outlet NPT %" (9.5 mm)
H. Liquid Fuel Inlet NPT ¼" (6.4 mm)
J. Primary Test Port NPT ½" (3.2 mm)
K. Vapor Fuel Outlet NPT ½" (12.7 mm)
L. Vent/Balance Line Connect NPT . 1/8" (13.2 mm)



Item	Part No.	Description	Qty.
1*	N00-6443	N-S1-59, SCREW, 8-32 X 5/8" SEMS 6	(RK2)
2	N00-7004	N-S7-4, Screen, Atmospheric Vent	1
3	N00-4523-1	Cover Assembly, Secondary	1
4*	N00-4722A	N-AD1-26, DIAPHRAGM ASSEMBLY, SECONDARY, SILICONE	1
5*	N00-6434	N-S1-42, SCREW 8-32 X 3/8" SEMS	1
6	N00-5651	N-L1-37, Lever Assembly, Secondary Regulato	or 1
7	N00-5904	N-P1-8, Pin, Secondary Fulcrum	1
8*	N00-6812	N-S4-27, SEAT, SECONDARY REGULATOR	1
9	N00-6618**	N-S2-35, Spring, Blue Secondary (N-SBA)	1
	N00-6621**	N-S2-38, Spring, Orange Secondary (N-SOA)	
10	N00-4229A	N-AB1-33, Body Assembly	1
11	N00-6402	N-S1-5, Screw, 1/4-20 x 5/8" SEMS	2
12	N00-6105	N-P3-14, Plug, Pipe	1
13*	N00-6804-1	N-S4-16-2, SEAT, PRIMARY REGULATOR	1
14*	N00-5256	N-G1-85, GASKET, BODY TO PLATE	1
15	N00-6009	N-P2-26, Plate, Converter Body Cover	1
16	N00-6104	N-P3-13, Plug, 1/8" Pipe, Hex Head	1
17	N00-6711	N-S3-15, Spring, Primary Valve	1
18*	N-P10-3	PIN, PRIMARY VALVE	1
19*	N00-4717-1A	N-AD1-22-1, DIAPHRAGM ASSEMBLY, PRIMARY	1
20	N00-4521	N-C1-33, Cover, Primary Regulator	1
21*	N00-6406	N-S1-10, SCREW, 8-32 X 1" SEMS 7	(RK2)

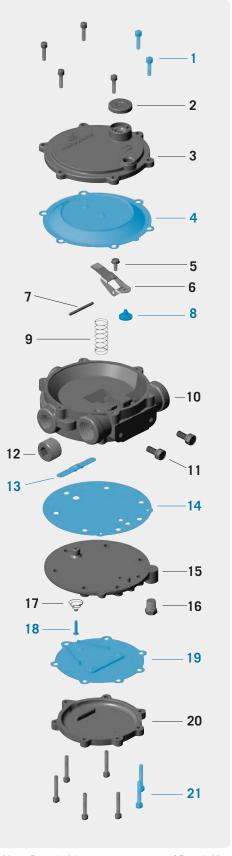
<sup>\*</sup> Indicates Repair Kit Components

**REPAIR KIT:** (Components shown in blue)

N-RK-S-2A Repair Kit with Silicone Diaphragm

#### **ORDERING INFO**

Part No.	Description
N-SBA	N-S, Regulator, with Silicone Diaphragm, Blue Spring (-1.5")
N-SOA	N-S, Regulator, with Silicone Diaphragm, Orange Spring (-0.5")



Note: Parts in blue are components of Repair Kit (N-RK-S-2A).

<sup>\*\*</sup> Two outlet fuel flow initiation pressures are available. Orange secondary spring (N00-6621) requires approximately -0.5" of water pressure to initiate fuel flow. Blue secondary spring (N00-6618) requires approximately -1.5" of water pressure.

#### Repair Kit only for Model L Regulators

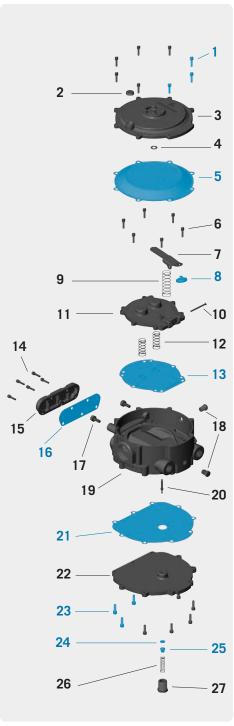
While Woodward does not manufacture Model L regulators, we do provide repair kits for them. Components of these kits are shown in blue on the parts diagram.

#### **REPAIR KIT COMPONENTS**

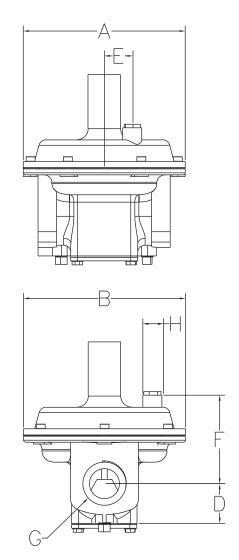
Item	Part No.	Description	Qty.
1	N00-6443	N-S1-9, Screw, 8-32 x 5/8" SEMS	3
5	N00-4725A	N-AD1-23, Diaphragm Assembly, Secondary, Hydrin	1
	N00-4726A	N-AD1-23, Diaphragm Assembly, Secondary, Silicone	
8	N00-6820	N-S4-37, Seat, Secondary	1
13	N00-4731A	N-AD1-32, Diaphragm Assembly, Primary	1
16	N00-5275	N-G1-118, Gasket, Water Passage	1
21	N00-5276	N-G1-119, Gasket, Vaporization Chamber	1
23	N00-6400	N-S1-3, Screw, 10-24 x 5/8" SEMS	3
24	N00-6806	N-S4-18, Seat, Primary Valve	1
25	N00-6808A	N-S4-23, Seat, Support, Primary	1

#### **ORDERING INFO**

Part No.	Description
N00-6316A	N-RK-L, Repair Kit with Hydrin Diaphragm
N00-6317A	N-RK-L-2, Repair Kit with Silicone Diaphragm



Note: Parts in blue are components of Model L Repair Kits.





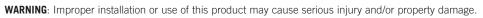
#### STANDARD REDUCTION VALVES

					BOTTOM TO	OFNITEDI INF	CENTER OF	INUET O	VENIT
		01/20411	01/30 411	0.475.444	CENTER OF	CENTERLINE	VAPOR FUEL OUTLET	INLET &	VENT
		OVERALL	OVERALL	OVERALL	VAPOR FUEL	TO CENTER OF	TO TOP OF	OUTLET	BOSS
	STANDARD	LENGTH	WIDTH	HEIGHT	OUTLET	VENT BOSS	VENT BOSS	NPT	DIA.
PART NO.	VALVE	Α	В	C	D	E	F	G	I
N00-0054	N-IMP52	3-3/16"	3-1/4"	5-1/16"	1-1/2"	1-3/32"	2"	3/4"	1/8"
		(80.96mm)	(82.55mm)	(128.59mm)	(38.1mm)	(27.78mm)	(50/8mm)	(19.1mm)	(3.2mm)
N00-0055	N-IMP53	3-5/8"	3-7/8"	5-9/16"	1-11/32"	1-15/32"	2-11/32"	1"	1/8"
		(92.08mm)	(98.43mm)	(141.29mm)	(34.13mm)	(37.31mm)	(59.53mm)	(25.4mm)	(3.2mm)
N00-0056	N-IMP61	4-3/8"	5-7/16"	6-7/16"	1-21/32"	1-27/32"	2-7/8"	1-1/4"	1/8"
		(111.13mm)	(138.11mm)	(163.51mm)	(42.07mm)	(46.83mm)	(73.03mm)	(31.75mm)	(3.2mm)
N00-0057	N-IMP81	6"	7"	8-3/8"	2-1/32"	2-3/8"	3-1/16"	1-1/2"	1/8"
		(152.4mm)	(177.8mm)	(212.73mm)	(51.59mm)	(60.36mm)	(77.79mm)	(38.1mm)	(3.2mm)
N00-0058	N-IMP91	7-1/8"	9-1/8"	10-1/2"	2-7/16"	3-1/4"	4-3/16"	2"	1/8"
		(180.98mm)	(231.78mm)	(266.7mm)	(64.45mm)	(82.55mm)	(106.36mm)	(50.8mm)	(3.2mm)

#### **Cubic Feet per Hour (CFH)**

This chart shows pressure drop values for each model with the regulator in the open position. Differential pressure (inlet pressure minus outlet pressure) must be at least twice pressure drop value for practical use. Maximum recommended capacity limit is at a flow equivalent to 4.0" W.C. pressure drop.

	PRESSURE DROP MODEL/PIPE SIZE				
RATE OF FLOW CFH 0.64 GR GAS	N-IMP52 3/4" (19.1mm)	N-IMP53 1" (25.4mm)	N-IMP60 1-1/4" (31.75mm)	N-IMP81 1-1/12" (38.1mm)	N-IMP91 2" (50.8mm)
100					
200	.18				
300	.39	.13			
400	.70	.24			
500	1.10	.37	.16		
600	1.58	.54	.23		
700	2.16	.73	.32		
800	2.82	.95	.41	.13	
900	3.55	1.20	.52	.16	
1,000	4.37	1.48	.64	.20	
1,100	5.30	1.79	.78	.24	
1,200		2.13	.93	.28	
1,300		2.52	1.09	.33	.12
1,400		2.90	1.26	.38	.14
1,500		3.31	1.45	.44	.15
1,600		3.78	1.65	.50	.18
1,700		4.27	1.87	.56	.20
1,800		4.80	2.09	.63	.22
1,900			2.33	.71	.25
2,000			2.58	.78	.27
2,500			4.03	1.22	.43
3,000			5.80	1.76	.62
3,500			7.90	2.38	.84
4,000				3.12	1.09
4,500				3.95	1.39
5,000				4.86	1.71
5,500				5.90	2.07
6,000					2.46
6,500					2.90
7,000					3.35
7,500					3.85
8,000					4.39
8,500					4.95
9,000					





#### N-CA55-500 Series

For LP-Gas & Natural Gas



Carburetors consist of a mixer, throttle body assembly, and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA55-500 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required.)

Letters in ( ) refer to the dimension diagrams on facing page. Numbers in ( ) indicate metric dimensions.



#### AIR VALVE ASSEMBLY (Item No. 8 on Parts List)

Part No.	Model No.	Description
N00-7462A	N-AV1-18	Standard air valve assembly

**MIXERS** (Item No. 13 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements.

			Fuel Inlet NPT
AIR HORN	Standar	Standard Air Valve	
DIAMETER	Mixer Part No.	Mixer Model No.	(E)
N/A	N00-0405A	N-CA55M-500	3/8" (9.5mm)

#### AIR HORN (Item No. 2 on Parts List)

Part No.	Model No.	Description	Diameter (C)
N1-4063	N-A2-35	Aluminum	
N1-4064	N-A2-36	Aluminum	1-1/2" (38.1mm)
N1-4065	N-A2-37	Aluminum	1-5/8" (41.40mm)
N1-4066	N-A2-38	Aluminum	1-7/8" (47.75mm)
N00-4067	N-A2-39	Aluminum	2-1/16" (52.32mm)
N00-4068	N-A2-39-1	Polycarbonate	2-1/16" (52.32mm)
N00-4070	N-A2-41	Polycarbonate	2-5/16" (58.67mm)
N00-4070-1	N-A2-41	Aluminum	2-5/16" (58.67mm)
N1-4086	A2-65	Adapter for Toyota 4Y engines	N/A
N1-4085	A2-61	8mm center stud	2-1/2" (63.5mm)
N1-4085-1	A2-61-2	8mm center stud	2-1/2" (63.5mm)
N1-4081	A2-59	Aluminum	1-11/16" (42.80mm)

#### THROTTLE BODY ASSEMBLIES (Item No. 20 on Parts List)

			Center to Center			
			Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(G)	(H)
N1-7251	N-AT2-24	1/2" SAE (12.7mm)				
N1-7253	N-AT2-25	3/4" SAE (19.05mm)	2-1/4" (57.15mm)	1-1/6" (26.99mm)	1-5/16" (33.34mm)	1/4" (6.35mm)
N00-7255	N-AT2-26	1" SAE (25.4mm)	2-3/8" (60.45mm)	1-3/16" (31.24mm)	1-5/16" (33.34mm)	1/4" (6.35mm)
N1-7256	N AT2-26-2	1" SAE (25.4mm)				
N00-7259	N-AT2-27	1-1/4" SAE (31.75mm)	2-11/16" (68.33mm)	1-3/16" (31.24mm)	1-5/16" (33.34mm)	1/4" (6.35mm)
N1-7260	N-AT2-27-2	1-1/4" SAE (31.75mm)	2-11/16" (68.33mm)	1-3/16" (31.24mm)	1-5/16" (33.34mm)	1/4" (6.35mm)
N00-4096 *	N-A2-41	N/A	N/A	2-5/16" (58.67mm)	N/A	N/A

<sup>(\*)</sup> Hose adapter used in place of throttle body.

#### THROTTLE BODY ADAPTER (Not shown on Parts List)

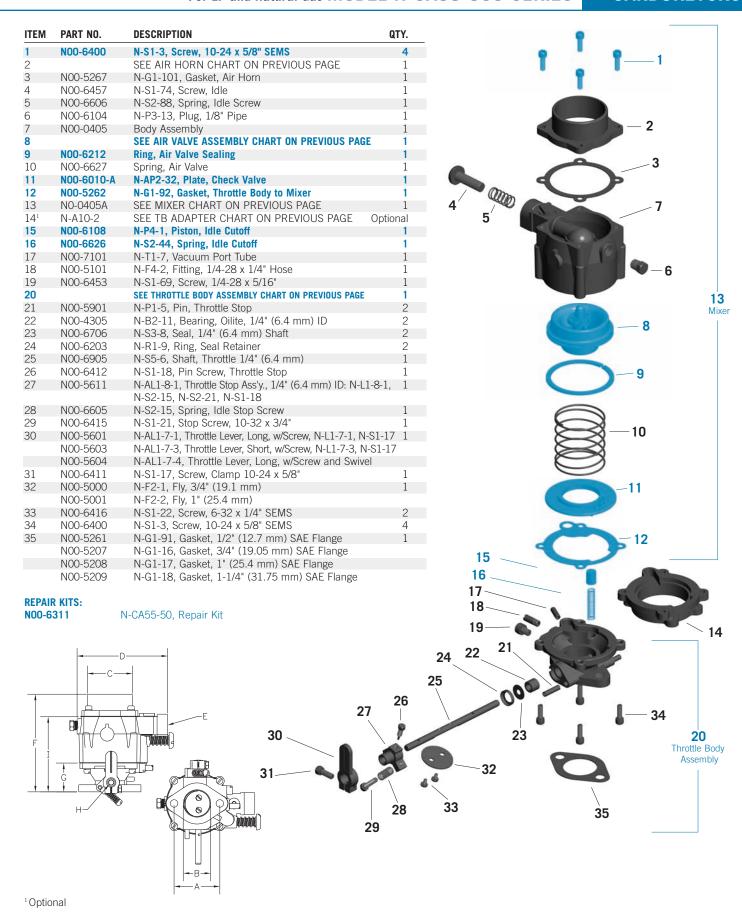
Part No.	Model No.	Description
N-A10-2	N/A	CA55 mixer attached to CA100 or CA125 throttle body

#### **CA55 CARBURETOR ASSEMBLIES**

			CARBURETO	IRS COMPRISED OF:		CARBURETOR ASS	EMBLY DIMENSIONS
Carburetor			Throttle				
Assembly		Mixer	Body Assembly	Air Horn	Air Valve	Width	Height
Part No.	Model No.	Part No.	Part No.	Part No.	Part No.	(D)	(E)
N1-0200A	N-CA55-4	N00-0405A	N1-7253	N1-4065	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N00-0225A	N-CA55-508	N00-0405A	N1-7259	N00-4068	N00-7462A	4-1/8" (104.78mm)	6-1/4" (158.75mm)
N1-0225A	N-CA55-508	N00-0405A	N1-7260	N00-4067	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N1-0226A	N-CA55-510	N00-0405A	N1-7259	N00-4070	N00-7462A	4-1/8" (104.78mm)	4-3/4" (120.65mm)
N00-0231A	N-CA55-542	N00-0405A	N00-7206**	N1-4063	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N00-0239A	N-CA55-576	N00-0405A	N00-7206**	N1-4081	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N00-0268A	N-CA55-598	N00-0405A	N1-7260	N1-4085	N00-7462A	4-1/8" (104.78mm)	4-1/10" (104.14mm)
N1-0269A	N-CA55-553	N00-0405A	N1-7256	N1-4086	N00-7462A	4-1/8" (104.78mm)	4-3/4" (120.65mm)
N00-0306A	N-CA55-596-2	N00-0405A	N1-7260	N1-4085	N00-7462A	4-1/8" (104.78mm)	4-1/10" (104.14mm)
N1-0306-1A	N-CA55-596	N00-0405A	N1-7260	N1-4085-1	N00-7462A	4-1/8" (104.78mm)	4-1/10" (104.14mm)
N00-0307A	N-CA55-577	N00-0405A	N00-7206**	N1-4081	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N1-0307-1A	N-CA55-577	N00-0405A	N00-7206**	N1-4082	N00-7462A	4-1/8" (104.78mm)	4-1/10" (104.14mm)
N00-0307-2A	N-CA55-577-2	N00-0405A	N00-7206**	N1-4081	N00-7462A	4-1/8" (104.78mm)	4-1/2" (114.3mm)
N00-0703A	N-CA55-756L	N00-0405A	N00-4096	N00-4067	N00-7462A	4-1/8" (104.78mm)	4-3/4" (120.65mm)

<sup>(\*\*)</sup> See CA 100 throttle bodies for description.





Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

#### **N-CA70 Series**



Carburetors consist of a mixer and throttle body assembly, and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA70 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required.)

Letters in ( ) refer to the dimension diagrams on this page. Numbers in ( ) indicate metric dimensions.

#### AIR VALVE ASSEMBLY (Item No. 12 on Parts List)

Part No.	Model No.	Description
N-AV1-70-2A		Standard, silicone diaphragm
N-FBV1-70-2A		Feedback, lean flow, silicone diaphragm
N-FBV1-70-3A		Feedback, silicone diaphragm
		, , , , , , , , , , , , , , , , , , , ,

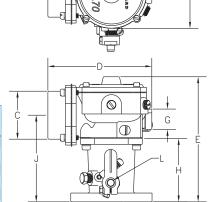
#### AIR HORN ASSEMBLY (Item No. 19 on Parts List)

Part No.	Model No.	Description	Diameter (C)	
N1-4064 <i>N-A2-36</i>		Aluminum	1-1/2" (38.1mm)	
N1-4065 <i>N-A2-37</i>		Aluminum	1-5/8" (41.40mm)	
N00-4066 N-A2-38		Aluminum	1-7/8" (47.75mm)	
<b>N00-4067</b> <i>N-A2-39</i>		Aluminum	2-1/16" (52.32mm)	
N00-4068	N-A2-39-1	Polycarbonate	2-1/16" (52.32mm)	
N00-4070 <i>N-A2-41</i>		Polycarbonate	2-5/16" (58.67mm)	
N00-4070-1	N-A2-41	Aluminum	2-5/16" (58.67mm)	

MIXERS (Item No. 22 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements

contact factory for other assemblies that	carr be built to your	specific requireme	ziilo.
AIR HORN	Standard Air Valve	Feedback Air Valve	Lean Feedback Air Valve
DIAMETER	Mixer Part No.	Mixer Part No.	Mixer Part No.
None	N-CA70M-A	N-FB70M-A	
1-1/2" (38.1mm)	N-CA70M-1A	N-FB70M-1A	_
1-5/8" (41.40mm)	N-CA70M-5A	N-FB70M-5A	_
1-7/8" (47.74mm)	N-CA70M-2A	N-FB70M-2A	_
2-1/16" (52.32mm)	N-CA70M-3A	N-FB70M-3A	_
2-1/16" x 2-1/2" L (52.32mm x 63.5mm)	N-CA70M-6A	N-FB70M-6A	N-FB70M-6A-1
2-5/16" polycarbonate (58.67mm)	N-CA70M-4A	N-FB70M-4A	_
2-5/16" aluminum (58.67mm)	N-CA70M-4A	N-FB70M-4A	

**Mixer** Throttle **Body Assembly** 



NOTE: Contact factory for lean feedback mixers suited to your particular requirements.

#### THROTTLE BODY ASSEMBLIES (Item No. 23 on Parts List)

			Center to Center			
			Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(H)	(L)
N1-7201	N-AT2-1	3/4" SAE (19.05mm)	2-1/4" (57.15mm)	1-1/6" (26.92mm)	1-3/8" (35.05mm)	1/4" (6.35mm)
N00-7206	N-AT2-2-5	1" SAE (25.4mm)	2-3/8" (60.45mm)	1-3/16" (31.24mm)	1-3/8" (35.05mm)	5/16" (8.13mm)
N00-7208	N-AT2-3	1-1/4" SAE (31.75mm)	2-11/16" (68.33mm)	1-7/16" (36.58mm)	2-23/32" (69.09mm)	5/16" (8.13mm)
N00-7239	N-AT2-16-1	1-1/4" and 1-1/2", short (31.75mm and 38.1mm)	2-13/16" (71.37mm)	1-11/16" (42.93mm)	1-5/8" (41.40mm)	5/16" (8.13mm)
N00-7271-1	_	1" SAE (25.4mm)*	3-1/4" (82.55mm)	1-3/16" (31.24mm)	3" (76.2mm)	0.31" (7.87mm)
N1-7210	N-AT2-4-1	1-1/2" (38.1mm)	2-15/16" (74.68mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)
N1-7214	N-AT2-4-3	1-3/4" (44.45mm)	3-5/16" 84.07mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)
N00-7223	N-AT2-23	1-1/4" SAE short (31.75mm)	2-11/16" (68.33mm)	1-7/16" (36.58mm)	1-38" (35.05mm)	5/16" (8.13mm)

<sup>(\*)</sup> Nissan H20-II / H25 Engines

#### **CA70 CARBURETOR ASSEMBLIES**

			CARBURETORS	COMPRISED OF:		CARBURETOR ASSEMBLY DIMENSIONS			NSIONS
Carburetor Assembly Part No	Model No.	Mixer Part No.	Throttle Body Assembly Part No.	Air Horn Part No.	Air Valve Part No.	Depth (D)	Height (E)	Width (F)	Flange to Center of Air Horn (J)
N-CA70-1A		N-CA70M-1A	N1-7201	N1-4064	N-AV1-70-2A	4-1/2"	3-7/8"	3"	2-3/8"
N-CA70-1A-2		N-CA70M-5A	N1-7201	N1-4065	N-AV1-70-2A	4-1/2"	3-7/8"	3"	2-3/8"
N-CA70-7A		N-CA70M-3A	N00-7206	N1-4067	N-AV1-70-2A	_	_	_	_
N-CA70-7ANG		N-CA70-7ANG	N00-7206	N1-4067	_	_	_	_	_

NOTE: All above carburetor assemblies are available in feedback models. Please contact factory if you have that requirement.

TEM	PART NO.	DESCRIPTION	QTY
1	N00-6443	N-S1-59, Screw, 8-32 x 5/8" SEMS	4
2	N-C1-6	Cover, Diaphragm	1
3	N-S3-70	Spring, Air Valve	1
4	N-S10-11	Screw, 4-40 x 1/4" SEMS	3
5	N-P2-70	Plate, Diaphragm Backup	1
6	N-D1-70-2	Diaphragm, Silicone	- 1
7	N-R1-70	Ring, Air Valve	1
8	N-R12-1	Ring, Lean Idle Mixture *	1
9	N-V1-70	Air Valve	1
10	N-W1-70-2	Washer, Gas Valve *	1
	N-W1-70	Washer, Gas Valve, Feedback †	
11	N-V2-70	Gas Metering Valve *	1
	N-V2-70-2	Gas Metering Valve, Feedback †	
12		SEE AIR VALVE ASSEMBLY CHART ON PREVIOUS PAGE	1
13	N-S2-70	Screw, Idle, 5/16-18 Hex Head	1
14	N-S11-9	Spring, Idle Screw	1
15	N2-1011	N-P3-3, Plug, 1/8" NPT, Brass	3
16	N-B9-4	Body, Mixer	1
17	N00-6453	N-S1-69, Screw, 1/4-28 x 5/16* Slotted Fillister Head	2
18	N00-5267	N-G1-101, Gasket for Air Horn	1
19		SEE AIR HORN CHART ON PREVIOUS PAGE	1
20	N00-6400	N-S1-3, Screw, 10-24 x 5/8" SEMS Slotted Fillister Head	4
21	N00-5204	N-G1-11, Gasket, Throttle Body to Mixer	1
22		SEE MIXER CHART ON PREVIOUS PAGE	1
23		Throttle Body	1
24	N00-5901	N-P1-5, Pin, Throttle Stop	1
25	N00-4305	N-B2-11, Bearing, Oilite, 1/4" ID (6.4mm)	2
	N00-4306	N-B2-12, Bearing, Oilite, 5/16" ID (7.9mm)	_
26	N00-6706	N-S3-8, Seal, 1/4" Shaft (6.4mm)	2
	N00-6707	N-S3-9, Seal, 5/16" Shaft (7.9mm)	_
27	N00-6203	N-R1-9, Ring, Seal Retainer	2
28	N00-6203	N-S5-1, Throttle Shaft, 1/4" Dia. (6.4mm): N-T2-1, N-T2-2	1
	N00-6901	N-S5-2, Throttle Shaft, 5/16" Dia. (7.9mm): N-T2-3, N-T2-4-1,	-
	1100-0301	N-T2-4-3,N-T2-16, N-T2-23	
	N00-6911	N-S5-11, Throttle Shaft, 5/16" Dia. (7.9mm): N-T2-3, N-T2-4-1,	
		N-T2-4-3, N-T2-16, N-T2-23	
29	N00-6415	N-S1-21, Stop Screw, 10-32 x 3/4"	1
30	N00-6605	N-S2-15, Spring, Idle Stop Screw	1
31	N00-5611	N-AL1-8-1, Throttle Stop Ass'y., 1/4" ID (6.4mm): N-L1-8-1,	1
	NOO EC10	N-S2-15, N-S2-21, N-S1-18	
	N00-5612	N-AL1-8-2, Throttle Stop Ass'y., 5/16" ID (7.9mm): N-L1-8-2, N-S2-15, N-S1-21, N-S1-28	
32	N00-5601	N-AL1-7-1, Throttle Lever, Long, w/Screw, N-L1-7-1, N-S1-17	1
	N00-5603	N-AL1-7-3, Throttle Lever, Short, w/Screw, N-L1-7-3, N-S1-17	
	N00-5604	N-AL1-7-4, Throttle Lever, Long, w/Screw and Swivel	
33	N00-6411	N-S1-17, Screw, Clamp 10-24 x 5/8"	1
34	N00-6412	N-S1-18, Pin Screw, Throttle Stop	1
35	N00-5412	N-F2-1, Fly, 3/4" (19.1mm)	1
33	N00-5001	N-F2-2, Fly, 1" (25.4mm)	1
	N00-5001	N-F2-2, Fly, 1 (25.4fffff) N-F2-3, Fly, 1-1/4" (31.75mm)	
		N-F2-4, Fly, 1-1/4 (31./5mm) N-F2-4, Fly, 1-1/2" (38.1mm)	
	N00-5003		
26	N00-5004	N-F2-5, Fly, 1-3/4" (44.45mm)	^
36	N00-6416	N-S1-22, Screw, 6-32 x 1/4" SEMS	2
27	N00-6408	N-S1-12, Screw, 8-32 x 5/16" SEMS	
37	N00-7101	N-T1-7, Vacuum Port Tube	1
38	N00-6413	N-S1-19, Screw 12-24 x 5/8 "SEMS	4
39	N00-6104	N-P3-13, Plug, 1/8" Pipe, Hex Head	1
40	N00-5207	N-G1-16, Gasket, 3/4" (19.1mm) Flange	1
	N00-5208	N-G1-17, Gasket, 1" (25.4mm) Flange	
	N00-5209	N-G1-18, Gasket, 1-1/4" (31.75mm) Flange	
	N00-5210	N-G1-19, Gasket, 1-1/2" (38.1mm) Flange	
	N00-5214	N-G1-23, Gasket, 1-3/4" (44.45mm) Flange	
	N00-5239	N-G1-56, Gasket, 1-1/4" - 1-1/2" (31.75-38.1mm) Flange	
	N00-5241	Gasket, Throttle Body, NOO-7271	
41		SEE THROTTLE BODY ASSEMBLY CHART ON PREVIOUS PAGE	- 1

(\*) For use on air valve assembly N-FBV1-70-2A only. (†) For use on air valve assemblies N-FBV1-70-2A and -3A only.

Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice. boldface blue are available for purchase.

# **MODEL N-CA100 SERIES** For LP and Natural Gas

#### N-CA100 Series

Carburetors consist of a mixer, throttle body assembly and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA100 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required)

Letters in ( ) refer to the dimension diagrams on facing page. Numbers in ( ) indicate metric dimensions.

# Streamline. Mixer

**Throttle Body** 

Assembly

# AIR HORN (Item No. 16 on Parts List)

			Diameter
Part No.	Model No.	Description	(C)
N1-4064	N-A2-36	Aluminum	1-1/2" (38.1mm)
N1-4065	N-A2-37	Aluminum	1-5/8" (41.40mm)
N00-4066	N-A2-38	Aluminum	1-7/8" (47.75mm)
N00-4067	N-A2-39	Aluminum	2-1/16" (52.32mm)
N00-4068	N00-4068 N-A2-39-1		2-1/16" (52.32mm)
N00-4070 <i>N-A2-41</i>		Polycarbonate	2-5/16" (58.67mm)
N00-4070-1 N-A2-41		Aluminum	2-5/16" (58.67mm)

N00-0607A

shown here

# AIR VALVE ASSEMBLY (Item No. 8 on Parts List)

Part No.	Model No.	Description
N00-7426A	N-AV1-14-4	Standard, silicone diaphragm
N00-7426A-L	N-AV1-14-3	Lean flow, silicone diaphragm
N00-7426A-R	N-AV1-14-4R	Rich flow, silicone diaphragm
N00-7433A	N-AV1-1447-2	Feedback, silicone diaphragm

MIXERS (Item No. 19 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements.

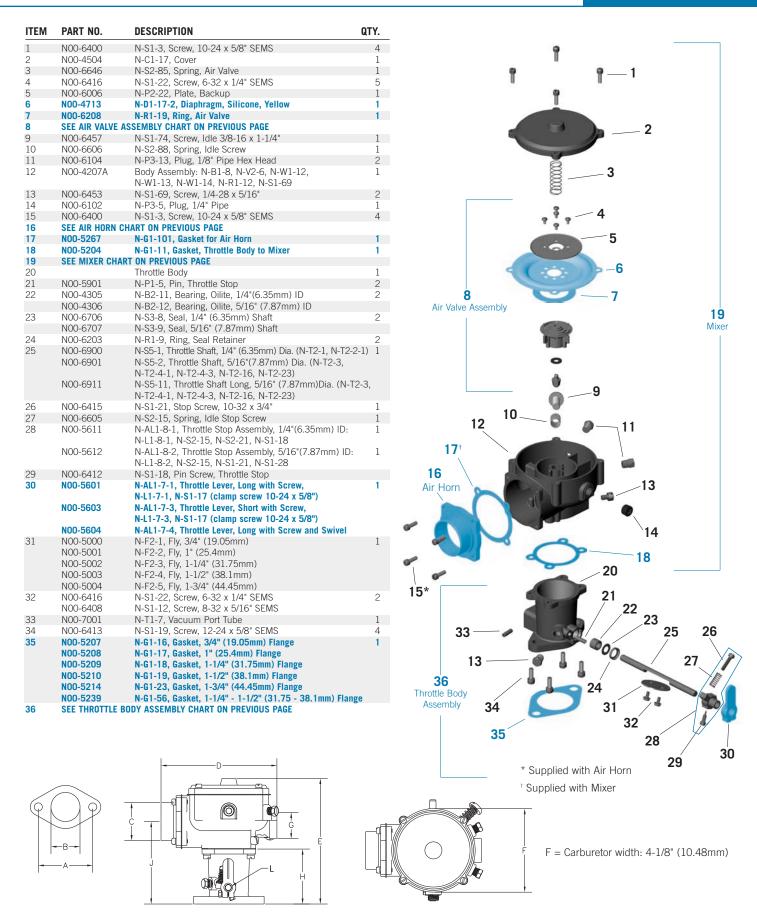
	AIR VALVE OPTIONS						
AIR HORN	Standard	l Air Valve	Feedback	k Air Valve	Rich Ai	NPT	
DIAMETER	Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	(G)
None	N00-0799A	N-CA100M	N00-0799AFB	N-FB100M	_	_	1/2" (12.7mm)
1-1/2" (38.1mm)	N00-0800A	N-CA100M-1	N00-0800AFB	N-FB100M-1	_	_	1/2" (12.7mm)
1-5/8" (41.40mm)	N00-0807A	N-CA100M-5	N00-0807AFB	N-FB100M-5	_	_	1/2" (12.7mm)
1-7/8" (47.75mm)	N00-0801A	N-CA100M-2	N00-0801AFB	N-FB100M-2	_	_	1/2" (12.7mm)
2-1/16" (52.32mm)	N00-0803A	N-CA100M-3	N00-0803AFB	N-FB100M-3	N00-0803A-R	CA100M-3-R	1/2" (12.7mm)
2-1/16" x 2-1/2" L (52.32mm)	N00-0803-1A	N-CA100M-3	N00-0803-1AFB	N-FB100M-3	_	_	1/2" (12.7mm)
2-5/16" (polycarbonate) (58.67mm)	N00-0805A	N-CA100M-4	N00-0805A-FB	N-FB100M-4	N00-0805A-R	CA100M-4-R	1/2" (12.7mm)
2-5/16" (aluminum) (58.67mm)	N00-0805-1A	N-CA100M-4	N00-0805-1AFB	N-FB100M-4		_	1/2" (12.7mm)

### THROTTLE BODY ASSEMBLIES (Item No. 36 on Parts List)

			Center to Center	D	Halada	Ob at Dia
			Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(H)	(L)
N1-7201	N-AT2-1	3/4" SAE (19.05mm)	2-1/4" (57.15mm)	1-1/6" (26.92mm)	1-3/8" (35.05mm)	1/4" (6.35mm)
N00-7206	N-AT2-2-5	1" SAE (25.4mm)	2-3/8" (60.45mm)	1-3/16" (31.24mm)	1-3/8" (35.05mm)	5/16" (8.13mm)
N00-7208	N-AT2-3	1-1/4" SAE (31.75mm)	2-11/16" (68.33mm)	1-7/16" (36.58mm)	2-23/32" (69.09mm)	5/16" (8.13mm)
N00-7239	N-AT2-16-1	1-1/4" and 1-1/2", short (31.75mm and 38.1mm)	2-13/16" (71.37mm)	1-11/16" (42.93mm)	1-5/8" (41.40mm)	5/16" (8.13mm)
N00-7271-1	_	1" SAE (25.4mm)	3-1/4" (82.55mm)	1-3/16" (31.24mm)	3" (76.2mm)	0.31" (7.87mm)
N1-7210	N-AT2-4-1	1-1/2" (38.1mm)	2-15/16" (74.68mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)
N1-7214	N-AT2-4-3	1-3/4" (44.45mm)	3-5/16" 84.07mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)
N1-7223	N-AT2-23	1-1/4" short (31.75mm)	2-11/16" (68.33mm)	1-7/16" (36.58mm)	1-38" (35.05mm)	5/16" (8.13mm)

# **CA100 CARBURETOR ASSEMBLIES**

			CARBURETORS COMPRISED OF:			CARBURETOR ASSEMBLY DIMENSIONS		
Carburetor Assembly		Mixer	Throttle Body Assembly	Air Horn	Air Valve	Depth	Height	Flange to Center of Air Horn
Part No.	Model No.	Part No.	Part No.	Part No.	Part No.	(D)	(E)	(J)
N00-0599A	N-CA100-2	N00-0800A	N1-7201	N1-4064	N00-7426A	5-11/16" (14.45mm)	4-13/16" (12.22mm)	2-23/32" (6.91mm)
N00-0600A	N-CA100-4	N00-0800A	N00-7206	N1-4064	N00-7426A	5-11/16" (14.45mm)	4-13/16" (12.22mm)	2-23/32" (6.91mm)
N00-0602A	N-CA100-6	N00-0801A	N00-7206	N00-4066	N00-7426A	5-3/4" (14.61mm)	4-13/16" (12.22mm)	2-23/32" (6.91mm)
N00-0604A	N-CA100-8	N00-0803A	N00-7208	N00-4067	N00-7426A	5-11/16" (14.45mm)	5-1/16" (12.86mm)	2-23/32" (6.91mm)
N00-0604-R	N-CA100M-3-R	N00-0803A-R	N00-7208	N00-4067	N00-7426A-R	5-11/16" (14.45mm)	5-1/16" (12.86mm)	2-23/32" (6.91mm)
N00-0607A	N-CA100-10	N00-0805A	N00-7208	N00-4070	N00-7426A	5-15/16" (15.08mm)	5-1/16" (12.86mm)	3-31/32" (10.08mm)
N00-0609A	N-CA100-12	N00-0805A	N1-7210	N00-4070	N00-7426A	5-15/16" (15.08mm)	6-1/4" (15.88mm)	3-31/32" (10.08mm)
N00-0611A	N-CA100-26	N00-0803A	N00-7206	N00-4067	N00-7426A	5-11/16" (14.45mm)	4-13/16" (12.22mm)	2-23/32" (6.91mm)
N00-0614A	N-CA100-46	N00-0805A	N1-7214	N00-4070	N00-7426A	5-15/16" (15.08mm)	6-3/16" (15.72mm)	3-31/32" (10.08mm)
N00-0614A-R	N-CA100M-3-R	N00-0805A-R	N1-7214	N00-4070	N00-7426A-R	5-15/16" (15.08mm)	6-3/16" (15.72mm)	3-31/32" (10.08mm)



Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

# **MODEL N-CA125 SERIES** For LP and Natural Gas

### N-CA125 Series

Carburetors consist of a mixer, throttle body assembly, and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA125 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required)

Letters in ( ) refer to the dimension diagrams on facing page. Numbers in ( ) indicate metric dimensions.

#### AIR VALVE ASSEMBLY (Item No. 10 on Parts List)

Part No.	Model No.	Description
N00-7426A	N-AV1-14-4	Standard, silicone diaphragm
N00-7426A-L	N-AV1-14-3	Lean flow, silicone diaghragm
N00-7426A-R	N-AV1-14-4R	Rich flow, silicone diaphragm
N00-7433A	N-AV1-1447-2	Feedback, silicone diaphragm

#### **AIR HORN** (Not shown on Parts List)

			Diameter
Part No.	Model No.	Description	Diameter
N00-4047	N-A2-7	Aluminum	2-5/8" (66.66mm)
N00-4048	N-A2-8	Aluminum	2-5/16" (58.74mm)
N00-4049	N-A2-9	Aluminum, Ford (6)	2-7/32" (56.36mm)
N1-4061	N-A2-33	Aluminum	3.15" (80mm)
N1-4062	N-A2-34	Aluminum	2.17" (54mm)
N1-4076	N-A2-48	Aluminum, TCM	2-3/4"(69.85mm)







N-CA125 Air Horns

**MIXERS** (Item No. 17 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements.

		AIR VALVE OPTIONS						
Fuel	Standard Air Valve		Feedback Air Valve		Rich Ai	NPT		
Application	Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	(D)	
LP Gas	N00-1601A	N-CA125M-2	N00-1602A	N-FB125M-2			1/2" (12.7mm)	
Natural Gas					N00-1603A	N-CA125M-2R	1/2" (12.7mm)	
Dual Fuel	N00-1609A	N-CA125M-10-2	N00-1611A	N-FB125M-10-2			1/2" (12.7mm)	

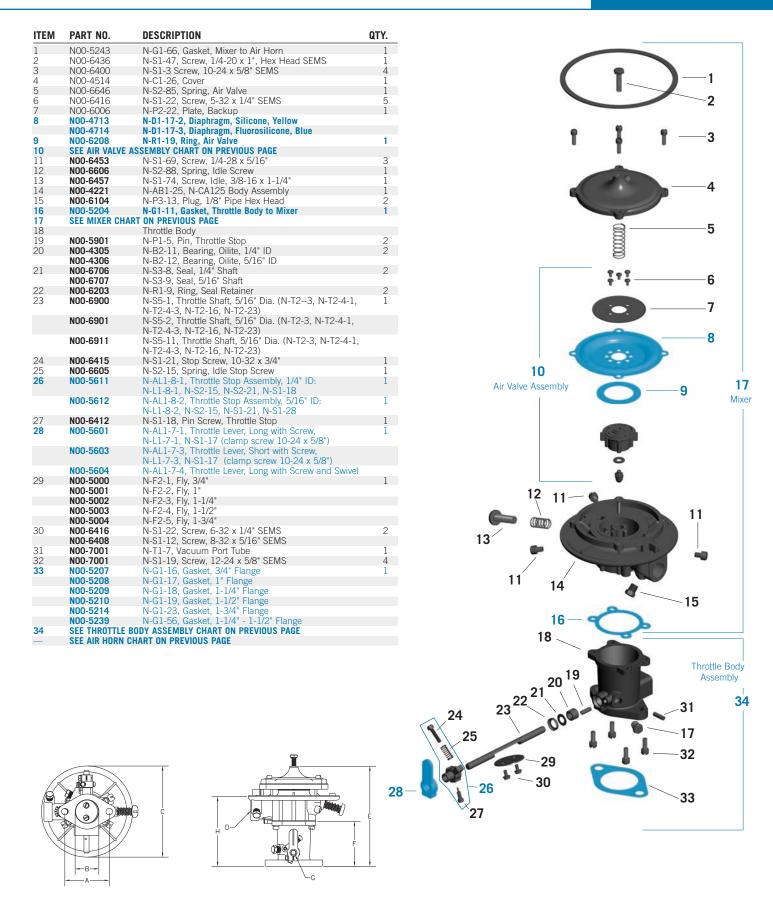
#### THROTTLE BODY ASSEMBLIES (Item No. 34 on Parts List)

Davi Na	Madal Na	Fl	Center to Center Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(F)	(G)
N1-7201	N-AT2-1	3/4" SAE (19.05mm)	2-1/4" (57.15mm)	1-1/6" (26.92mm)	1-3/8" (35.05mm)	1/4" (6.35mm)
N00-7206	N-AT2-2-5	1" SAE (25.4mm)	2-3/8" (60.45mm)	1-3/16" (31.24mm)	1-3/8" (35.05mm)	1/4" (6.35mm)
N00-7208	N-AT2-3	1-1/4" SAE (31.75mm)	2-11/16" (68.33mm)	1-7/16" (36.58mm)	2-23/32" (69.09mm)	5/16" (8.13mm)
N00-7239	N-AT2-16-1	1-1/4" and 1-1/2", short (31.75mm and 38.1mm)	2-13/16" (71.37mm)	1-11/16" (42.93mm)	1-5/8" (41.40mm)	5/16" (8.13mm)
N1-7210	N-AT2-4-1	1-1/2" (38.1mm)	2-15/16" (74.68mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)
N1-7214	N-AT2-4-3	1-3/4" (44.45mm)	3-5/16" 84.07mm)	1-11/16" (42.93mm)	2-13/16" (71.37mm)	5/16" (8.13mm)

#### **CA125 CARBURETOR ASSEMBLIES**

			CARBURETORS COMPRISED OF:			CARBURE	TOR ASSEMBLY DIMEN	ISIONS
			Throttle					Flange to
Carburetor			Body	Air	Air			Base of
Assembly		Mixer	Assembly	Horn	Valve	Height	Width	Air Horn
Part No	Model No.	Part No.	Part No.	Part No.	Part No.	(E)	(C)	(H)
N00-1402A	N-CA125-6	N00-1601A	N00-7239	N00-4048	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1409A	N-CA125-18	N00-1601A	N00-7239	N00-4049	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1412A	N-CA125-20	N00-1601A	N00-7239	_	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1420A	N-CA125-52	N00-1601A	N00-7239	_	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1442A	N-CA125-4	N00-1601A	N1-7206	N00-4048	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1443A	N-CA125-76-2	N00-1601A	N00-7239	N1-4061	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
N00-1444A	N-CA125-12	N00-1601A	N00-7239	N00-4047	N00-7426A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)
NOO-1444AFB	N-FB125-12	N00-1602A	N00-7239	N00-4047	N00-7433A	5-9/16" (141.27mm)	5-1/2" (139.7mm)	3-1/8" (76.2mm)

NOTE: All above carburetor assemblies are available in feedback models. Please contact factory if you have that requirement.



Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

# MODEL N-CA200 SERIES For LP and Natural Gas

#### N-CA200 Series

Carburetors consist of a mixer and throttle body assembly, and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA200 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required.)

Letters in ( ) refer to the dimension diagrams on this page. Numbers in ( ) indicate metric dimensions.

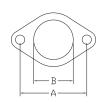


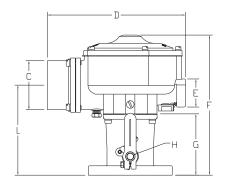
#### AIR VALVE ASSEMBLY (Item No. 8 on Parts List)

Part No. Model No.		Description		
N00-7407A	N-AV1-12-2	Standard, silicone diaphragm		
N00-7415A	N-AV1-1245-2	Feedback, silicone diaphragm		
N00-7418A	N-CV1-12-2	CNG, silicone diaphragm		



			Diameter
Part No.	Model No.	Description	(C)
N00-4095	N-A3-30	Aluminum	2-5/8" (66.55mm)
N00-4090	N-A3-28	Aluminum	3-1/16" (77.79mm)





MIXERS (Item No. 18 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements.

		AIR VALVE OPTIONS						
Air Horn	Standard	l Air Valve	Air Valve Feedback Air Valve		Rich Air Valve		NPT	
Diameter	Mixer Part No.	Mixer Model No.	Mixer Part No. Mixer Model No. N		Mixer Part No.	Mixer Model No.	(E)	
None	N00-4206A	N-CA200M	N00-4206-1A	N-FB200M	_	_	3/4" (19.05mm)	
2-5/8" (66.55mm)	N00-2001A	N-CA200M-1-2	N00-2005A	N-FB200M-1-2	N00-2008A	N-NG200M-1-2	3/4" (19.05mm)	
3-1/16" (77.79mm)	N00-2003A	N-CA200M-2-2	N00-2007A	N-FB200M-2-2	N00-2009A	N-NG200M-2-2	3/4" (19.05mm)	
3-1/16" (77.79mm)	N00-2003A.D.F. *	N-CA200M-10-2	_	_	_	_	3/4" (19.05mm)	

<sup>(\*)</sup> For dual fuel applications.

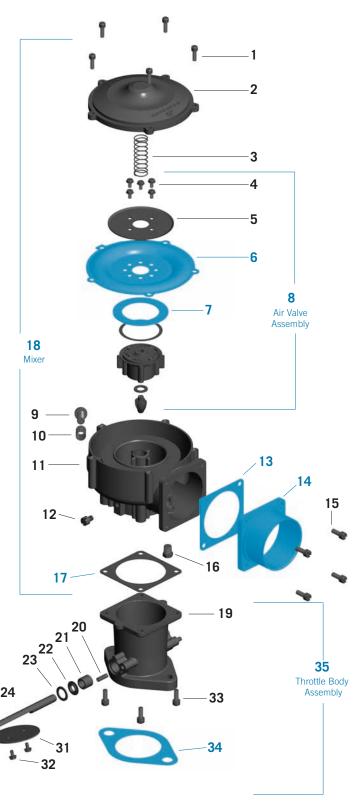
#### THROTTLE BODY ASSEMBLIES (Item No. 35 on Parts List)

	DOD! MODELING	(Item No. 00 on land List)				
			Center to Center Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(G)	(H)
N00-7212	N-AT2-4-2	1-1/2" SAE (38.1mm)	2-15/16" (74.61mm)	1-11/16" (42.86mm)	2-3/4" (69.85mm)	5/16" (7.9mm)
N00-7216	N-AT2-5	1-3/4" SAE (44.45mm)	3-5/16" (84.14mm)	1-15/16" (49.21mm)	3-1/4" (82.55mm)	3/8" (9.5mm)
N1-7220	N-AT2-6	2" SAE (50.8mm)	3-9/16" (90.49mm)	2-3/16" (55.56mm)	3-1/4" (82.55mm)	3/8" (9.5mm)

### **CA200 CARBURETOR ASSEMBLIES**

			CARBURETORS		CARBURET	OR ASSEMBLY DIM	ENSIONS	
Carburetor Assembly Part No	Model No.	Mixer Part No.	Throttle Body Assembly Part No.	Air Horn Part No.	Air Valve Part No.	Depth D	Height F	Flange to Center of Air Horn L
N00-1800A	N-CA200-2-2	N00-2001A	N00-7212	N00-4095	N00-7407A	6-1/2"	6-7/8"	4-11/32"
NOO-1800ANG	N-200-2-2	N00-2008A	N00-7212	N00-4095	N00-7418A	6-1/2"	6-7/8"	4-11/32"
N00-1802A	N-200-4-2	N00-2008A	N1-7216	N00-4095	N00-7418A	6-1/2"	7-3/8"	4-27/32"
N00-1805A	N-CA200-6	N00-2003A	N1-7220	N00-4090	N00-7407A	6-1/2"	7-3/8"	4-27/32"
N00-1806A	N-200-8-2	N00-2009A	N1-7216	N00-4090	N00-7418A	6-1/2"	7-3/8"	4-27/32"
NOO-1815A	N-CA200-10	N00-2001A	N1-7220	N00-4095	N00-7407A	6-1/2"	7-3/8"	4-27/32"

PART NO.	DESCRIPTION	QTY.
N00-6400	N-S1-3, Screw, 10-24 x 5/8"SEMS	5
N00-4505	N-C1-18, Cover, Air Valve	1
N00-6607	N-S2-17, Spring, Air Valve	1
N00-6408	N-S1-12, Screw, 8-32 x 5/16" SEMS	5
N00-6005	N-P2-21, Plate, Backup	1
N00-4711	N-D1-16-2, Diaphragm, Silicone, Yellow	
N00-6206		1
	SEE AIR VALVE ASSEMBLY CHART ON PREVIOUS PAGE	1
N00-6421	N-S1-28, Screw, Idle, 3/8-16 x 1-1/4" Fillister Head	1
N00-6606	N-S2-16, Spring, Idle Screw	1
N00-4205	N-AB1-11, Body Assembly	1
N00-6453	N-S1-69, Screw, 1/4-28 x 5/16"	2
N00-5212	N-G1-21, Gasket, Air Horn	1
	SEE AIR HORN CHART ON PREVIOUS PAGE	1
N00-6413	N-S1-19, Screw, 12-24 x 5/8" SEMS	4
N00-6104	N-P3-13, Plug, 1/8" NPT, Hex Head	1
N00-5212	N-G1-21, Gasket, Throttle Body to Mixer	1
	SEE MIXER CHART ON PREVIOUS PAGE	1
	Throttle Body	1
N00-5901	N-P1-5, Pin, Throttle Stop	2
N00-4306	N-B2-12, Bearing, 5/16" ID (7.87mm)	2
N00-4307		
		2
		2
		_
		1
		=
N00-6902		
N00-6907		
1100 0007		
N00-6911		
1100 0011		
N00-6415		1
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NUU-3213		4
	SEE THRUTTLE DUDT ASSEMBLT CHART ON PREVIOUS PAGE	1
	N00-6400 N00-4505 N00-6607 N00-6408 N00-6005 N00-4711 N00-6206 N00-6421 N00-6606 N00-4205 N00-6453 N00-5212 N00-6413 N00-6104 N00-5212	NO0-6400   N-S1-3, Screw, 10-24 x 5/8*SEMS     NO0-4505   N-C1-18, Cover, Air Valve     NO0-6607   N-S2-17, Spring, Air Valve     NO0-6408   N-S1-12, Screw, 8-32 x 5/16* SEMS     NO0-6005   N-P2-21, Plate, Backup     NO0-4711   N-D1-16-2, Diaphragm, Siticone, Yellow     NO0-6206   N-R1-17, Ring, Air Valve     SEE AIR VALVE ASSEMBLY CHART ON PREVIOUS PAGE     NO0-6206   N-S2-16, Spring, Idle Screw     NO0-6421   N-S1-28, Screw, Idle, 3/8-16 x 1-1/4* Fillister Head     NO0-6606   N-S2-16, Spring, Idle Screw     NO0-6407   N-S1-19, Screw, 1/4-28 x 5/16*     NO0-6430   N-S1-69, Screw, 1/4-28 x 5/16*     NO0-6431   N-S1-69, Screw, 1/4-28 x 5/16*     NO0-6312   N-G1-21, Gasket, Air Horn     SEE AIR HORN CHART ON PREVIOUS PAGE     NO0-6104   N-P3-13, Plug, 1/8* NPT, Hex Head     NO0-5212   N-G1-21, Gasket, Throttle Body to Mixer     SEE MIXER CHART ON PREVIOUS PAGE     Throttle Body   N-P1-5, Pin, Throttle Stop     NO0-5901   N-P1-5, Pin, Throttle Stop     NO0-4306   N-B2-13, Bearing, 3/8* ID (9.5mm)     NO0-6707   N-S3-9, Seal, 5/16* Shaft (7.87mm)     NO0-6003   N-R1-9, Ring, Seal Retainer, 5/16* Shaft (9.5mm)     NO0-6001   N-S5-2, Throttle Shaft, 5/16* Dia. (7.87mm)     NO0-6901   N-S5-3, Throttle Shaft, 5/16* Dia. (7.87mm)     NO0-6902   N-R1-8, Ring, Seal Retainer, 5/16* Dia. (7.87mm)     NO0-6901   N-S5-3, Throttle Shaft, 5/16* Dia. (7.87mm)     S-7/16* Long (133.35mm)     NO0-6901   N-S5-7, Throttle Shaft, 5/16* Dia. (7.87mm)     NO0-6901   N-S5-1, Throttle Shaft, 5/16* Dia. (7.87mm)     NO0-6901   N-S5-1, Throttle Shaft, 5/16* Dia. (7.87mm)     NO0-6901   N-S1-12, Screw, Throttle Stop Jof* (9.5mm)     NO0-6901   N-S1-18, Pin Screw, Throttle Stop Jof* (9.5mm)     NO0-6901   N-S1-19, Screw, Throttle Stop Jof* (9.5mm)     NO0-6014   N-S1-19, Screw, Throttle Stop Jof* (9.5mm)     NO0-6018   N-11-9-1, Throttle Lever Ass'y., Long 2-5/16* (58.74MM)     NO0-6000   N-F2-6, Fly, 2" (50.8mm)     NO0-



Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

28 30

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#### N-CA225 Series

Carburetors consist of a mixer and throttle body assembly, and an optional air horn. The mixer has a replaceable air valve assembly. The charts below describe these components and the most common combinations available as CA225 Series carburetors. Other combinations of air valve assemblies and air horns can be built for your specific requirements. (Minimum quantities may be required.)

Letters in ( ) refer to the dimension diagrams on this page. Numbers in ( ) indicate metric dimensions.



#### AIR VALVE ASSEMBLY (Item No. 10 on Parts List)

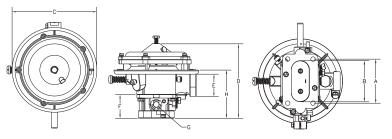
Part No.	Model No.	Description
N00-7407A	N-AV1-12-2	Standard, silicone diaphragm
N00-7415A	N-AV1-1245-2	Feedback, silicone diaphragm
N00-7418A	N-CV1-12-2	CNG, silicone diaphragm



N-CA225 Air Horn

#### AIR HORN ASSEMBLY (Not shown on Parts List)

Part No.	Model No.	Description	Diameter
N00-4043	A2-2	Aluminum	5-1/8" (130.18mm)
N00-4044	N-A2-3	Aluminum	2-5/8" (66.55mm)
N00-4046	N-A2-6	Aluminum	3-1/16" (77.79mm)



#### 2-BARREL FLANGE ADAPTERS (Item No. 37 on Parts List)

Part No.	Model No.	Description
N1-7231	BT2-11	1-1/4" SAE (31.75mm)
N1-7233	BT2-12	1-1/2" SAE (38.1mm)
N00-7237	N-BT2-13	2" SAE (50.8mm) Holley
N00-7236A	N-AT2-13-1	*

(\*) Adapter assembly for Holley 2-barrel mounting flange

MIXERS (Item No. 17 on Parts List) The chart below lists the most common mixer assemblies. Please contact factory for other assemblies that can be built to your specific requirements.

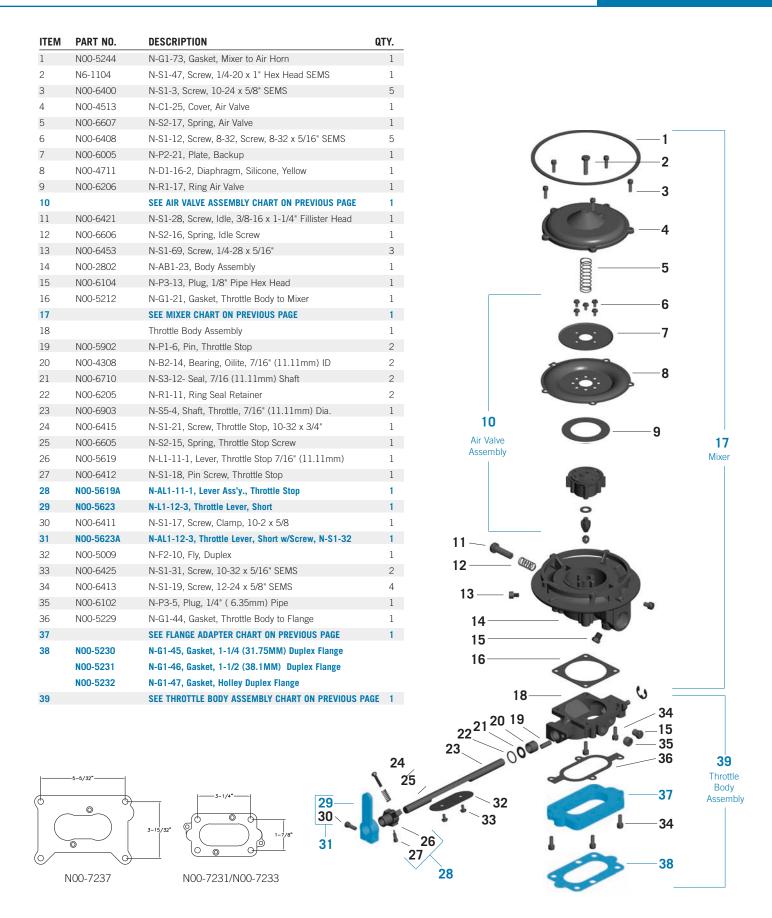
AIR VALVE OPTIONS						
Standard Air Valve Feedback Air Valve		CNG A	NPT			
Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	Mixer Part No.	Mixer Model No.	(E)
N00-2803A	N-CA225M-2	N00-2807A	N-FB225M-2	N00-2801A	N-225M-2R	3/4" (19.05mm)

## THROTTLE BODY ASSEMBLIES (Item No. 39 on Parts List)

			Center to Center			
			Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(F)	(G)
N00-7212	N-AT2-4-2	1-1/2" SAE (38.1mm)	2-15/16" (74.61mm)	1-11/16" (42.86mm)	2-3/4" (69.85mm)	5/16" (7.9mm)
N00-7216	N-AT2-5	1-3/4" SAE (44.45mm)	3-5/16" (84.14mm)	1-15/16" (49.21mm)	3-1/4" (82.55mm)	3/8" (9.5mm)
N1-7220	N-AT2-6	2" SAE (50.8mm)	3-9/16" (90.49mm)	2-3/16" (55.56mm)	3-1/4" (82.55mm)	3/8" (9.5mm)
N00-4220A	N-AB1-24-1	Duplex		1-3/8" x 3"	1-1/5" (30.48mm)	7/16" (11.09mm)
				(34.93 x 76.2mm)		

# **CA225 CARBURETOR ASSEMBLIES**

			CARBURET	ORS COMPRISI	D OF:		CARBUR	ETOR ASSEMBLY DIME	NSIONS
Carburetor			Throttle Body	2-Barrel Flange	Air	Air			Flange to Base of
Assembly		Mixer	Assembly	Adapter	Horn	Valve	Width	Height	Air Horn
Part No	Model No.	Part No.	Part No.	Part No.	Part No.	Part No.	(C)	(D)	(H)
N00-2609A	N-CA225-11	N00-2803A	N00-4220A	N1-7231	_	N00-7407A	6-1/4" (158.75mm)	5-3/4" (146.05mm)	3-1/2" (88.9mm)
N00-2610A	N-CA225-12	N00-2803A	N00-4220A	N1-7233	_	N00-7407A	6-1/4" (158.75mm)	5-3/4" (146.05mm)	3-1/2" (88.9mm)
N00-2611A	N-CA225-13-1	N00-2803A	N00-7236	_	_	N00-7407A	6-1/4" (158.75mm)	4-3/4" (120.65mm)	3-1/2" (88.9mm)
N00-2612A	N-225-13-1	N00-2801A	N00-7236	_	_	N00-7418A	6-1/4" (158.75mm)	5-3/4" (146.05mm)	3-1/2" (88.9mm)
N00-2617A	N-CA225-30	N00-2803A	N00-4220A	N00-7237	N00-4043	N00-7407A	6-1/4" (158.75mm)	5-3/4" (146.05mm)	3-1/2" (88.9mm)
N00-2621A	N-CA225-52-2	N00-2803A	N00-7212	_	_	N00-7407A	6-1/4" (158.75mm)	6-3/4" (171.45mm)	4-3/4" (120.65mm)
N00-2623A	N-CA225-62	N00-2803A	N00-7212	_	N00-4044	N00-7407A	6-1/4" (158.75mm)	6-3/4" (171.45mm)	4-3/4" (120.65mm)
N00-2625A	N-CA225-94	N00-2803A	N1-7220	_	_	N00-7407A	6-1/4" (158.75mm)	7-1/4" (184.15mm)	5-1/4" (133.35mm)



Note: Part numbers shown in **BOLDFACE BLUE** are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.



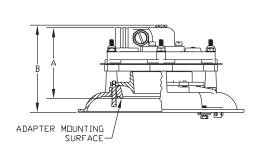
#### **MIXERS**

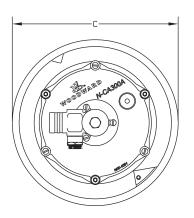
### N-CA300 Series

The CA300 Series are mixers only, not assembled carburetors. Mixer specifications are shown in the chart below.

Letters in ( ) refer to the dimension diagrams on this page. Numbers in ( ) indicate metric dimensions.







#### AIR VALVE ASSEMBLY (Item No. 30 on Parts List)

Part No.	Model No.	Description
N00-7404A	N-AV1-10-1	Standard, hydrin diaphragm
NO0-7405A	N-AV1-10-2	Standard, silicone diaphragm

#### CA300 MIXERS (Item No. 42 on Parts List)

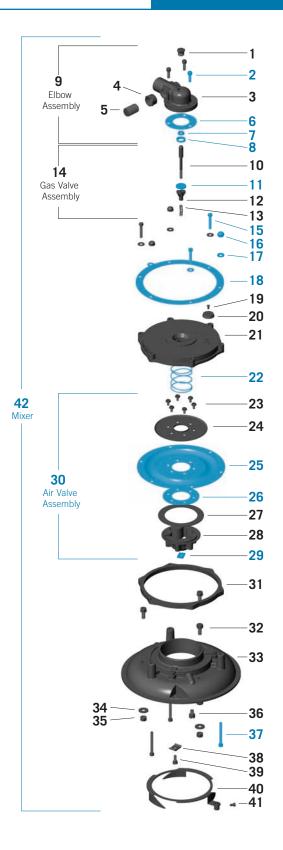
		MOUNTING SURFACE			
Gas			to Top of Inlet	Height	Width
Valve	Mixer Part No.	Mixer Model No.	(A)	(B)	(C)
	N00-3002A	N-CA300A-M-3	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
	N00-3002VLA	N-VL300A-M-3	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
STANDARD	N00-3007A	N-CA300A-M-3-2	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
	N00-3010A	N-CA300AM-50	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
	N00-3014VLA	N-VL300AM-50-2	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
	N00-3008A	N-FB300A-M-4	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
FEEDDAGN	N00-3009A	N-FB300A-M-4-2	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)
	N00-3015A	N-FB300AM-50-2	3-1/2" (88.9mm)	4-1/8" (104.78mm)	8-1/8" (206.38mm)

#### **MODEL N-CA300 SERIES CARBURETORS**

ITEM	PART NO.	DESCRIPTION	
1	N00-6103	N-P3-2, Plug, Idle Adjustment	1
2†	N00-6400	N-S1-3, SCREW, 10-24 X 5/8" SEMS	3 (RK 3)
3	N00-4801	N-AE1-4, Elbow	1
4	N00-5710	N-N1-20, Nut, 5/8-16, Hex Head	1
5	N00-6500	N-S1-500, Screw, 5/8-16 x 1", Slotted	1
6†*	N00-5203	N-G1-2, GASKET, GAS ELBOW	1
7†*	N00-6705	N-S3-3, SEAL, IDLE SCREW	1
8†*	N00-6203	N-R1-9, RING, SEAL RETAINER	1
9	N00-4802	N-BE1-4, Elbow Ass'y., Complete	1
10	N00-6409	N-S1-15, Screw, Idle Adjustment	1
11*	N00-6800	N-S4-2, SEAT, GAS VALVE (N-CA300A)	1
12	N00-7468	N-V2-11, Valve, Gas Metering (N-CA300A)	1
13	N00-6602	N-S2-3, Spring, Gas Valve	1
14†	N00-7501A	N-AV2-11, Gas Valve Ass'y.,	
		Complete N-S1-15, N-S4-2, N-V2-11, N-S2-3	1
<b>15</b> †	N00-6403	N-S1-6, SCREW, 10-24 X1	3 (RK 3)
16†	N00-5700	N-N1-3, NUT, DOME, 10-24	3 (RK 3)
<b>17</b> †	N00-7500	N-W1-2, WASHER, NO. 10 LIGHT FLAT	6 (RK 6)
18†	N00-5202	GASKET, FILTER COVER	1
19	N00-6300	N-R2-2, Rivet, Vent Valve	1
20	N00-7422	N-V1-13, Valve, Cover Vent	1
21	6070-1003	N-AC1-2, Cover Ass'y.,	
		Diaphragm w/Vent Valve N-R2-2, N-V1-13, N-C1-2	1
22†	N00-6601	N-S2-2, SPRING, AIR VALVE, ORANGE	1
23	N00-6408	N-S1-12, Screw, 8-32 x 5/16" SEMS	6
24	N00-6000	N-P2-1, Plate, Diaphragm Backup	1
25*	N00-4700	N-D1-1-1, DIAPHRAGM, AIR VALVE, HYDRIN	1
	N00-4701	N-D1-1-2, DIAPHRAGM, AIR VALVE, SILICONE	
26*	N00-5206	N-G1-15, GASKET, AIR VALVE	1
27	N00-6200	N-R1-2, RING, AIR VALVE	1
28	N00-7403	Valve, Air Metering	1
29*	N00-5600	N-L1-3, LOCK, NYLON, IDLE ADJUSTMENT	1
<b>30</b> †		ASSEMBLY CHART ON PREVIOUS PAGE	1
31	N00-6201	N-R1-3, Ring Diaphragm Support (N-CA300A)	1
32	N00-6402	N-S1-5, Screw, 1/4-20 x 5/8" Hex SEMS	3
33	N00-4204	N-AB1-2, Base Ass'y., Complete N-L1-2,	
		N-B1-2, N-S2-1 (3), N-P1-1 (3), (N-CA300A)	1
34	N6-1102	1/4" (6.35mm) SAE Flatwasher	3
35	N6-1100	1/4-20 Hex Finish Nut	3
36	N00-6453	N-S1-69, Screw, 1/4-20 x 5/16" (Plug)	1
<b>37</b> †*	N00-6401	N-S1-4, SCREW, 10-24 X 1-1/2" SEMS	3 (RK 3)
38	N00-4608	N-C2-1, Clamp, Boden Wire	1
39	N00-6405	N-S1-8, Screw, 10-32 x 5/8" Hex Head	1
40	N00-4609A	N-AC2-2, Cam Ass'y. N-C2-2, N-W1-2, N-S1-7	1
41 <b>42</b>	NOO-6404	N-S1-7, Screw, 8-32 x 1/4"	1
42	SEE WILKER CHAI	RT ON PREVIOUS PAGE	1

#### **REPAIR KITS**

N00-6350A\* N-RK-CA300MI, Repair Kit, Minor, Hydrin N00-6352A N-RK-CA300MI-2, Repair Kit, Minor, Silicone N-RK-CA300MA, Repair Kit, Major, Hydrin N00-6351A† N00-6353A† N-RK-CA300MA-2, Repair Kit, Major, Silicone



Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

<sup>\*</sup> Indicates Components of Major Repair Kit

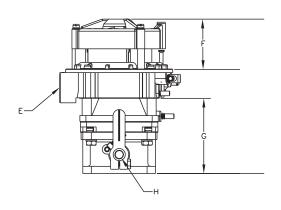
<sup>†</sup> Indicates Components of Minor Repair Kit

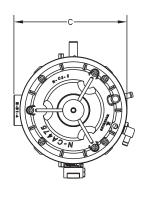


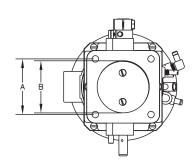
The CA475 Series are mixers only, not assembled carburetors. Throttle body assembly N1-7222 can be used with the CA475 series, as shown in the photo at right and on the exploded view diagram. Specifications for mixers and the throttle body assembly are shown in the charts below.

Letters in ( ) refer to the dimension diagrams on this page. Numbers in ( ) indicate metric dimensions.









GAS VALVES (Item No. 9 on Parts List)

Part No.	Model No.	Description
N-V2-475		Standard
N-V2-475-2		CNG & Natural Gas

#### THROTTLE BODY ASSEMBLY SPECIFICATIONS (Item No. 43 on Parts List)

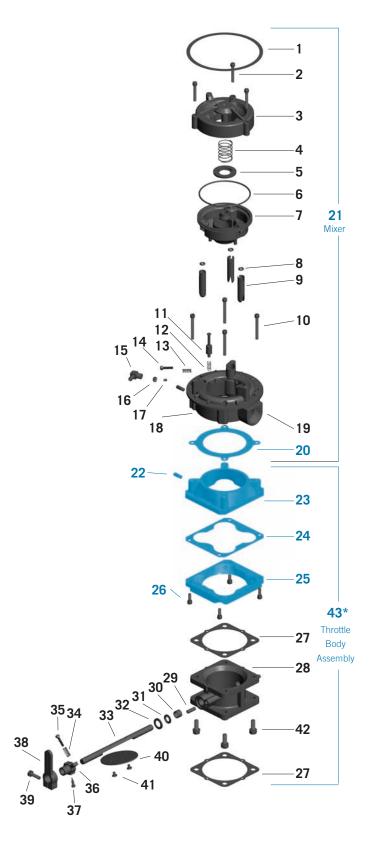
NOTE: This throttle body assembly is available for the CA475 mixer, it must be purchased separately.

			Bolt Spacing	Bore	Height	Shaft Dia.
Part No.	Model No.	Flange	(A)	(B)	(G)	(H)
N1-7222	AT2-2-7	2-1/2" SAE (63.5mm)	2-7/8" (73.03mm)	2-11/16" (68.26mm)	3-7/8" (98.43mm)	7/16" (11.11mm)

#### CA475 MIXERS (Item No. 21 on Parts List)

			Air Valve Spring	Gas Valve	Width	Height	Fuel Inlet
Engine Type	Mixer Part No.	Mixer Model No.	Part No.	Part No.	(C)	(F)	(E)
Natural Aspirated	N16-475-8A	N-CA475M	N-S3-17-1 (Light)	N-V2-475-2	5-27/32" (148.43mm)	4-1/8" (104.78mm)	1" (25.4mm)
	N16-475-9A	N-CA475M	N-S3-17-1 (Light)	N-V2-475	5-27/32" (148.43mm)	4-1/8" (104.78mm)	1" (25.4mm)
Turbo	N16-475-4A	N-CA475M	N-S3-17 (Strong)	N-V2-475	5-27/32" (148.43mm)	4-1/8" (104.78mm)	1" (25.4mm)
	N16-475-5A	N-CA475M	N-S3-17 (Strong)	N-V2-475-2	5-27/32" (148.43mm)	4-1/8" (104.78mm)	1" (25.4mm)

ITEM	PART NO.	DESCRIPTION	QTY.
1	N00-5243	N-G1-66, GASKET, AIR CLEANER	1
2	N-S2-15	Screw, 12-24 x 1-3/8" SEMS	3
3	N-C3-2	Cylinder, Air Valve	1
4	N-S3-17	Spring, Air Valve, Strong	1
	N-S3-17-1	Spring, Air Valve, Light	
5	N-W1-7-2	Washer, Air Valve, Standard	1
6	N-01-5	O-RING, AIR VALVE	1
7	N-V1-475A	AIR VALVE ASSEMBLY, W/N-P1-11 PINS	1
8	N-01-4	O-RING, GAS VALVE	3
9	N-V2-475	GAS VALVE, STANDARD	3
•	N-V2-475-2	GAS VALVE, CNG & NATURAL GAS	
10	N-S2-16	Screw, 12-24 x 1-7/8"	3
11	N-V1-5	Valve, Vacuum Sensing	1
12	N-S3-17	Spring, Vacuum Sensing Valve	1
13	N-S3-17	Spring, Idle Screw, Standard	1
14	N-S10-14	Screw, Idle, 10-32 x 1" Int. Hex Head	1
15	N2-1020-1	Fitting, 1/8" (3.2mm) Pipe x 3/8" (9.5mm) Hose,	1
10	N2-1020-1	Nylon, 90° Elbow	1
16	N-C2-2	Cap, Idle Screw, Tamper Resistant (Optional)	1
17	N-S2-14	Screw, Idle, Tamper Resistant (Optional)	1
18	N00-6453	N-S1-69, Screw, 1/4-28 x 5/16"	1
19	N-B1-4A	Body, Mixer	1
20	N-G10-7	GASKET, ADAPTER	1
21	SEE MIXER CHA	ART ON PREVIOUS PAGE	1
22	N00-5101	N-F4-2, FITTING, 1/4-28 X 1/4" (6.35MM) HOSE	1
23	N3-0339	N-A9-1 ADAPTER, 475 TO 4-BARREL ADAPTER	1
24	N00-5245	N-G1-74 GASKET, THROTTLE BODY ADAPTER	1
25	N00-4099	N-AA3-35 ADAPTER, 2-1/2" (63.5MM) OR	
		3" (76.2MM) THROTTLE BODY	1
26	N00-6413	N-S1-19, Screw, 12-24 x 5/8" SEMS	4
27	N00-5216	N-G1-25 Gasket, Throttle Body	2
28	N00-7222	N-AT2-7, Throttle Body, 2-1/2" (63.5mm) Flange	1
29	N00-5902	N-P1-6, Pin, Throttle Stop	2
30	N00-3302 N00-4303	N-B2-9, Bearing, Needle, 7/16" (11.11mm) ID	2
31	N00-4303	N-S3-19, Seal, 7/16" (11.11mm) Shaft	2
32	N00-6712	N-R1-11, Retainer Ring Seal	2
33	N00-6203	N-S5-4, Shaft, 7/16" (11.11mm)	2
33	N00-0903	Dia. x 7-1/16" (179.39) Long	1
	N00-6908	N-S5-8, Shaft, 7/16" (11.11mm)	
		Dia. x 7-11/16" (177.8mm) Long	
34	N00-6605	N-S2-15, Spring, Throttle Stop Screw	1
35	N00-6415	N-S1-21, Screw, Throttle Stop, 10-32 x 3/4"	1
36	N00-5619	N-L1-11-1, Lever Ass'y., Throttle Stop	1
37	N00-6412	N-S1-18, Pin Screw, Throttle Stop	1
38	N00-5623	N-L1-12, Lever, Throttle	1
39	N00-6411	N-S1-17, Screw, Clamp, 10-24 x 5/8"	1
40	N00-5007	N-F2-7, Fly, 2-1/2" (63.5mm)	•
41	N00-6425	N-S1-31, Screw, 10-32 x 5/16" SEMS	2
42	N00-6424	N-S1-30, Screw, 5-16-18 x 7/8" Hex Head SEMS	4
43		BODY ASSEMBLY CHART ON PREVIOUS PAGE	1
70	SEE THROTTEE	DOD! AGGERBET GHART ON FREVIOUS FAGE	



Note: Part numbers shown in BOLDFACE BLUE are available for purchase. Minimum quantities may be required. All parts are listed for reference purposes. Specifications subject to change without notice.

Note: While only certain parts are available for individual purchase, all parts are listed for reference purposes.

<sup>\*</sup> Throttle Body Assembly shown for reference only. Must be purchased separately.

**CATERPILLAR/PEUGEOT** 



Part No.

**Description** 

For Caterpillar T40 V40D/150D Peugeot N1600-0402A



Part No.

**Description** 

N1600-0403A For Caterpillar T40 V40D/T50D Peugeot

**CLARK** 



Part No.

**Description** 

N1600-0107A N-CA100 for Clark D155/176 Waukesha



Part No.

**Description** 

N1670-0105A for Clark with Y112 Continental Engine

### **HYSTER**



Part No. N000-0239A **Description** 

N-CA55-576 for Hyster with VA Engine



Part No. **Description** 

N1600-0154A

For Hyster with 172/192 Ford Engine



Part No. N1600-0173A **Description** For Hyster with S30-60/XL with Mazda VA Engine

# **KOMATSU**



Part No.	Description
N1600-0675A	For Komatsu with Nissan H20 Engine, ZB Series, Blue and Gray



Part No.	Description
N1600-0746A	For Komatsu with Nissan H20-II Engine, BX Series, Turquoise and Blue

# **MITSUBISHI**



Part No.	Description	
N000-0268A	N-CA55-598. For Mitsubishi GCS017/030	
	and GPS020/030	



Part No.	Description
N000-0306A	N-CA55-596-2. For older Mitsubishi Import Models



Part No.	Description
N1600-0328-1A	For Mitsubishi with 4G32/33/52/54 Engines with N-CA100 Carb



Part No.	Description
N1600-0721-1A	N-CA100-64G. For Mitsubishi with
	4G63/64 Engine

### MITSUBISHI/CATERPILLAR



Description Part No. N1600-0721-2A For Mitsubishi/ Caterpillar with 4G64 Engine

# **NISSAN**



Part No.	Description
N000-0307A	N-CA55-577. For Nissan H20 Engine,
	New Style



Part No.	Description
N000-1443A	N-CA125-76-2. For
	Nissan H20 Engine,
	Old Style, Yellow Truck

# **NISSAN**



Paπ No.	Description	
N1600-0253A	For Nissan P40 and H30 6-Cylinder Engines	



Part No.	Description
N1600-0384A	N-CA55-577. For Nissan H20 53mm
	Engine

# **TCM**



Part No.	Description
N1600-0247A	N-CA125-138. For TCM with J15 Engine,
	4-Bolt



Part No.	Description
N1600-0249A	TCM FG20/25/N4/N5/N6 with
	Nissan H20 Engine

# **TOYOTA**



Part No.	Description
N000-0231A	N-CA55-542. For Toyota 4P and 5R
	Engines



Part No.	Description
N1-0269A	For Toyota 4Y Engine



Paπ No.	Description	
N1600-0329-2A	For Toyota 4P/5R Engine with N-CA100	
	Carb	



Description Part No. N1600-0400A For Toyota 4Y Engine with N-CA100 Carb

# **YALE**



Part No.	Description
N1600-0288A	For Yale GLC/CLP 020-050 with
	Mazda UA Engine



Part No.	Description
N1600-0408A	For Yale GLC/CLP 020-
	050 with
	Mazda VA Engine



Part No.	Description
N1600-0422A	For Yale GCS40 1060 RD with
	Mazda FE Engine



Part No.	Description
N00-5601	N-AL1-7-1, Lever Assembly, 2-5/16" (58.74 mm) (long) - 1/4" (6.4 mm)



Part No.	Description
N00-5603	N-AL1-7-3, Lever Assembly, 1-7/8" (47.63 mm) (short) - 1/4" (6.4 mm)



Part No.	Description
N00-5611	N-L1-8-1, Throttle Stop Assembly, - 1/4" (6.4 mm)
N00-5612	N-L1-8-2, Throttle Stop Assembly, - 5/16" (7.9 mm)



Part No.	Description
N00-5627	N-L1-25-1, Spring Loaded Lever Assembly, - 1/4" (6.4 mm)
N00-5628	N-L1-25-2, Spring Loaded Lever Assembly, - 5/16" (7.9 mm)



Part No.	Description
N00-5638	N-AL1-31, Lever Assembly, - 1/4" (6.4 mm) Shaft Clamp
N00-5646	N-AL1-33, Lever Assembly, - 5/16" (7.9 mm) Shaft Clamp



Part No.	Description
N00-5647A	N-AL1-33-76, Lever Assembly with Swivel, 5/16" (7.9 mm) Shaft, H20 Engine



Part No.	Description
NOO-5673A	N-AL1-31-124, Lever Assembly with Swivel, 1/4" (6.4 mm) Shaft Clamp, J15 Engine



Part No.	Description
N5-0382A	Lever Assembly, Short - 1/4" (6.4 mm), Nissan & Komatsu H20, ZA/ZB; H20 II/H25, BX



Part No.	Description
N5-0083A	Lever Assembly, 5/16" (7.9 mm) Shaft, Komatsu



# N-CA70/100/125 Throttle Bodies

Part No.	Description
N1-7251	AT2-24, 1/2" (12.7 mm) Flange, 1-13/16" (46.04 mm) C-C
N1-7253	AT2-25, 3/4" (19.1 mm) Flange, 2-1/4" (57.15 mm) C-C
N1-7255	AT2-26, 1" (25.4 mm) Flange, 2-3/8" (60.36 mm) C-C
N1-7259	AT2-27, 1-1/4" (31.76 mm) Flange, 2-11/16" (68.26 mm) C-C
N1-7268	AT2-44, 53mm Flange



# N-CA70/100/125 Throttle Bodies N-CA70/100/125 Throttle Bodies

Part No.	Description
N1-7201	AT2-1, 3/4" (19.1 mm) Flange, 2-1/4" (57.15 mm) C-C
N00-7206	N-AT2-2-5, 1" (25.4 mm) Flange, 2-3/8" (60.36 mm) C-C



Part No.	Description
N00-7208	N-T2-3, 1-1/4", (31.75 mm) 2-11/16" (68.26 mm) C-C
N1-7210	AT2-4-1, 1-1/2", (38.1 mm) 2-15/16" (74.61 mm) C-C
N1-7214	AT2-4-3, 1-3/4", (44.45 mm) 3-5/16" (84.14 mm) C-C



# N-CA70/100/125 Throttle Bodies

Part No.	Description
N00-7239	N-AT2-16-1, 1-1/4" (31.75 mm) and 1-1/2" (38.1 mm) Flange, 2-11/16" (68.26 mm) - 2-15/16" (74.61 mm) C-C



Part No.	Description
N00-7208A	Throttle Body for Komatsu 53mm C-C ZA/ZB, H20 Engine



Part No.	Description
N00-7271A	Throttle Body for Komatsu BX Lift Truck 3-1/8" (79.38 mm) Offset or 80mm C-C



Part No.	Description
N3-0177	Throttle Body for Clark, Mitsubishi 4G63/4G64, 1-3/4" (44.45 mm) x 1-3/8" (34.93 mm) OEM# CL2802637



# N-CA200/225 Throttle Body

Part No.	Description
N00-4220A	N-AT2-13-1, Throttle Body,
	2 Barrel, No Flange
	(Use N00-7231,
	N00-7233, N00-7237
	Flange Adapters)



# N-CA200/225 Throttle Bodies

Part No.	Description
N00-7212	N-AT2-4-2, 1-1/2" (38.1 mm), 2-15/16" 74.61 mm) C-C
N1-7216	AT2-5, 1-3/4" (44.45 mm), 3-5/16" (84.14 mm) C-C
N1-7220	AT2-6, 2" (50.8 mm), 3-9/16" (90.49 mm) C-C



Part No.	Description
N00-6634A	N-S2-50-1, Throttle Return Spring Kit - 1/4" (6.4 mm)
N00-6635A	N-AS2-50-2, Throttle Return Spring Kit - 5/16" (7.9 mm)



Part No.	Description
N00-6726	N-S3-31, Ball Stud, 1/4" (6.4 mm) Ball, 10-32 Thread



Part No.	Description
N00-6729	N-S3-34 Ball Stud, 5/16" (7.9 mm) Ball,
	10-32 Thread



Part No.	Description
N00-6900	N-S5-1, Throttle Shaft,
	1/4" (6.4 mm) Dia.,
	4-1/2" (114.3 mm) Long



Part No.	Description
N00-6905	N-S5-6, Throttle Shaft, 1/4" (6.4 mm) Dia., 4-3/4" (120.65 mm) Long



Part No.	Description
N00-6901	N-S5-2, Throttle Shaft, 5/16" (7.9 mm) Dia.,
	E" Long



Part No.	Description
N00-6907	N-S5-7, Throttle Shaft, 5/16" (7.9 mm) Dia., 5-1/4" (133.35 mm) Long



Part No.	Description
N00-6911	N-S5-11 Throttle Shaft, 5/16" (7.9 mm) Dia., 6-1/8" (155.58 mm) Long



# N-CA55 Adapter

Part No.	Description
N1-4063	A2-35 Adapter, Air Horn, 1974 Toyota Lift Truck N-CA55



# N-CA55/100 Air Horns

Part No.	Description
N1-4085	A2-61 Adapter, 1" (25.4 mm) x
	2-1/2" (63.5 mm) Air Horn, Mitsubishi N-CA55



# N-CA55/100 Air Horns

Part No.	Description
N00-4066	N-A2-38, 1-7/8" (47.63 mm)
N00-4067	N-A2-39, 2-1/16" (52.39 mm)
N00-4068	N-A2-39-1, 2-1/2" (63.5 mm)
N00-4070	N-A2-41, 2-5/16" (58.74 mm)
	Polycarbonate
N00-4070-1	N-A2-41, 2-5/16" (58.74 mm),
	Aluminum



# N-CA70/100/125 Adapters

Part No.	Description
N00-4096	N-A2-41 Adapter,
	2-5/16" (58.74mm) Hose
N-A10-1	Adapter, 2-5/8" (66.68 mm)
	Hose x 1" (25.4 mm) Long,
	N-CA70/100/125



# N-CA125 Air Horns

Part No.	Description
N00-4047	N-A2-7, 2-5/8" (66.68 mm)
N00-4048	N-A2-8, 2-5/16" (58.74 mm)
N00-4049	N-A2-9, 2-7/32" (56.36 mm)
N1-4061	A2-33, 80mm
N1-4062	A2-34, 54mm



# N-CA225 Air Horns

Part No.	Description
N00-4044	N-A2-3 Adapter, 2-5/8" (66.68 mm) Air Horn
N00-4046	N-A2-6 Adapter, 3-1/16" (77.78 mm) Air Horn



Part No.	Description
N1-4095	A3-30 Adapter, 2-5/8" (66.68 mm) Hose
N1-4090	N-A3-32-2 Adapter, 3-1/16" (77.78 mm) Hose



# **N-CA300A Adapters**

Part No.	Description
N00-4005	N-A1-4 Adapter,
	2-5/8" (66.68 mm)
	Center Stud, N-CA300A
N00-4007	N-A1-6 Adapter
	3-1/16" (77.78 mm)
	Center Stud



N-CA300 Adapters

Part No.	Description
N00-4015	N-A1-16-2 Adapter, 5-1/8"
	(130.18mm) Center Stud
	Low Bowl, Mounts
	N-CA300A to Existing
	Gasoline Carburetor with a
	5-1/8" (130.18mm) Air Horn



# N-CA55

Part No.	Description
N1-4086	A2-65 Adapter, Air Horn,
	Toyota 4Y Engine



Part No.	Description
N1-4124	AA3-67 Adapter Assembly, Mitsubishi or Clark Lift Truck TB, 1-3/4" (44.45 mm) x 1-3/8" (34.98 mm) C-C



# N-CA100/125

Part No.	Description
N00-4097A	N-3-32-1 Adapter Assembly,
	2-Barrel TB



# N-CA100/125

Part No.	Description
N00-6708A	N-S3-10 Adapter 90°, N-CA100/125



Part No.	Description
N1-7231	N-BT2-11 Adapter, 1-1/4" (31.75 mm) Duplex Flange 1-7/8" (47.63 mm) x 3-1/4" (82.55 mm) C-C
N1-7233	N-BT2-11 Adapter, 1-1/2" (38.1 mm) Duplex Flange 2" (50.8 mm) x 3-11/16" (93.66 mm) C-C (Use with N00-4220, N-AB1-24-1 Throttle Body)



# N-CA55/70/100/125/200/225 1/2" High Throttle Body Spacers

Part No.	Description
N3-0105	Spacer, 1/2" (12.7 mm), 1-13/16" (46.04 mm) C-C
N3-0107	Spacer, 3/4" (19.1 mm), 2-1/4" (57.15 mm) C-C
N3-0108	Spacer, 1" (25.4 mm), 2-3/8" (60.36 mm) C-C
N3-0347	Spacer, 53mm C-C
N3-0190	Spacer, 1-1/2" (38.1 mm), 2-15/16" (74.61 mm) C-C



# N-CA200/225

Part No.	Description
N00-7237	N-BT2-13 Adapter, Holley Duplex Flange 3-7/16" (87.31 mm) x 5-1/8" (130.18 mm) C-C (Use with N00-4220 N-AB1-24-1 Throttle Body)



# N-CA100/125/300A

Part No.	Description
N1-4401	AB4-1 Bracket Assembly, Boden Wire, N-CA300A
N1-440-3	AB4-2 Bracket Assembly,Boden Wire, N-CA100/125

Part No.	OEM Part No.	Description
N17-0000	AC7303070 WB20-3010397 CL2384173 CL4322550	Hoof S200 Velocity Governor Can also be used as a Universal Governor for 2-11/16" (68.26 mm) C-C C.I.D. 100-350 cu. in., RPM1000-3800



Part No.	OEM Part No.	Description
N17-0011	AC7305526 CHR4142140 CL3676066 HY199340 F5JL-12450-FA	Hoof S301 Velocity Governor with Spark Advance for Ford 172/192/300 Universal Governor 2-11/16" (68.26 mm)– 2-15/16" (74.61 mm) C-C C.I.D. 150-450 cu. in., 1200-3000 RPM



Part No.	OEM Part No.	Description
N17-0005		Hoof S126B Velocity Governor
		Replaces Peugeot Governors
		Complete kit available to replace
		Solex Carburetors
		2-3/8" C-C



Part No.	OEM Part No.	Description
N17-0016	T03675020 CL992006 YT5137093 AC7305526 CHR3675020 HY3004946	Hoof S351T Velocity Governor Designed for Chrysler H225 Slant 6, 2600 RPM NL 2-11/16" – 2-15/16" C-C



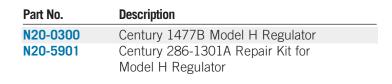
Part No.	OEM Part No.	Description
N17-0107	TCM-19100-K9000 NI19100-K900 NI19100-00H73 NI19100-00H01 KO19100-K9000	Velocity Governor Datsun/Nissan H20 Engine/53mm C-C



Part No.	OEM Part No.	Description
N17-0109	CT973993 TY26300-78052-71 TY26300-78051-71 TY26300-96051	Velocity Governor Toyota 4Y









Part No.	Description
N20-0303	Century Model 2335B/G85 Regulator Water Cooled – 4-Cylinder
N20-5904	Century 286-1554 Repair Kit for Model 2335B/2379/2380



Part No.	Description
N20-0304	Century Model 2335B/G85 Regulator
	Air Cooled Version – Manual Primer
N20-0305	Air Cooled Version – Electric Primer
N20-5904	Century 286-1554 Repair Kit
	for Model 2335B/2379/2380



Part No.	Description
N20-0403	Century Model 2341 12V Electric Lockoff



Part No.	Description			
N20-0406	Century Model 2385B 12V Electric Lockoff			
	with Filter and Magnet			
	Replaces Algas 1-1050			
N20-5920A	Century 286-1798 Repair Kit for Model 2385B			



MODEL A962A-1A VAPORIZER (NON-ADJUSTABLE) Part No. N4-0000 MODEL A962A-1A VAPORIZER (ADJUSTABLE) Part No. N4-0000-1

(shown)





Part No.	Description		
N1-0103	N-SV Start Valve, 12V, Electric Primer Solenoid		

Part No.	Description	
N1-0109	N-VCS Vacuum Control Solenoid	





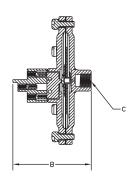


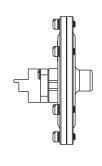
Part No.	Description
N3-0180A	Fast Idle Dashpot, Nissan

Part No.	Description
N3-0345	Inline Forklift Thermostat, 3/8" (9.5 mm) NPT Female Connections

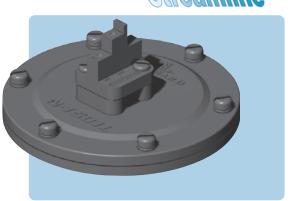
Part No.	Description
N3-0345-1	Inline Forklift Thermostat, 5/8" (15.9 mm) I.D. Hose Push-on Connections

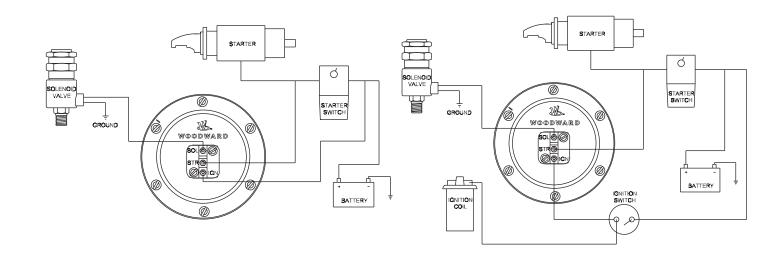












		DIMENSION A	DIMENSION B	DIMENSION C
PART NO.	DESCRIPTION	DIAMETER	OVERALL WIDTH	VACUUM PORT
N-1501L-A	Microvac Safety Switch	3-13/16" (96.84mm)	2-5/16" (58.74mm)	1/8" (3.2mm)

#### **GENERAL**

The Microvac switch provides immediate closing of points during starting. Maximum working pressure is about 30 inches of mercury vacuum. Maximum electrical rating is 12 Vdc @ 2A. Switch remains closed down to 1.5" of water column.

PART		DESCRIPTION	OTV
NO.	NO.	DESCRIPTION	QTY.
1	N-S10-8	Screw, 10-32 x 7/16" Slotted Fillister Head SEMS	6
2*	N-S10-9	SCREW, 8-32 X 7/16" SLOTTED FILLISTER HEAD	2
3	N-S10-11	Screw, #4-40 x 1/4" Slotted SEMS	3
4	N3-00076-1	Ring Terminal	3
5*	N-H10-1	SWITCH HOUSING	1
<b>6</b> *	N-S16-1	SWITCH, MICRO	1
7	N-G10-3	Gasket	1
8	N3-0012	Clamp	1
9	N-C10-5	Cover, Top	1
10*	N-S11-8	DIAPHRAGM ASSEMBLY	1
11*	N-S11-8	SPRING	1
12	N-C10-6	Cover, Bottom	1

#### REPAIR KIT N-RKN1501LA

WARNING: Never short the Microvac terminals to ground. Microvac is a precision unit and will not withstand heavy surges of current that bypass the solenoid valve circuit.

#### INSTALLATION

- 1. Install Microvac at any convenient source of manifold vacuum, away from the heat of the exhaust system.
- 2. Use 16-gauge primary automotive wire. Insulated terminals are provided. To avoid mistakes, connect one circuit at a time as follows:
- 3. Connect "SOL" (Solenoid) terminal of Microvac to electric solenoid valve or filter-lock.
- 4. Connect "IGN" (Ignition) terminal of Microvac to coil side terminal of ignition switch. If there is no bypass resistor in the ignition circuit, this wire may be connected to the battery terminal of the ignition coil.

For use as a 2-wire switch, simply do not connect the center terminal; use the two outside terminals only. Proceed to Step 6.

For use as a 3-wire switch, proceed with Steps 5 and 6.

- 5. Connect center "STR" (Starter) terminal of Microvac to terminal on starter switch which goes to starter. Engaging starter will complete circuit to solenoid valve only while the starter is energized.
- 6. Secure all the electrical wires to the Microvac. After installation, remove one screw at the most convenient location, replace it with the longer screw and clamp provided. Run all wires through the clamp and tighten. This will avoid vibration at the terminals and extend their life.

#### **OPERATION**

2-Wire Installation: Start engine on a closed throttle or use a pumping action to allow the throttle to close momentarily to build up manifold vacuum to close the normally open circuit ("IGN" to "SOL"). Solenoid valve will remain open as long as the manifold vacuum is present.

3-Wire Installation: Normally, the engine will start at any throttle position. The normally closed circuit (Step 5, "STR" to "SOL") will automatically open to avoid current feedback after the engine starts.

#### **SERVICE**

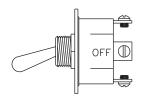
If the unit requires service, we suggest you take it to a qualified service technician. If not available, Woodward will furnish you a list of repair facilities or provide service information.

Note: While only certain parts are available for individual purchase, all parts are listed for reference purposes.

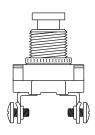
<sup>3</sup> 5 6

<sup>\*</sup> Indicates Repair Kit Components

# **CONTROL COMPONENTS SWITCHES & GAUGES**



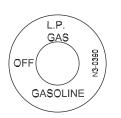
Part No.	Description
N3-0094	3-Way Toggle Switch, Heavy Duty 3 Screw Terminals 7/16-28 x 3/8 Threaded Mounting Stem

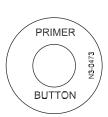


Part No.	Description
N3-0096	Push Button Primer Switch, Heavy Duty 2 Screw Terminals 7/16-28 x 3/8 Threaded Mounting Stem



Part No.	Description
N3-0135	Toggle Switch, (N3-0094) Mounting Bracket

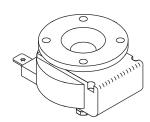




Part No.	Description
N3-0390	Switch Position Plate for Toggle Switch Mounting
N3-0473	Switch Position Plate for Primer Button



Part No.	Description
N3-0092	Pressure Gauge 0-30 PSI Brass 1/4 NPT Thread
N3-0092-1	Pressure Gauge 0-6 PSI Brass 1/4 NPT Thread



Part No.	Description
N3-2529	Electric Primer Solenoid for Remote Priming of Model N-J, N-H420, N-E, N-2000, and N-LPR Regulators

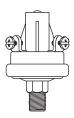
Part No.	Description
N-1501L-A	Vacuum Micro-Switch



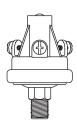
Part No.	Description
N3-0083	Vacuum Switch with 1/8" (3.2 mm) NPT Female Connection
N3-0083-1	Vacuum Switch with 7/32" (5.6 mm) Nipple and Mounting Bracket



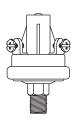
Part No.	Description
<b>N3-0079</b> Mfg. P/N 78303-40	Hobb's 2-Prong LP Pressure Switch, 40 lbs. Used in Low Fuel Light Kit – N15-0013A



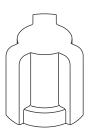
Part No.	Description
<b>N3-0080</b> Mfg. P/N 78310-05	Hobb's 3-Prong Oil Pressure Switch, 3-4 lbs.

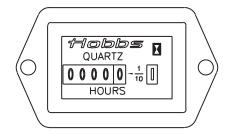


Part No.	Description
<b>N3-0081</b> Mfg. P/N 76576	Hobb's 2-Prong Oil Pressure Switch, 10 lbs.

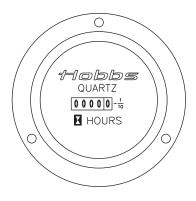


Part No.	Description
<b>N3-0110</b> Mfg. P/N 79380A	Neoprene Oil Pressure Switch Boot





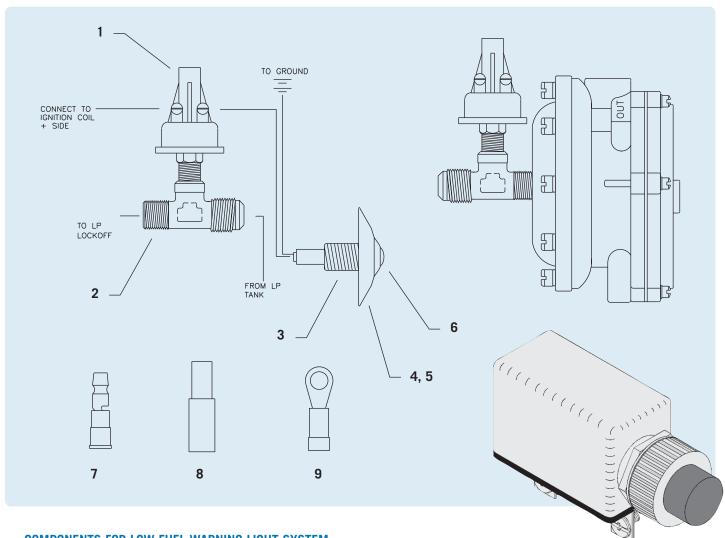
Part No.	Description
<b>N3-0158</b> Mfg. P/N 085094C-12	Hobb's Hour Meter 10-80 Volt, 2 Screws, Black



Part No.	Description	
<b>N3-0159</b> Mfg. P/N	Hobb's Hour Meter 10-80 Volt, Black	
085097C-02	,	



Part No.	Description	
N3-0160	Hobb's Hour Meter	
Mfg. P/N	10-80 Volt, Chrome	
085098C-03		



COMPONENTS FOR LOW FUEL WARNING LIGHT SYSTEM SYSTEM PART NUMBER - N15-0013-1A (LIGHT ONLY), N15-0012A-1A (LIGHT AND BUZZER)

Part	Part No.	Description	Qty.
1	N3-0079	LP Pressure Switch, 40 lb.	1
2	N2-1125	1/4" (6.4 mm) T x 3/4" (3.2 mm) NPT x 1/8" (3.2 mm) Fitting	1
3	N3-0101	Pilot Light Socket 12V	1
	N3-0186	Optional, Light/Buzzer 12V	1
4		Fuel Light Dash Panel	1
5	N3-0074	Decal, Refuel When Lit	1
6		Light Bulb for Pilot Light	1
7	N3-0047	Male Bullet Connector	2
8	N3-0045	Nylon Receptacle 16-14 ga.	2
9	N3-0049	Ring Tongue Terminal	3*
10	N3-0253	14 Ga. Wire, Yellow 12 ft. (365	.76 cm)

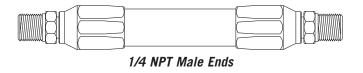
<sup>\*(5)</sup> Required when using N3-0186

### STAINLESS STEEL BRAIDED - NEOPRENE - UL LISTED

There are 3 fitting styles and 8 popular lengths to choose from. Hose is also available in 20 ft. lengths and 250 ft. rolls so that you can stock.



Part No.	End Fittings	Length
N35-3001-FF12A	3/8" (9.5 mm) Female Flare	12"
N35-3001-FF14A	3/8" (9.5 mm) Female Flare	14"
N35-3001-FF16A	3/8" (9.5 mm) Female Flare	16"
N35-3001-FF18A	3/8" (9.5 mm) Female Flare	18"
N35-3001-FF20A	3/8" (9.5 mm) Female Flare	20"
N35-3001-FF24A	3/8" (9.5 mm) Female Flare	24"
N35-3001-FF28A	3/8" (9.5 mm) Female Flare	28"
N35-3001-FF36A	3/8" (9.5 mm) Female Flare	36"
N35-3001-FF46A	3/8" (9.5 mm) Female Flare	46"



Part No.	End Fittings	Length
N35-3001-MM12A	1/4" (6.4 mm) NPT Male	12"
N35-3001-MM14A	1/4" (6.4 mm) NPT Male	14"
N35-3001-MM16A	1/4" (6.4 mm) NPT Male	16"
N35-3001-MM18A	1/4" (6.4 mm) NPT Male	18"
N35-3001-MM20A	1/4" (6.4 mm) NPT Male	20"
N35-3001-MM24A	1/4" (6.4 mm) NPT Male	24"
N35-3001-MM36A	1/4" (6.4 mm) NPT Male	36"
N35-3001-MM46A	1/4" (6.4 mm) NPT Male	46"



1/4 NPT Male and 3/8 Female Fla	1/4 NPT	Male a	nd 3/8	Female	Flare
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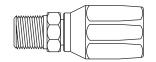
Dort No	End Fittings	l oneth
Part No.		Length
N35-3001-MF12A	1/4" (6.4 mm) NPT Male	12"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF14A	1/4" (6.4 mm) NPT Male	14"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF16A	1/4" (6.4 mm) NPT Male	16"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF18A	1/4" (6.4 mm) NPT Male	18"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF20A	1/4" (6.4 mm) NPT Male	20"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF24A	1/4" (6.4 mm) NPT Male	24"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF36A	1/4" (6.4 mm) NPT Male	36"
	3/8" (9.5 mm) Female Flare	
N35-3001-MF46A	1/4" (6.4 mm) NPT Male	46"
	3/8" (9.5 mm) Female Flare	

Part No.	Description
N8-3001	5/16" (7.9 mm) ID HP Hose #6

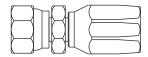
Available in 10, 20 and 50 ft. Lengths or 250 ft. Rolls



Part No.	Description
N2-0014	1/4" (6.4 m) NPT Male x
	3/8" (9.5 mm) Hose #6 HP



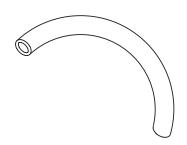
Part No.	Description
N2-0015	3/8" (9.5 mm) Tube x 3/8" (9.5 mm)
	Hose 45° Swivel #6 HP



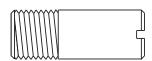
Part No.	Description
N3-0038-1	Hydrostatic Relief Valve



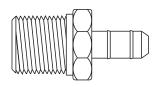
<sup>\*</sup> These fittings are commonly used with N8-0002 1/4" hose.



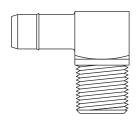
Part No.	Description
N8-1001	3/8" (9.5 mm) Hose ID Push-Lok Hose/Balance



Part No.	Description
N00-5101	N-F4-2, 1/4"-28 to 1/4" (6.4 mm) ID Hose, Brass Commonly used on Carburetor to hook up Vacuum Lock-off, N-VFF-30-2



Part No.	Description	
N2-1017	1/8" (3.2 mm) NPT x 3/8" (9.5 mm)	
	Tube, Male Connect	



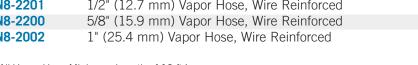
Part No.	Description
N2-1019	1/8" (3.2 mm) NPT x 3/8" (9.5 mm)
	Tube OD Male Elbow
N2-1019-1	1/8" (3.2 mm)NPT x 1/4" (6.4 mm)
	Hose Nylon 90° Elbow

# **COOLANT HOSES & FITTINGS HOSE COMPONENTS**

Part No.	Description
N8-1001	3/8" (9.5 mm) ID Push-Lok Hose. Water



Part No.	Description
N8-2000-1	5/8" (15.9 mm) Vapor Hose, Wire Reinforced
N8-2201	1/2" (12.7 mm) Vapor Hose, Wire Reinforced
N8-2200	5/8" (15.9 mm) Vapor Hose, Wire Reinforced
N8-2002	1" (25.4 mm) Vapor Hose, Wire Reinforced

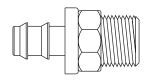




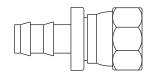
(All Vapor Hose Minimum Length of 10 ft.)

Part No.	Description
N3-0000	5/8" (15.9 mm) x 5/8" x 5/8" Water "Y", Brass
N3-0000-1	5/8" (15.9 mm) x 5/8" x 5/8" Water "Y", Plastic

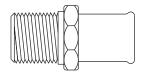
Part No.	Description
N2-0001	1/4" (6.4 mm) NPT x 3/8" Hose Male Pipe
N2-0003	3/8" (9.5 mm) NPT x 3/8" (9.5 mm) Hose Male Pipe Push-Lok
N2-0004	1/2" (12.7 mm) NPT x 3/8" (9.5 mm) Hose Male Pipe Push-Lok



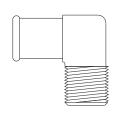
Part No.	Description
N2-0006	3/8" (9.5 mm) Female x 3/8" (9.5 mm) Hose SAE JIC 45° SW
N2-0007	1/2" (12.7 mm) Female x 3/8" (9.5 mm) Hose SAE JIC 45° SW
N2-0041	1/2" (12.7 mm) Female x 1/2" (12.7 mm) Hose SAE JIC 45° SW



Part No.	Description
N2-1305	3/8" (9.5 mm) M-NPT x 5/8" (15.9 mm) Hose, Beaded Barb
N2-1402	1/2" (12.7 mm) M-NPT x 5/8" (15.9 mm) Beaded Hose



Part No.	Description
N2-0020-1	3/8" (9.5 mm) M-NPT x 5/8" (15.9 mm) ID Hose Nylon Elbow
N2-0020	3/8" (9.5 mm) M-NPT x 5/8" (15.9 mm) Hose Zinc Elbow
N2-021-1	1/2" M-NPT x 5/8" (15.9 mm) ID Hose Nylon Elbow
N2-0021	1/2" M-NPT x 5/8" (15.9 mm) Hose Zinc Elbow



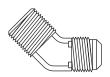
# **COMPONENTS BRASS FITTINGS**



Part No.	Description
N2-1306	3/8" (9.5 mm) M-NPT x 5/8" (15.9 mm) Hose Elbow



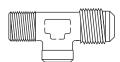
Part No.	Description
N2-1107	1/4" (6.4 mm) M-NPT x 3/8" (9.5 mm) Tube, 90°
N2-1303	3/8" (9.5 mm) M-NPT x 3/8" (9.5 mm) Tube, 90°



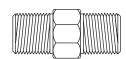
Part No.	Description
N2-1105	1/4" (6.4 mm) M-NPT x 3/8" (9.5 mm) Tube, 45°
N2-1302	3/8" (9.5 mm) M-NPT x 3/8" (9.5 mm) Tube, 45°



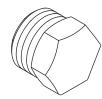
Part No.	Description
N2-1112	1/4" (6.4 mm) M-NPT, 90° Street



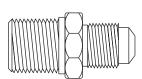
Part No.	Description
N2-1125	$1/4\mbox{"}$ (6.4 mm) M-NPT x 3/8 $\mbox{"}$ (9.5 mm) Tube x 1/8 $\mbox{"}$ (3.2 mm) x F-NPT Brass Tee



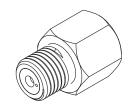
Part No.	Description
N2-1109	1/4" (6.4 mm) M-NPT, Hex Nipple



Part No.	Description
N2-1301	3/8" (9.5 mm) M-NPT, Plug Hex Head



Part No.	Description
N2-1108	3/8" (9.5 mm) Tube x 1/4" (6.4 mm) M-NPT Connector
N2-1304	3/8" (9.5 mm) Tube x 3/8" (9.5 mm) M-NPT Connector



Part No.	Description
N00-5126A	1/8 NPT Check Valve

Part No.	Description
<b>N3-0037</b>	"T" Bulkhead Fitting
Mfg. P/N: T-444	1/4" (6.4 mm) F-NPT, 3-Way



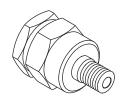
Part No.	Description
<b>N3-0037-1</b> Mfg. P/N: TB-444	Brass Bulkhead 1/4" (6.4 mm) NPT, 4-Way with Plug, Female



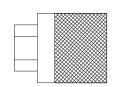
Part No.	Description
<b>N3-0344</b> Mfg. P/N: 156	1/4" (6.4 mm) F-NPT, 3-Way with Magnet and Filter 1/4" (6.4 mm) NPT Female Inlet
	Two Female Outlets
N3-0344-1A	Repair Kit



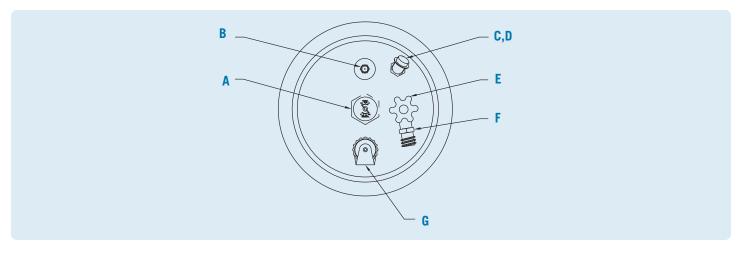
Part No.	Description
N3-2512	Inline Filter with Magnet
Mfg. P/N: 155	1/4" (6.4 mm) NPT Male Outlet
	1/4" (6.4 mm) NPT Female Inlet
N3-0344-1A	Repair Kit



Part No.	Description
<b>N3-0042-1</b> Mfg. P/N: 3125L	Female coupling



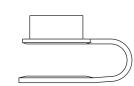
### **TANK FITTINGS & ACCESSORIES**





All new aluminum and steel tanks have new horizontal float gauge, universal steel and aluminum, 33-1/2, 42-1/2

Part No. N3-0484 - Old Style

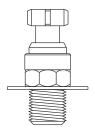


**RAIN CAP** 

Ε

F

Part No. N3-0334



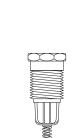
80% STOP BLEEDER WITH PLATE Part No. N3-0205 Mfg. P/N - 3165C



SERVICE VALVE 3/8" (9.5 mm) NPT

Part No. N3-0200 Mfg. P/N - 8545AK Repair Kit - N3-0199-1

**Part No. N3-0200** – 3/8" (9.5 mm) Flare



PRESSURE RELIEF VALVE Part No. N3-0332 Mfg. P/N - 8545AK



TANK END MALE COUPLING

Part No. N3-0041-1 Mfg. P/N - 7141M

Part No. N3-0040 – Outer Washer

Part No. N3-0044 - Inner O-Ring



G **FILLER VALVE** 

Part No. N3-0188 Mfg. P/N - 7647SC

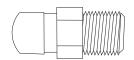
Part No. N3-0208 - Yellow Cap Part No. N3-0189 - Inner O-Ring



**FEMALE COUPLING** 

Part No. N3-0042-1

OEM P/N - 3865 Mfg. P/N - 3125L



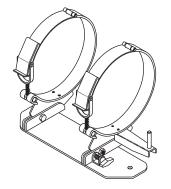
**HYDROSTATIC RELIEF VALVE** Part No. N3-0038-1 OEM P/N - 3865

Mfg. P/N - 3125L

N5-1070A-1 Roll Back Type Tank Bracket (for LP gas only) N5-1070A-2 Komatsu ZA and ZB

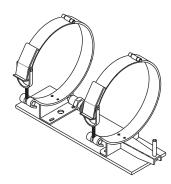
(for dual fuel app.) Tailift FG18/30 33-1/2 lb. and 43-1/2 lb. Tanks

N3-0504 T-Handle Pull Pin, 3-1/8" Long N3-0505 Ball End Pull Pin, 4-3/4" Long



N5-2009A Tank Bracket Komatsu ZC and BX Forklifts

(for LP gas only) 33-1/2 lb. and 43-1/2 lb. Tanks

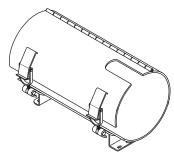


N5-0013-1 Shrouded Horizontal Tank Bracket 33-1/2 lb.

Tanks – 26" Long

N5-0013-2 Shrouded Horizontal Tank Bracket 43-1/2 lb.

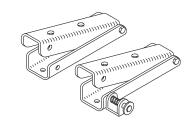
Tanks – 34" Long



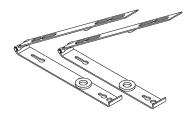
N5-2050A Tank Bracket Swing Hinges

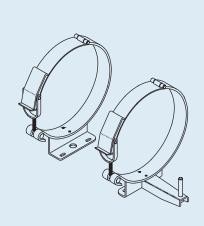
Swings Tank Bracket away from Seat for

Hood Clearance when open



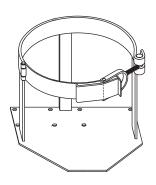
N5-2030A Universal Seat Hinges. Fits Most Forklifts





### N5-1000A

Horizontal Bracket for 33-1/2 and 43-1/2, 2-1/2 lb. Includes Locating Pin and 2 Toggle Clamps.



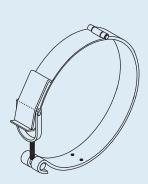
### N5-1003A-1

Vertical Bracket for 33-1/2 lb. Includes 1 Toggle Clamp.



### N5-1001

Toggle Clamp



### N5-1009A

Tank Bracket Band with Toggle Clamp

### Minimum 10-piece quantities

Part No.	Description
N3-0059	"This Is Not A Fuel Gauge" circular label

## THIS IS NOT A FUEL GAUGE REFER TO L.P.G. TANK N3-0059

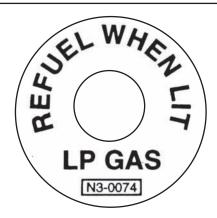
Part No.	Description
N3-0385	"This Is Not A Fuel Gauge" rectangular label

### THIS IS NOT A FUEL GAUGE **REFER TO** L.P.G. TANK

W-WOODWARD 1-800-451-7040

N3-0385

Part No.	Description
N3-0074	Refuel When Lit label



#### Part No. **Description** N3-0060-1 Starting Procedure label

### STARTING PROCEDURE

- 1. PUSH ACCELERATOR TO FLOOR.
- 2. TURN KEY ON AND CRANK ENGINE.
- 3. WHEN VEHICLE STARTS, LET IT RUN AND WARM UP AT LEAST (5) MINS. CAUTION:

DO NOT OPERATE VEHICLE IN ENCLOSED AREA WHERE VENTILATION IS INSUFFICIENT.

.WOODWARD

1-800-451-7040

N3-0060

#### Part No. Description N3-0071 Fuel Changeover Instructions label

#### **FUEL CHANGEOVER INSTRUCTIONS DUAL FUEL SYSTEM**

CAUTION - FLAMMABLE LIQUIDS, WHEN SWITCHING FROM LP-GAS TO LIQUID FUEL, BE SURE THAT THERE IS NO SPILLAGE OF LIQUID FUEL FROM THE CARBURETOR FLOAT SYSTEM.

1. SHUT OFF BOTH FUEL LINES COMPLETELY BY PLACING SWITCH IN THE OFF POSITION.

2. START ENGINE AND RUN UNTIL SYSTEM IS PURGED OF ALL FUEL AND STOPS.

3. TURN SWITCH TO DESIRED FUEL SELECTION, LPG OR GASOLINE.

4. START ENGINE AS USUAL

1-800-451-7040

W.woodward

N3-0071

### Streamline FUEL SYSTEM PRODUCTS

### RECOMMENDED SAFETY MAINTENANCE PROCEDURE FOR LP GAS FUELED FORKLIFT TRUCKS

WARNING: LP GAS is a combustible fuel that is heavier than air. Escaping gas may accumulate in low areas. The fuel cylinder should be mounted so that it does not extend outside the truck and properly positioned by using

that it does not even do distance the trick and properly positioned by using the locating pin or key way.

The fuel valve should be turned off when the machine is not in service. Cast fittings should not be used in the LP-GAS system. Use only Underwriters Laboratories or Factory Mutual listed LP-GAS hose assemblies where pressure fuel times are required.

assembles where pressure neithness are required.
All pipe threaded fittings should be installed using an approved sealing compound. Fuel lines should be supported by clamps to minimize chafing

and wear.

The LP-GAS solenoid valve should be wired to an automatic shut off. switch (oil pressure or vacuum) to prevent leakage of gas in the event the ignition is on without the engine running.

Check the propane solenoid or vacuum shutoff valve for leakage as

- Turn fuel cylinder valve off; start and run engine until it stops.
   Install a 0 to 30 PSI pressure gauge per instruction A or B.
   A Primary test port of single units consisting of primary and
- A Primary test port of single units consisting of primary and secondary regulators.

  B. Between the primary and secondary stage regulators when the propage as yet means to five separate regulators.

  Turn cythinder fuel valve on. The pressure gauge should maintain a zero reading. If it does not, the solenoid valve or vacuum shut off valve must be repaired or replaced. An odor is added to LP-GAS to help detect leaks. If the gas odor is detected the first cythinder supply valve and engine should be turned off. Remove all sources of ignition, and ventilate the area. Make all the necessary repairs before you turn the fuel supply on. The complete LP-GAS system should be inspected periodically. Check all hoses for wear, connections for leaks, and all parts for damage.

  NOTE: Fuel hoses have a limited life expectancy. They should be checked for cracking and drying due to age. Hoses with visible signs of age should be replaced. Use only Underwriters Laboratories or Factory Mutual listed.

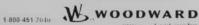
De repraced. Use only Underwriters Laboratories or Factory Mutual Insted LP-GAS parts for replacement.

NOTE: The above information is provided as a guide. Consult the National Fire Protection Association pamphlet 58 for the safe storage and handling of liquefled petroleum gases. Government safety regulations in your locality could vary. Check with proper agencies to insure that you meet all their requirements. Contact manufacturer for detailed service information.

SERVICE WORK SHOULD BE PERFORMED BY

be replaced. Use only Underwriters Laboratories or Factory Mutual listed

QUALIFIED PERSONNEL ONLY.



N3-0368

Part No. **Description** N3-0368 Safety Maintenance label

### Streamline FUEL SYSTEM PRODUCTS

#### LPG FUEL CYLINDER REPLACEMENT PROCEDURE

- NO SMOKING DO NOT REPLACE FUEL CYLINDERS IN AREAS THAT HAVE A SOURCE OF FUEL IGNITION.
- 2. CLOSE CYLINDER VALVE AND RUN ENGINE UNTIL IT STOPS PRIOR TO DISCONNECTING THE FUEL HOSE FROM THE TANK.
- 3. REPLACE FUEL CONTAINER, BE SURE TO USE THE CORRECT SIZE AND TYPE PER THE CYLINDER DESCRIPTION PLATE, SECURELY MOUNT AND POSITION AS FOLLOWS:
  - a. WITH LOCATING PIN THROUGH POSITIONING HOLE IN COLLAR b. WITH SLOT IN FOOTRING OVER LOCATING KEYWAY
- CONNECT FUEL HOSE, OPEN VALVE SLOWLY SO THE HOSE AND TANK PRESSURE CAN EQUALIZE OR THE VALVE MAY SLUG, SHOULD LEAKAGE OCCUR, CLOSE VALVE AND HAVE QUALIFIED PERSONNEL MAKE REPAIRS.
- 5. USE FUEL MANUFACTURED TO NATIONAL GAS PROCESSORS ASSOCIATION HD-5" SPECIFICATION.

NOTE: THE ABOVE IS PROVIDED AS A GUIDE. FOR ADDITIONAL INFORMATION, CONSULT THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET 58 FOR THE SAFE STORAGE AND HANDLING OF LIQUIFIED PETROLEUM GASES.

1-800-451-7040

.W.WOODWARD

N3-0066

Part No.	Description
N3-0066	LPG Fuel Cylinder Replacement Procedure label

### FORKLIFT FUEL SYSTEM KITS

LP-gas conversion kits are shipped with pre-assembled components for fast, simple installation.

Kits contain the regulator, carburetor, and vacuum fuelock suited to your application, as well as the proper hoses, fittings, and brackets.

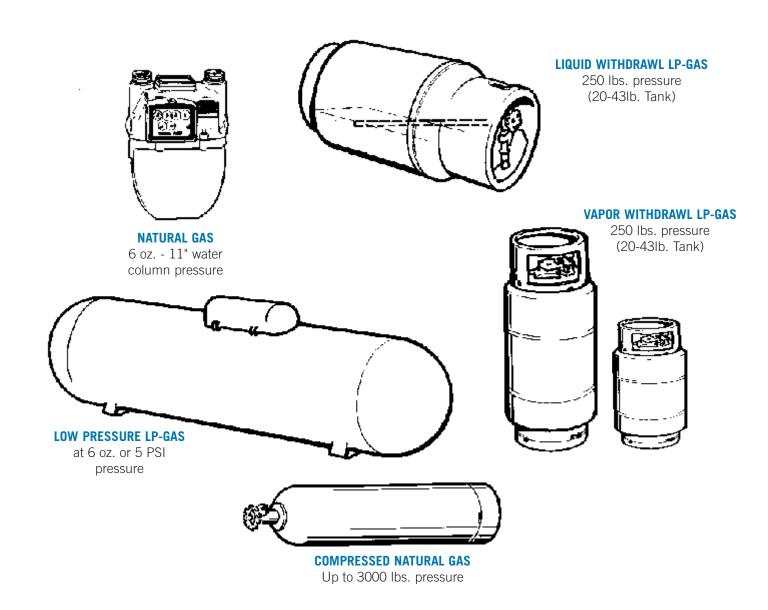
### **KIT SELECTION**

The exact kit you need will depend upon your available fuel supply. We recommend the use of liquid withdrawal (LP) gas only where the tank must be small in relation to the engine demand or where LP gas is used in below-zero weather from a relatively small tank.

Kits for natural gas and LP gas at reduced pressure are set for 6 oz. pressure or 11" W.C. If your gas pressure is greater, please specify the pressure you will use.

### **OTHER AVAILABLE KITS**

The following pages show some of the most commonly used conversion kits. Please call a customer service representative at 800/451-7040 for other kits that are available from Streamline.



## LP FORKLIFT KITS CONVERSION KIT INFO FORM

### Information Needed to Determine Conversion Kit for Industrial Engine:

1. Make	, Model	_, Engine	
		Be very specific and accurate.This manifold! Use Bolt Spacing Chart!	s is a crucial
3. Is the manifold a two	or four bolt pattern?		
4. Is the throttle body a	single, double, or four barr	el throttle body?	
5. Do you need vacuum	advance on the throttle bo	ody?	
6. What is the outside d	liameter of the air horn on t	he carburetor?	
		ge? for throttle and second for governor)	-
If so, is it a velocity What is the Cubic I	or mechanical governor?_ Inch Displacement of the E	ngine?	-
9. Is the existing carbure	etor - straight or 90 degree	elbow?	_
10. Is this a carbureted	or E.F.I engine?		
11. Is the engine water	cooled or air cooled?		
How many cylinder	rs?		
12. If Dual Fuel, what is	s the inside diameter of the	air cleaner hose?	

### **CATERPILLAR**

Part No	Engine	Model	Carb No.	Mixer	Throttle Body	Ctr to Ctr	Air Horn	Regulator	Lockoff	Bridge Plate	Tank Bracelet
N1001-0073	CONT F163	V 30B,V35B,V40B, V50B,V60B	N1600-0073A	N00-1601A	N00-7239	211/16"	25/16"	N00-0005A	N3-0165-2 ELECT	NONE	N5-1000A
N1001-00761	CONT F163	T 30B,T35B,T40B, T45B,T50B,T60B	N1600-0076A	N00-0803A	N00-7208	211/16"	21/16"	N00-0005A	N3-0165-2 ELECT	NONE	N5-1000A
N1001-0088 <sup>2</sup>	CAT / HERC 1404	T 30B,T35B,T40B, T45B,T50B,T60B	N1600-0088A	N00-1601A	N00-7239	211/16"	25/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0088²	CAT / HERC 1404	T 30C,T35C,T40C, T45C,T50C,T55C, T350	N1600-0088A	NOO-1601A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	NOO-0125A	NONE	N5-1000A
N1001-0330³	PERKINS 4.236	T 100D,T120D, T150D	N1600-0330A	N00-0803A	N00-7208	<b>2</b> 11/16"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0402 <sup>4,11</sup>	PEUGEOT 2.0 L	T 40D,T50D	N1600-0402A	NOO-1601A	N5-0415 No TB	4 BOLT Adapt to Solex	54 MM	N00-0014A	N3-0165-2 ELECT	NONE	N5-1000A
N1001-0403 5,11	PEUGEOT 2.0 L	T 40D,T50D	N1600-0403A	NOO-1601A	N00-7206	2¾"	54 MM	N00-0014A	N3-0165-2 ELECT	NONE	N5-1000A
N10-0384-0000°	MIT 4G63	GC 15K,18K, 20K,25K,30K	N1600-0384A	N00-0803A	NONE	4-BOLT Adapter	<b>2</b> 1/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0384-0000 <sup>6</sup>	MIT 4G64	GC 15K,18K, 20K,25K,30K	N1600-0384A	N00-0803A	NONE	4-BOLT Adapter	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0538-0000 <sup>7,12</sup>	PERKINS 4.235	R 60C, 70C, 80C,	N1600-0538A	NOO-0803A	N00-7239	211/16"	2½16"	N00-0014A N00-0005A	N3-0165-2 ELECT	NONE N5-2095A	N5-1000A N5-1000A
N10-0538-0000 <sup>7</sup>	PERKINS 4.235	R 60D, 70D,80D	N1600-0538A	N00-0803A	N00-7239	211/16"	21/16"	N00-0005A	N3-0165-2 ELECT	N5-2095A	N5-1000A
N10-0538-0000 <sup>7</sup>	PERKINS 4.235	V 60C, 70C, 80C	N1600-0538A	NOO-0803A	N00-7239	211/16"	21/16"	N00-0005A	N3-0165-2 ELECT	N5-2095A	N5-1000A
N10-0538-0000 <sup>7</sup>	PERKINS 4.235	V 60D, 70D, 80D	N1600-0538A	N00-0803A	N00-7239	211/16"	<b>2</b> ½6"	N00-0005A	N3-0165-2 ELECT	N5-2095A	N5-1000A
N10-0542-0000 <sup>8,13</sup>	CAT / HERC 1404	T 30DSA, 40DSA, 50DSA, 60DSA	N1600-0542A	N00-0803A	N00-7239	215/16"	21/16"	N00-0005A	N00-0125A	N5-2081	N5-1000A
N10-0542-0000°	CAT / HERC 1404	TC 30DSA, 40DSA, 50DSA, 60DSA	N1600-0542A	N00-0803A	N00-7239	215/16"	21/16"	N00-0005A	N00-0125A	N5-2081	N5-1000A
N10-0542-0000°	CAT / HERC 1404	V 30 DSA, 40DSA, 50DSA, 60DSA	N1600-0542A	NOO-0803A	N00-7239	215/16"	21/16"	N00-0005A	N00-0125A	N5-2081	N5-1000A
N10-0542-0000°	CAT / HERC 1404	VC 30DSA, 40DSA, 50DSA, 60DSA	N1600-0542A	N00-0803A	N00-7239	215/16"	21/16"	N00-0005A	N00-0125A	N5-2081	N5-1000A
N10-0558-0000°	PERKINS 4.236	V 60 E, 70E, 80E, 90E, 100E, 110E	N1600-0558A	N00-0803A	N00-7208	211/16"	21/16"	N00-0005A	N3-0342-1 ELECT	N5-2043A	N5-1000A
N10-0558-0000°	PERKINS 4.236	V 60F, 70F, 80F, 90F,100F,110F	N1600-0558A	N00-0803A	N00-7208	211/16"	21/16"	N00-0005A	N3-0342-1 ELECT	N5-2043A	N5-1000A
N10-0558-0000°	PERKINS 4.236	R 60E, 70E, 80E, 90E, 100E, 110E	N1600-0558A	N00-0803A	N00-7208	211/16"	21/16"	N00-0005A	N3-0342-1 ELECT	N5-2043A	N5-1000A
N10-0558-0000°	PERKINS 4.236	R 60F, 70F, 80F, 90F,100F,110F	N1600-0558A	N00-0803A	N00-7208	<b>2</b> 11/16"	21/16"	N00-0005A	N3-0342-1 ELECT	N5-2043A	N5-1000A
N10-0721-1A 10,14	MITS 4G63/4G64	GCP12-30	N1600-0721-1A	N00-0803A	N1-4124	ADAPTER 4-Bolt	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N10-0721-2A 10,15	MITS 4G63/4G64	GCP12-30	N1600-0721-2A	N00-0803A	N00-7239	111/16 x 31/8" 4-BOLT	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A

<sup>&</sup>lt;sup>1</sup>Cat # for kit is 12N1229.

<sup>&</sup>lt;sup>2</sup>Use only for stated models.

<sup>&</sup>lt;sup>3</sup>NCA100 Carb Cat tow T100/150D Perkins 4236.

<sup>&</sup>lt;sup>4</sup>Adapts to the Solex Gas Carb System. Has N17-0110 governor which is not made. Use N1001-0403.

<sup>&</sup>lt;sup>5</sup>Complete carb with new governor N17-0005 for V-series trk, customer may have to modify reg. bracket.

<sup>&</sup>lt;sup>6</sup>Must have K IE GC15K. If no K, use N10-0721-0000 Kit. Carb has no throttle body. Adapts carb TB with internal gov.

 $<sup>^{7}\</sup>text{Comes}$  in 3 boxes. Fits only models that start with "R" or "V" and end in "C" or "D."

<sup>\*</sup>T/TC/V/VC 30-60 DSA Discovery series. Also fits -C trucks carb. Okay for T/V 30-60E but use N1001-0327 for kit.

<sup>&</sup>lt;sup>9</sup>Will also fit R60-110E or F. Will not fit on T-series. Use N1001-0330. Will not fit V/R60-80 C or D.

<sup>10</sup> Model number ends in "K" use N10-0384-0000. WIll also fit Mitsu FG25 4G630R4G64. Fit Daewoo G25E-3 with throttle body external governor.

 $<sup>^{\</sup>rm 11}\,\text{N}1\text{-}4062$  IMPCO A2-34 adapter. 54 mm dia. Datsun CA125M.

<sup>&</sup>lt;sup>12</sup> Only for models that start with "R" or "V" and end in a "C" or "D." If model ends in "E" or "F," use N10-0558-0000.

 $<sup>^{\</sup>rm 13}\,\text{N00-6708A}$  spacer -N-S3-10, 90 deg Bowl, Model N-CA100/N-CA125.

<sup>&</sup>lt;sup>14</sup> Is governor built into throttle body or is it totally separate? For Clark trucks, see N10-0736-0000.

<sup>&</sup>lt;sup>15</sup>Use when governor is separate from throttle body.

## **CLARK**

OLANIN					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0100	CONT Y92	P 20B, 25B	N1601-0100A	N1-0400	N1-7255	2¾"	1½"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0100	CONT Y112	C 20B, 25B	N1601-0100A	N1-0400	N1-7255	2¾"	1½"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0100¹	CONT Y92	C 20B, 25B	N1670-0100A	N-CA70M-1A	N1-7206	2¾"	1½"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-01001	CONT Y92	P 20B, 25B	N1670-0100A	N-CA70M-1A	N1-7206	2¾"	1½"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0102 <sup>2</sup>	CONT F162	C 30B, 40B, 50B	N1670-0102A	N-CA70M-A	N1-7206	2¾"	1%"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N1001-0102 <sup>2</sup>	CONT F163	C 30B, 40B, 50B	N1670-0102A	N-CA70M-A	N1-7206	2¾"	1%"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N1001-0102³	CONT F162	C 30B, 40B, 50B	N1601-0102A	N1-0403	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N1001-0102³	CONT F163	C 30B, 40B, 50B	N1601-0102A	N1-0403	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N1001-01054	CONT Y112	C500 20, 25, 30	N1670-0105A	N-CA70M-5A	N00-7206	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-01054	CONT Y112	C500 S30	N1670-0105A	N-CA70M-5A	N00-7206	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0105³	CONT Y112	C500 20, 25, 30	N1601-0105A	N1-0401	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0105³	CONT Y112	C500 S30	N1601-0105A	N1-0401	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0107	WAUKESHA D155	C500 30, 35, 40, 45, 50, 55	N1600-0107A	N00-0803A	N00-7206	2¾"	21/16"	N00-0005A	NOO-0125A	N5-2011	N5-1000A
N1001-0107	WAUKESHA D155	C500-560	N1600-0107A	N00-0803A	N00-7206	2¾"	21/16"	N00-0005A	N00-0125A	N5-2011	N5-1000A
N1001-0107	WAUKESHA D176	C500 30, 35, 40, 45, 50, 55	N1600-0107A	N00-0803A	N00-7206	2¾"	21/16"	N00-0005A	N00-0125A	N5-2011	N5-1000A
N1001-0107	WAUKESHA D176	C500-560	N1600-0107A	N00-0803A	N00-7206	2¾"	21/16"	N00-0005A	N00-0125A	N5-2011	N5-1000A
N1001-0108	CONT F162	C500 Y20, Y25, Y30, Y35,	N1670-0108A	N-CA70M-2A	N00-7206	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0108	CONT F163	C500 Y20, Y25, Y30, Y35,	N1670-0108A	N-CA70M-2A	N00-7206	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0108³	CONT F162	C500 Y20, Y25, Y30, Y35,	N1601-0108A	N1-0403	N1-7255	2¾"	11%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0108³	CONT F163	C500 Y20, Y25, Y30, Y35,	N1601-0108A	N1-0403	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0109 <sup>5</sup>	CONT F163	C300 Y40, Y45, Y50	N1670-0109A	N-CA70M-5A	N00-7206	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0109³	CONT F163	C300 Y40, Y45, Y50	N1601-0109A	N1-0401	N1-7255	2¾"	1%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0111 <sup>6</sup>	CONT F245	C500Y&H 60-150	N1600-0111A	N00-0803A	N00-7239	211/16"	21/16"	N00-0005A	N00-0125A	N5-2011	N5-1000A
N1001-0113	CONT F227	C500 60, 70, 80, 90	N1600-0113A	N00-0803A	N00-7239	211/16"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0113	CONT F227	C500 S80, S100	N1600-0113A	N00-0803A	N00-7239	211/16"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0116 <sup>7</sup>	CONT F245	C500 100, 120, 135	N1600-0116A	NOO-1601A	N00-7239	211/16"	25/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0119	CHRY SLANT 6 H225	IT60N	N1600-0119A	NOO-1601A	N00-7239	211/16"	<b>2</b> 5∕16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0380°	CONT F163	C300 30, 40, 50	N1670-0380A	N-CA70M-2A	N1-7206	2¾"	11%"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N1001-0380³	CONT F163	C300 30, 40, 50	N1601-0380A	N1-0403	N1-7255	23/8"	11/8"	N00-0005A	N00-0125A	N5-2008	N5-1000A
N10-0383-0000°	GM 4.3L	GPX40E / 50E/ 60E/70E	N1600-0383A	N00-0803A	N1-7210	215/16"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N10-0545-0000 <sup>10</sup>	4G54	GCS/GPS/GPX 17-30	N1600-0545-2A	N00-0803A	N00-7239	111/16" x 31/8" 4-BOLT	21∕₁₅"	N00-0005A	NOO-0125A	N5-2088A	N5-1000A
N10-0545-0000 <sup>10</sup>	4G32	GCS/GPS/GPX 17-30	N1600-0545-2A	N00-0803A	N00-7239	111/16" x 31/8" 4-BOLT	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A

<sup>&</sup>lt;sup>1</sup>CA70 Series carb not in kit.

<sup>&</sup>lt;sup>2</sup>Y233 signifies F162/F163 engine.

<sup>&</sup>lt;sup>3</sup>CA55 Series carb not in kit.

<sup>4</sup>Y235 signifies Y112 engines. Clark numbers 2358556 or 923145.

 $<sup>^{\</sup>rm 5}\mbox{Yard}$  truck with big tires, small tired truck is C300-40/50/ See kit N1001-0380.

 $<sup>^{\</sup>rm 6}\text{Is}$  an updraft kit. TB with internal gov.

<sup>&</sup>lt;sup>7</sup>Only for downdraft carbs.

<sup>8</sup> NCA-70 carb Clark C300 30-50 Continental F163.

 $<sup>^{\</sup>rm 9}\mbox{Will}$  not fit fuel injected truck.

 $<sup>^{\</sup>rm 10}\,\text{For}$  trucks where the OEM governor is external from the OEM throttle body.

 $<sup>^{\</sup>rm 11}\textsc{Used}$  for internal governors built into carb. Carb does not have throttle body.

 $<sup>^{\</sup>rm 12}\,\text{Cannot}$  be used for the Cat. or Mitsu. trucks.

### **CLARK** (cont.)

	-	-			Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N10-0545-0000 <sup>10</sup>	4G33	GCS/GPS/GPX 17-30	N1600-0545-2A	N00-0803A	NOO-7239	111/16" x 31/8" 4-BOLT	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0545-0000 <sup>10</sup>	4G52	GCS/GPS/GPX 17-30	N1600-0545-2A	N00-0803A	N00-7239	111/16" x 31/8" 4-BOLT	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0545-0001"	4G54	GCS/GPS/GPX 17-30	N1600-0545-1A	N00-0803A	N1-4124	ADAPTER ASS'Y	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0545-0001"	4G32	GCS/GPS/GPX 17-30	N1600-0545-1A	N00-0803A	N1-4124	ADAPTER ASS'Y	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0545-0001"	4G33	GCS/GPS/GPX 17-30	N1600-0545-1A	N00-0803A	N1-4124	ADAPTER ASS'Y	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0545-0001"	4G52	GCS/GPS/GPX 17-30	N1600-0545-1A	N00-0803A	N1-4124	ADAPTER ASS'Y	21/16"	N00-0005A	N00-0125A	N5-2088A	N5-1000A
N10-0736-000012	4G63/64	25/G&L/G/L&D/	N1600-0736A	N00-0803A	CLARK TB	2½" x 3"	21/16"	N00-0028A	N00-0125A	N5-2106A	N5-1000A

<sup>&</sup>lt;sup>1</sup>CA70 Series carb not in kit.

<sup>&</sup>lt;sup>2</sup>Y233 signifies F162/F163 engine.

<sup>&</sup>lt;sup>3</sup>CA55 Series carb not in kit.

 $<sup>^4\</sup>mbox{Y}235$  signifies Y112 engines. Clark #s 2358556 or 923145.

 $<sup>^{5}</sup>$ Yard truck with big tires, small tired truck is C300-40/50/ See kit N1001-0380.

 $<sup>^{\</sup>rm 6}\text{Is}$  an updraft kit. TB with internal gov.

 $<sup>^{7}\</sup>mbox{Only}$  for downdraft carbs.

<sup>8</sup> NCA-70 carb Clark C300 30-50 Continental F163.

<sup>&</sup>lt;sup>9</sup>Will not fit fuel injected truck.

 $<sup>^{\</sup>scriptscriptstyle 10}$  For trucks where the OEM governor is external from the OEM throttle body.

 $<sup>^{\</sup>rm 11}\textsc{Used}$  for internal governors built into carb. Carb does not have throttle body.

 $<sup>^{\</sup>rm 12}\,\text{Cannot}$  be used for the Cat. or Mitsu. trucks.

### DATSUN/NISSAN

DAISUI	W 11100				Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0122-1A1	NISSAN J15	F01C0/FEC/C2000	N1600-0122-1A	N00-0805A	N1-7206	1%" x 2%" 4-BOLT	<b>2</b> 5∕₁₅"	N00-0014A	N00-0125A	NONE	N5-1003A
N1001-0122-2A <sup>2</sup>	NISSAN J15	F01C0/FEC/C2000	N1600-0122-2A	NOO-1601A	N1-7206	1%" x 2%" 4-BOLT	25/16"	N00-0014A	N00-0125A	NONE	N5-1003A
N1001-0124-1A	NISSAN J15	F02/FEP/P2000 3000/P2700/3500	N1600-0124-1A	N00-0805A	N1-7206	1%" x 2%" 4-BOLT	25/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0124-2A3	NISSAN J15	F02/FEP/P2000 3000/P2700/3500	N1600-0124-2A	N00-1601A	N1-7206	1%" x 2%" 4-BOLT		N00-0014A	N00-0125A	NONE	N5-1000A
N1001-01284	NISSAN D11	CFG103/C2-C3/ C2-3B/P2-3/P2-3B	N1600-0128A	NOO-1601A	N1-7206	2¾"	54 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-01385	NISSAN P40	UF03P0 P7000- P9000	N1600-0138A	NOO-1601A	N00-7239	111/16" x 31/8" 4-BOLT	80 MM	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0384 <sup>6</sup>	NISSAN H20	CPH02A20V/A25V	N1601-0384A	N00-0307A	N00-7206	2¾"	43 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0385 <sup>7</sup>	NISSAN Z24	CRGH02F30V/ F33V/ F353V	N1601-0385A	N00-0307A N5-1000A	N00-7206	111/16" x 31/8" 4-BOLT	43 MM	N00-0014A	N00-0125A	NONE	
N1001-0388 <sup>7</sup>	NISSAN A15	PH01A14V-18V/ PH02A18V-25V	N1601-0388A	N00-0307A	N00-7206	2¾"	43 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0388 <sup>7</sup>	NISSAN H20	PH01A14V-18V/ PH02A18V-25V	N1601-0388A	N00-0307A	N00-7206	2¾"	43 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0557-0001	NISSAN A15	AH01A OR M 15VCP30 NOMAD	N1601-0557A	N00-0405A	N00-7206	2¾"	43 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0728-0000	NISSAN H20	KPH02A25PV	N1601-0728A	N00-0307A	N00-7206	2¾"	43 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0728-0000-1	NISSAN H2011	KPH02A25PV	N1600-0728AD.	P N00-0803A	N00-7271A	31/4"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0728-0000-1	NISSAN H25	KPH02A25PV	N1600-0728AD.	P N00-0803A	N00-7271A	31/4"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0759-0000	H20II	KH01/KH02/KCH01/ KCH02/KCPH01/ PJ01an	N1600-0759A.D.F	N00-0803A	NOO-7271A	31/4"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A

 $<sup>^{\</sup>rm 1}\text{OEM}$  design. use if truck has pressed hose to air cleaner.

 $<sup>^{\</sup>rm 2}\mbox{Has}$  its own air cleaner.

 $<sup>^{\</sup>scriptscriptstyle 3}\text{N00-6708A}$  spacer - N-S3-10, 90 deg. bowl, model N-CA100/N-CA125.

 $<sup>^4\</sup>mbox{Will}$  also fit Komatsu with Nissan D-11 engine.

 $<sup>^{\</sup>scriptscriptstyle 5}33\text{-}35\text{-}40,\!000$  lb. truck. Any bigger, go with N1001-0140.

<sup>6</sup>Will also fit CPH01A15V & CPH01A18V. Use in place of N1001-0387. APH is pneumatic. CPH is cushion GOV N17-0107.

<sup>&</sup>lt;sup>7</sup>Carb for N1001-0385 Z24 NISSAN 53MM CA55-500.

### **HYSTER**

IIIJIL					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-01461	CONT Y112	S20A, 25A, 30A	N1600-0146A	N00-1601A	N1-7206	2¾"	<b>2</b> 5/16"	N00-0005A	N3-0165-1 ELECT	N5-2010	N5-1003A
N1001-01461	CONT Y112	S20E, 25E, 30 E	N1600-0146A	N00-1601A	N1-7206	2¾"	<b>2</b> 5/16"	N00-0005A	N3-0165-1 ELECT	N5-2010	N5-1003A
N1001-0148	CONT F163	S30C, 40C, 50C	N1600-0148A	N00-1601A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0150	CONT F227	H/S 60-100 B OR C	N1600-0150A	NOO-1601A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0150	CONT F245	H/S 60-100 B OR C	N1600-0150A	N00-1601A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0154 <sup>2</sup>	FORD 172	H30/40/50/60H	N1600-0154A	N00-0805A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0154 <sup>2</sup>	FORD 192	H30/40/50/60H	N1600-0154A	N00-0805A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0156	GM V6 305	H150/180/200/250	N1600-0156A	N00-2803A	N00-4220A	1½" x 3½"	25/16"	N-H420-SA	N00-0125A	NONE	N5-1000A
N1001-0160	GM 4 -153	S30E/40E/50E/60E	N1600-0160A	N00-0805A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0415	GM250	H/S 60 - 120 E/F	N1600-0415A	N00-0805A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0416-1A3	GM 4.3L	H/S 70 - 150 XL/XLS	N1600-0416-1A	N00-0805A	N00-4220	1%" x 3%" 4 BOLT	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0416-2A4	GM 4.3L	H/S 70 - 150 XL/XLS	N1600-0416-2A	N00-1601A	N00-4220	1%" x 3%" 4 BOLT	2%"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0416-3A5	GM 4.3L	H/S 70 - 150 XL/XLS	N1600-0416-3A	N00-1601A	N1-7232	2" x 311/16" 4 BOLT	25/8"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0416-4A6	GM 4.3L	H/S 70 - 150 XL/XLS	N1600-0416-4A	N00-0805A	N00-4220	2" x 311/16" 4 BOLT	25/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0416ANG	GM 4.3L V6 CARB	H/S 70 - 150 XL/XLS	N1600-0416- 2ang	NOO-1603A	N1-7231	3¼" x 1½"	25//"	N00-0005A	N00-0125A	N5-2089A	N5-1000A
N10-0553-00007	MAZDA 4-121	H35/60XL	N1600-0553A	N00-0803A	N1-7202	21/4"	<b>2</b> 1/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0553-0000	MAZDA 4-121	H35/60XL	N1601-0553A	N00-0405A	N1-7268	53MM OFFSET	43MM	N00-0014A	N00-0125A	NONE	N5-1000A
N10-0729-0000°	GM 4.3L EFI VORTEC	H/S 70-155 XL/XL2	N1600-0729A	NOO-1601A		2%" HOSE ADAPT	2%"	N00-0005A	NOO-0125A	NONE	N5-1000A
N10-0754-0000°	GM 2.2L	H45XM-H65XM	N1600-0754A	N00-0805A	ADAPTER	25/16" AIR HOSE	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N10-0755-0000 <sup>10</sup>	GM181	H40J/H50J/H60J	N1600-0755A	N00-0805A	N00-7239	211/16" TO 2-15/16	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N40-0660-0000 <sup>11</sup>	GM 250	H60E - H120E	N1600-0660A	N00-0805A	ADAPTER	25%6" AIR HOSE	<b>2</b> 5/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N40-0729-0000	GM4.3 EFI	H/S 70 - XL/XL2	N1600-0729-1AD	FN00-1609A	ADAPTER	2%" HOSE ADAPT	25%"	N00-0005A	N00-0125A & N3-0165-2 Elect	N5-2109	N5-1000A

 $<sup>^1</sup>$ If ctr to ctr is  $2^{11}\!/_{16}$ , use N1001-0158. This kit, use N3-0165-2 ELECT.

<sup>&</sup>lt;sup>2</sup>Comes with N17-0003 Govenor.

 $<sup>^{3}</sup>$ Carbureted gas engine. The N1600-0416-1A is not listed in BOM for kit. Govenor is N17-0019.

 $<sup>^4\</sup>mbox{Carbureted}$  gas engine. The N1600-0416-2A is not listed in BOM for kit. Govenor is N17-0019.

 $<sup>^{\</sup>rm 5}\text{Carbureted}$  gas engine. The N1600-0416-3A is not listed in BOM for kit. Govenor is N17-0112.

 $<sup>^{\</sup>rm 6}\text{Carbureted}$  gas engine. The N1600-0416-4A is not listed in BOM.

 $<sup>^{7}\</sup>mbox{This}$  kit is strictly for H series trucks, for S series use N1001-0173.

 $<sup>^{\</sup>rm 8}\mbox{\rm Kit}$  is for truck that is EFI.

 $<sup>^{\</sup>rm 9} For fuel injection only. For duel fual N40-0754-0000.$ 

 $<sup>^{\</sup>mbox{\tiny 10}}\mbox{Will}$  not fix any XL or XM trucks. For fuel injection only.

 $<sup>^{\</sup>rm 11}\,\text{Dual}$  fuel kit.

### **KOMATSU**

					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0355 <sup>1,9</sup>	TOYOTA 4 P	FG14-18	N1600-0355A	N00-0803A	N1-7206	2¾"	25/16"	N00-0014A	N00-0125A	W/TANK BRACKET	N5-1070A33
N1001-0355 <sup>2</sup>	TOYOTA 4 P	FG14-18	N1601-0355A	N00-0405A	N1-7256	23/8"	211/16"	N00-0014A	N00-0125A	W/TANK BRACKET	N5-1070A33
N10-0672-00003	NISSAN H20	FG10S / ST ZA	N1601-0675A	N00-0405A	N1-7268	53 MM	43 MM	N00-0014A	N00-0125A	N5-1065A	W/BRIDGE PLATE
N10-0673-00004	NISSAN H20	FG15-18S / ST/ H / HT ZA	N1600-0673A	N00-0803A	N00-7208	211/16"	211/16"	N00-0014A	N00-0125A	N5-1070A-33SF13	W/BRIDGE PLATE
N10-0673-00004	NISSAN H20K	FG15-18S / ST/ H / HT ZA	N1600-0673A	N00-0803A	N00-7208	211/16"	211/16"	N00-0014A	N00-0125A	N5-1070A-33SF13	W/BRIDGE PLATE
N10-0675-0000 <sup>5</sup>	NISSAN H20	FG20-25 C/T/ST	N1600-0675A	N00-0803A	N00-7208	211/16"	211/16"	N00-0014A	N00-0125A	N5-1070A-33SF13	W/BRIDGE PLATE
N10-0675-0001	NISSAN H20-11	FG20-25 C/T/ST	N1601-0675A	N00-0405A	N00-7206	23/8"	43 MM	N00-0014A	N00-0125A	N5-1070A-33SF13	W/BRIDGE PLATE
N10-0675-0001	NISSAN H25	FG20-25 C/T/ST	N1601-0675A	N00-0405A	N00-7206	23/8"	43 MM	N00-0014A	N00-0125A	N5-1070A-33SF13	W/BRIDGE PLATE
N10-0678-0000 <sup>6,9</sup>	NISSAN TB42	40Z/40/45 OUTDOOR	N1600-0678A	NOO-1601A	N00-7239	2" x 4½" 4 BOLT	78 MM	N00-0014A	N00-0125A	N5-2099A-33SF13	N5-1000A
N10-0679-0000	NISSAN H20	20\$/25\$	N1600-0675A	N00-0803A	N00-7208	211/16"	211/16"	N00-0014A	N00-0125A	N5-2099A-33SF13	N5-1000A
N10-0693-0000	H20	15H/18H	N1600-0675A	N00-0803A	N00-7208	211/16"	211/16"	N00-0014A	N00-0125A	N5-1070A-33	W/BRIDGE PLATE
N10-0746-0000 <sup>7,10</sup>	NISSAN H20-11 With D.P	FG30ST-12	N1600-0746 A.D.P	N00-0799A	N00-7271A	_	211/16"	N00-0014A	N00-0125A	_	N5-2099A-3343SF
N10-0746-0000 <sup>8,10</sup>	NISSAN H25 With DP	FG30ST-12	N1600-0746 A.D.P	N00-0799A	N00-7271A	_	211/16"	N00-0014A	N00-0125A	_	N5-2099A-3343SF

 $<sup>^1</sup>$ NCA100 carb Komatsu FG14/15 4P stick old yellow truck 1970-80s. If gov 2 bolt N17-0109.

### **MITSUBISHI**

					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0328-1-1A1	4G-32/33/52/54	FG/FGC10-30	N1600-0328-1A	N00-0803A	NOO-7239	111/16" x 31/8" 4-BOLT	21/16"	N00-0005A	N3-0164-2 Electric	NONE	N5-1000A
N1001-0328-1-2A <sup>2</sup>	4G-32/33/52/54	FG/FGC10-30	N1600-0328-2A	N00-1601A	NOO-7239	111/16" x 31/8" 4-BOLT	25/16"	N00-0005A	N3-0164-2 Electric	NONE	N5-1000A
N1001-0328-A³	MITS 4G32/33/ 53/54	FG/FGC 10-30	N1600-0328A	NOO-1601A	NONE	N/A	25/16"	N00-0005A	N3-0164-2 Electric	NONE	N5-1000A
N10-0721-1A4	MITS 4G63/4G64	GCP12-30	N1600-0721-1A	N00-0803A	N1-4124	ADAPTER 4-Bolt	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N10-0721-2A <sup>5</sup>	MITS 4G63/4G64	GCP12-30	N1600-0721-2A	N00-0803A	N00-7239	111/4" x 31/4" 4-BOLT	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A

<sup>&</sup>lt;sup>2</sup>NCA100 carb Komatsu FG14/15 4P stick old yellow truck 1970-80s. This CA125 carburetor not in BOM.

<sup>&</sup>lt;sup>3</sup>Governor is N17-0107. FOR CARB USE N1600-0675A.

<sup>&</sup>lt;sup>4</sup>This truck has 53 mm cc carb manifold. Governor is N17-0105.

<sup>&</sup>lt;sup>5</sup>Idle up dashpot N3-0180A.

<sup>&</sup>lt;sup>6</sup> For 33½ lb. tank. If 43 lb. tank, use kit N10-0682-0000.

 $<sup>^7</sup>$ Nissan part no. for governor is 19100-50K70 or 19100-K7202.

 $<sup>^{\</sup>rm s}$  If truck is blue and gray, use N10-0674-0000.

<sup>9</sup>Will also fit Kalmar P80 trucks K8590A.

<sup>&</sup>lt;sup>10</sup> N00-4067 adapt. - air horn, model N-CA100.

<sup>&</sup>lt;sup>1</sup>Use if governor is not part of the throttle body.

<sup>&</sup>lt;sup>2</sup>Uses CA125 series carburetor.

<sup>&</sup>lt;sup>3</sup>No throttle body.

<sup>4</sup>Model No. ends in "K" use N10-0384-0000. Will also fit Mitsu FG25 4G630R4G64. Fit Daewoo G25E-3 without throttle body.

<sup>&</sup>lt;sup>5</sup>Model No. ends in "K" use N10-0384-0000. Will also fit Mitsu FG25 4G630R4G64. Fit Daewoo G25E-3 with throttle body.

					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0220-1A1	TOYOTA 2 F 3 F	FG & FGC 32/35/40	N1600-0220-1A	NOO-1601A	N00-7239	211/16"	25/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0220-2A <sup>2</sup>	TOYOTA 2 F 3 F	FG & FGC 32/35/40	N1600-0220-2A	N00-1601A	N1-7206	2½" OFFSET	<b>2</b> 5//6"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0220-3A3	TOYOTA 2 F 3 F	FG & FGC 32/35/40	N1600-0220-3A	N00-1601A	N1-7206	2¾"	<b>2</b> 5∕16″	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0329-1AA4	TOYOTA 4P OR 5 R	FG10-14-15-18- 20-25 3FGC-15	N1600-0329-1A	NOO-1601A	N1-7206	1¾" x 3¾₅" 4 BOLT	54 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-1AA5	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1601-0329-1A	N00-0405A	N1-7255	23/8"	2 BOLT A/H	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-1AJ <sup>6</sup>	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-1A	NOO-1601A	N1-7206	1¾" x 3¾ <sub>6</sub> " 4 BOLT	54 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-2AA4	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-2A	N00-0803A	N1-7206	23/8"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-2AJ4	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-2A	N00-0803A	N1-7206	2¾"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-2AJ <sup>7</sup>	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	NO BOM	NO BOM	NO BOM	2¾"	IMPCO A/F Adapter	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-3AA8	TOYOTA 4P OR 5 R	FG10-14-15-18- 20-25 3FGC-15	N1600-0329-3A	NOO-1601A	N1-7206	1¾" x 3¾ <sub>6</sub> " 4 BOLT	A/F	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-3AA8	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1601-0329-3A	N00-0405A	N1-7255	1¾" x 3¾" 4 BOLT	A/F	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-3AJ*	TOYOTA 4P OR 5 R	FG10-14-15-18- 20-25 3FGC-15	N1600-0329-3A	NOO-1601A	N1-7206	1¾" x 3¾ <sub>6</sub> " 4 BOLT	-	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-4AA°	TOYOTA 4P OR 5 R	FG10-14-15-18- 20-25 3FGC-15	N1600-0329-4A	N00-0803A	N1-7206	1¾" x 3⅓₅" 4 BOLT	21//6"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-4AA10	TOYOTA 4P OR 5 R	FG10-14-15-18- 20-25 3FGC-15	N1601-0329-4A	N00-0405A	N1-7255	1¾" x 3¾₅" 4 BOLT	21//6"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-4AJ <sup>9</sup>	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-4A	N00-0803A	N1-7206	1¾" x 3%。" 4 BOLT	21/₁₅"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-5AA"	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-5A	NOO-1601A	N1-7206	2¾"	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-0329-5AJ <sup>11</sup>	TOYOTA 4P OR 5 R	FG10-14-15-18- 20- 25 3FGC-15	N1600-0329-5A	NOO-1601A	N1-7206	2¾"	54 MM	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-035312	TOYOTA 3 P OR 2 R	FG10/14/15/ 18/20/ 25	N1600-0353A	NOO-1601A	N1-7206	1¾" x 3¾s" 4 BOLT	AIR CLEANER	N00-0014A	N00-0125A	NONE	N5-1003A
N1001-0400 <sup>13</sup>	TOYOTA 4Y	5FC10-30	N1600-0400A	N00-0803A	N00-7206	2%"	21/16"	N00-0014A	N00-0125A	N5-2050A	N5-1000A
N10-0374-0000	5P	2- 5 FG / FGC 18 - 30	N1600-0374A	NOO-1601A	N1-7206	2¾"	AIR CLEANER	N00-0014A	N00-0125A	N5-2050A	N5-1000A
N10-0374-000114	5P	2/3/4/5/60/62 FG/FGC 18 - 30	N1601-0374A	N00-0405A	N1-7256	2¾"	AIR CLEANER	N00-0014A	N00-0125A	N5-2050A	N5-1000A
N10-0792-0000 <sup>15</sup>	TOYOTA 4Y/5K	6 & 7 SERIES 6FGCU 15-25	N1600-0792-1A	N00-0803-1A	N1-7206	2¾"	21/16" x 4"	N00-0014A	N00-0125A	N5-2050A	N5-1000A
N10-0795-000016	4.3L GM	52-6FGU33- 456FGU50	NONE	N00-1601A	ADAPTER	25/16" HOSE	25/₁6"	N00-0005A	N00-0125A		N5-1070A-3
N4000-0007 <sup>17</sup>	GM 4.3L	6FGU35	N/L	N00-0799A.D.F.	N/A	N/A	<b>2</b> 5//6"	N00-0005A	N3-0343 & N3-225-4 Elect	N5-2050A	N5-1000A

 $<sup>^1</sup>$ N00-4048 ADAPTER - N-A2-8, 2%6" air horn, model N-CA125 governor is N17-0108.

TOVOTA

<sup>&</sup>lt;sup>2</sup>NCA125 carb Toyota 32-40 2F/3F offset 21/8 C.C.

<sup>3</sup>NCA125 carb Toyota 32-40 2F/3F offset 2% C.C.

<sup>&</sup>lt;sup>4</sup>01-203-4 FG were Japanese made. 5FG and up were American made. 2-bolt gov. N17-0109.

<sup>&</sup>lt;sup>5</sup>01-203-4 FG were Japanese made. 5FG and up were American made. 2-bolt gov. N17-0109 carb not in kit.

 $<sup>^{\</sup>circ}$ 01-2-3-4 FG were Japanese made. 5FG and up were American made. 2-bolt gov. N17-0109.

 $<sup>^7</sup>$ 01-203-4 FG were Japanese made. 5FG and up were American made. 2-bolt gov. N17-0109 CA55-4 bolt.

<sup>8</sup>N00-4902 filter - N-F1-5, air cleaner element, model N-CA55-500/CA125.

 $<sup>^{\</sup>rm o}{\rm N}1600\mbox{-}0329\mbox{-}4A\,$  – Toyota 5R & 4P 4 bolt NCA100 carb.

<sup>&</sup>lt;sup>10</sup> N1600-0329-4A - Toyota 5R & 4P 4 bolt N NCA100 carb.

 $<sup>^{\</sup>rm 11}\,\text{N}1600\text{-}0329\text{-}5\text{A}\,$  - Toyota 5R-4P 2 bolt with airhorn NCA125 carb.

 $<sup>^{\</sup>scriptscriptstyle{12}}\text{Toyota}$  FG10-25 3P/2R NCA125 carb with A/C.

 $<sup>^{13}</sup>$ Toyota NCA100 carb for 4Y applications. No governor available except thru Toyota.

 $<sup>^{14}</sup>$  N-CA125 with  $2\% \epsilon^{\text{\tiny{II}}}$  air horn is too tall. Build air clenar right to carb.

 $<sup>^{\</sup>scriptscriptstyle 15}\text{Carb}$  for 3.0L 181 GM N1600-0792A.

<sup>&</sup>lt;sup>16</sup>Use adapter to go into airstream. Will work for trucks with travel speed controller.

 $<sup>^{\</sup>scriptscriptstyle 17}\mbox{Will}$  fit on Toyota 6 series trucks with GM 4.3L VORTEK EFI.

YALE					Throttle	Ctr to	Air			Bridge	Tank
Part No	Engine	Model	Carb No.	Mixer	Body	Ctr	Horn	Regulator	Lockoff	Plate	Bracelet
N1001-0280	CONT F163	G-51-C-030, 035, 040, 050	N1600-0280A	N00-0803A	N00-7239	211/16" to 215/16"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0286	CHRY SLANT 6 H225	G-83C-040, 045, 050, 055, 060, 070, 080, 100	N1600-0286-2A	N00-1601A	N00-7239	2¹1⁄/₁6"	25/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0286	CHRY SLANT 6 H225	G-83C-040, 045, 050, 055, 060, 070, 080, 100	N1600-0286-1A	N00-0805A	N00-7239	211/16"	<b>2</b> 5/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-02881	MAZDA UA	GLC/GLP 020-050 AA	N1600-0288A	N00-0803A	N00-7208	2 <sup>11</sup> // <sub>6</sub> "	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N1001-0408 <sup>2</sup>	MAZDA VA	GP/GLC 020- 060 Raj P series	N1600-0408A	N00-0803A	N1-7202	53 MM	21/16"	N00-0014A	N00-0125A	NONE	N5-1000A
N1001-04223	MAZDA D5,FE, F2	GC GP 030UA / RD / RE / TEN AA	N1600-0422A	N00-0803A	N1-7206	2¾"	21/16"	N00-0005A	N00-0125A	NONE	N5-1000A
N10-0425-00004	MAZDA VA	GC/GP 030- 060 ABJ / RCJ	N1600-0425A	N00-0803A	N00-7239	2 <sup>11</sup> // <sub>6</sub> "	21/16"	N00-0005A	N00-0125A	N5-2093	N5-1000A
N10-0710-1A	F2 OR FE	GP040/060RF/ TG/RG/TF	N1600-0710-1A	N00-0801A	N00-7239	211/16"	11/8"	N00-0005A	N00-0125A	N5-2014A	N5-1000A
N10-0710-2A	F2 OR FE	GP040/060RF/ TG/RG/TF	N1600-0710-2A	NOO-0801A	N1-7206	2¾"	11/8"	N00-0005A	N00-0125A	N5-2014A	N5-1000A
N10-0716-0000 <sup>5</sup>	MAZDA D5 / FE	GLC/P 030-050 Ab/Ad/Ae Af/ Bf/Cd/de	N1600-0716A	N00-0801A	N1-7206	2¾"	11/8"	N00-0005A	N00-0125A	NONE	N5-1000A

 $<sup>^{\</sup>scriptscriptstyle 1}\mbox{\ensuremath{\mbox{Verify}}}$  CTR to CTR to be 2%". Carburetor is side draft.

 $<sup>^{\</sup>rm 2}\mbox{Verify CTR}$  to CTR & pay attention to three letters following model, i.e. GP040RAJ.

<sup>&</sup>lt;sup>3</sup> Verify CTR to CTR.

<sup>&</sup>lt;sup>4</sup>Down draft carburetor.

 $<sup>^{\</sup>rm s}\mbox{Verify C.C }2\%\mbox{"}$  Yale part number for governor is 9012798-96.

### **UNIVERSAL KITS**

			Reg/Lock-	lank	
Kit No	Regulator	Lockoff	off Bracket	Bracket	Notes
N1001-0327	N00-0005A	N00-0125A	N5-0038	N5-1000A	COMPLETE UNIVERSAL KIT
(WATER COOLED)	N-JB	N-VFF-30	N5-0260		
N1001-0327-1	N20-0304	N00-0125	N5-0700	N5-1000A	COMPLETE UNIVERSAL KIT
(AIR COOLED)	CENTURY P2379	N-VFF-30	N5-0038		
N4001-0000 <sup>1</sup>	N00-0005A	N3-0164-1	N5-0038	N5-1000A	COMPLETE DUAL FUEL (LP/GASOLINE) KIT
(WATER COOLED)	N-JB	<b>ELECTRIC LOCKO</b>	F	N5-0260	
N4002-00041	N20-0304	N3-0342	N5-0700	N5-1000A	COMPLETE DUL FUEL (LP/GASOLINE) KIT
(AIR COOLED)	CENTURY P2379	<b>INLINE ELECTRIC</b>			
N40-0530-0019 <sup>2</sup>	N19-7100	N3-0342	N19-3507	N5-1000A	COMPLETE DUAL FUEL (LP/GASOLINE) KIT
(WATER COOLED)	BEAM 60	INLINE ELECTRIC	<b>AP-1507 UNIVERSAL</b>		ADAPTER STYLE
N10-0662-0000	N-H420-SA	N00-0125A	N5-0725	NONE	COMPLETE UNIVERSAL KIT FOR VEHICLES WITH
	N-H420	N-VFF-30	N5-0008		INDUSTRIAL V8 ENGINES, TANK BRACKETS
					PURCHASED ADDITIONAL.

<sup>&</sup>lt;sup>1</sup> Ask air horn size.

Information needed to build a universal kit:

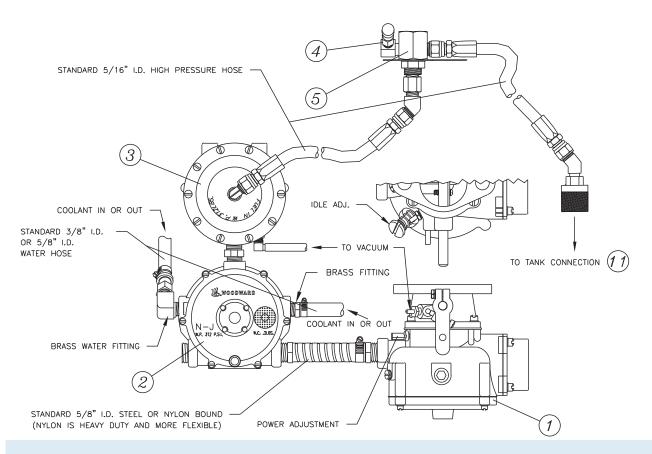
- 1. Make, Model, and Engine?
- 2. Center-Center on manifold studs. 2-Bolt or 4-Bolt pattern, Single, Double, or Four Barrel?
- 3. What is the O.D. of the air horn?
- 4. Does the carburetor have single or double linkage? Does the engine have a governor?
- 5. Is the existing carburetor a straight carburetor or a 90° elbow?
- 6. If Dual Fuel, what is the I.D. of the air cleaner hose?

### **CARBURETOR FLANGE ADAPTERS**

S.A.E CARB.	BOLT SPACING
1/2"-5/8" (12.7-15.9 mm)	1-13/16" (46.04 mm)
3/4" (19.1 mm)	2-1/4" (57.15 mm)
1" (25.4 mm)	2-3/8" (60.36 mm)
1-1/4" (31.75 mm)	2-11/16 (68.26 mm)
1-1/2" (38.1 mm)	2-15/16" (74.61 mm)
1-3/4" (44.45 mm)	3-5/16" (84.14 mm)
2" (50.8 mm)	3-9/16" (90.49 mm)
2-1/2" (63.5 mm)	2-7/8" (73.03 mm)
3" (76.2 mm)	3-1/4" (82.55 mm)
3-1/2" (88.9 mm)	3-23/32" (94.46 mm)
4" (101.6 mm)	4-1/8" (104.8 mm)

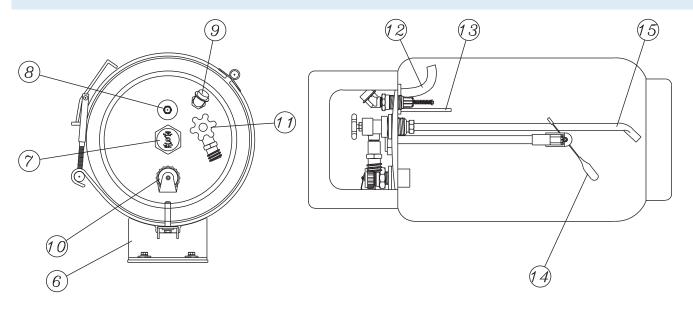
Flange size is best determined by bolt spacing as bore size can vary.

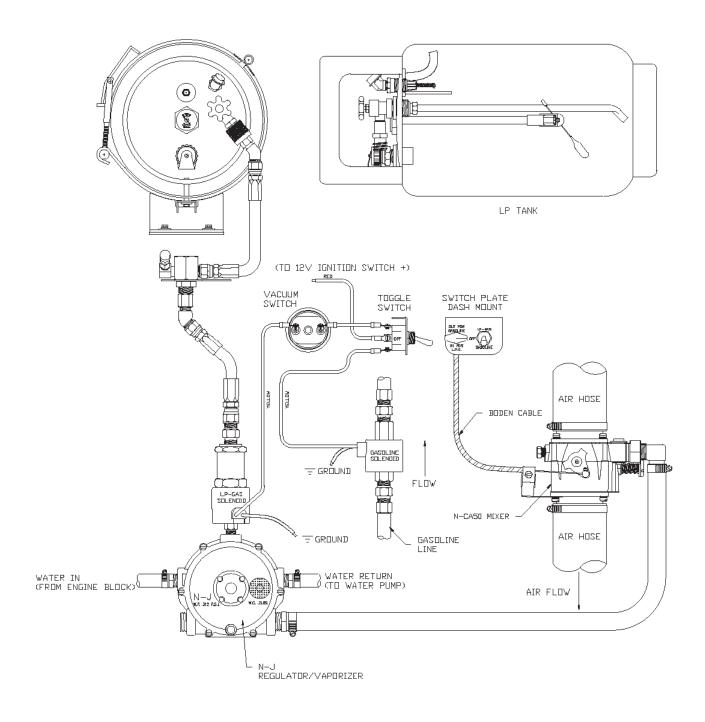
<sup>&</sup>lt;sup>2</sup> Ask air horn size for adapter.

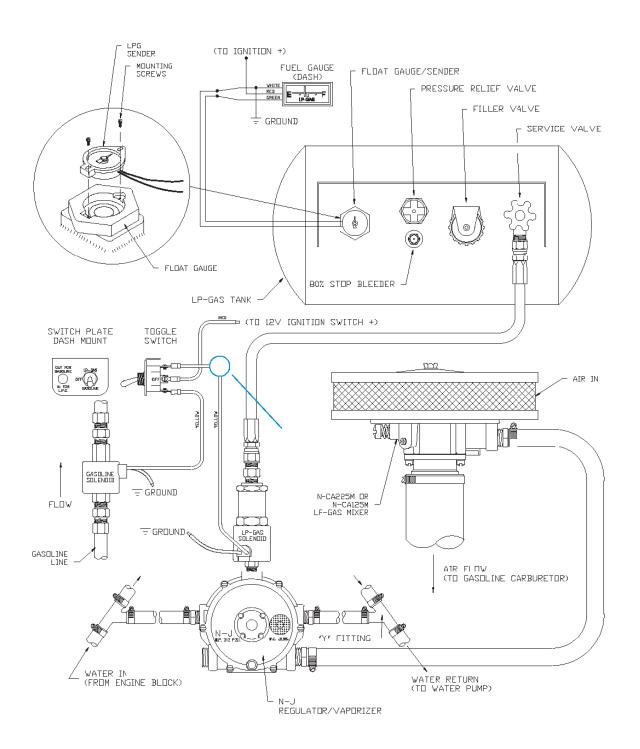


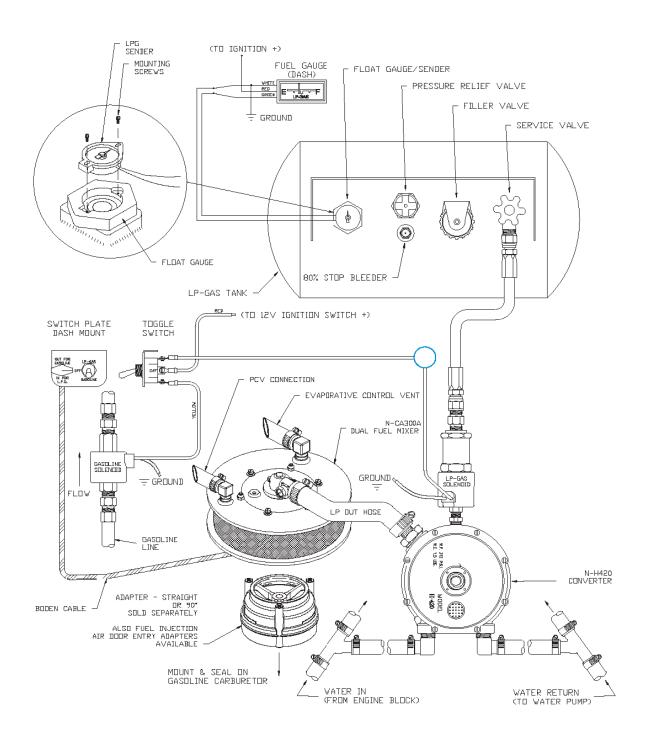
- 1. N-CA100 Mixer
- 2. N-J Vaporizer/Regulator
- 3. N-VFF-30 Vacuum Fuelock Filter
- 4. Hydrostatic Relief Valve
- 5. Bulkhead Fitting
- 6. Tank Bracket

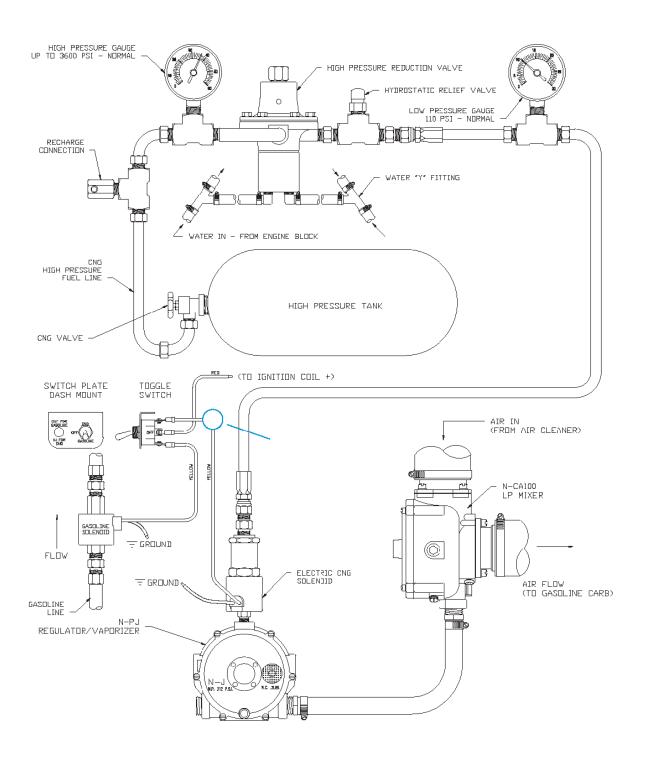
- 7. Fuel Gauge
- 8. 80% Stop Bleeder
- 9. Pressure Relief Valve
- 10. Filler Valve
- 11. Service Valve w/Tank End Male Coupling
- 12. Vapor Withdrawal Tube (Vapor Only)
- 13.80% Limiter Tube
- 14. Fuel Level Float
- 15. Liquid Withdrawal Tube

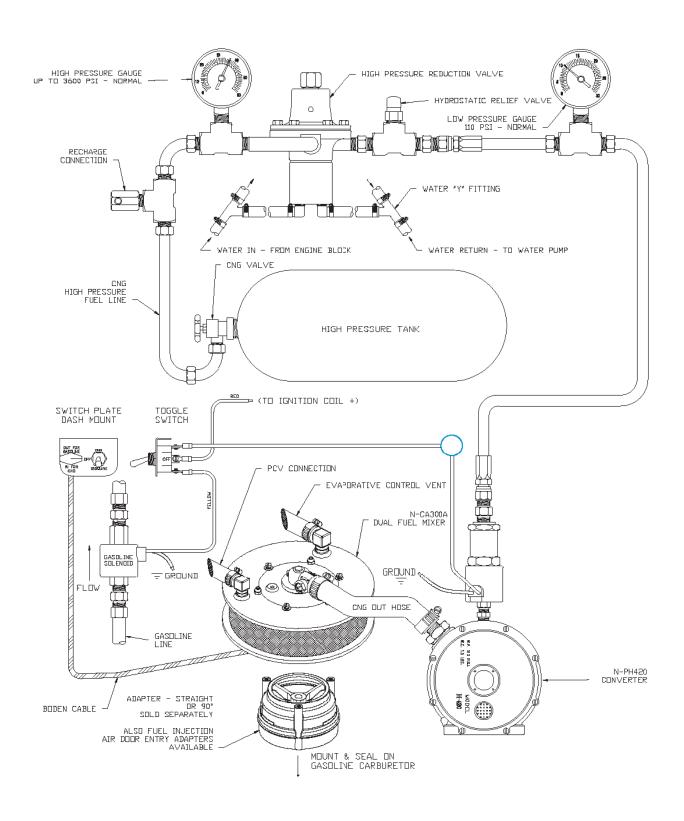


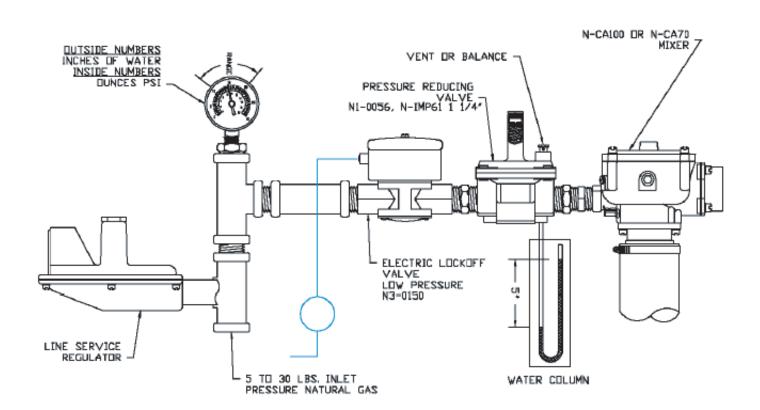


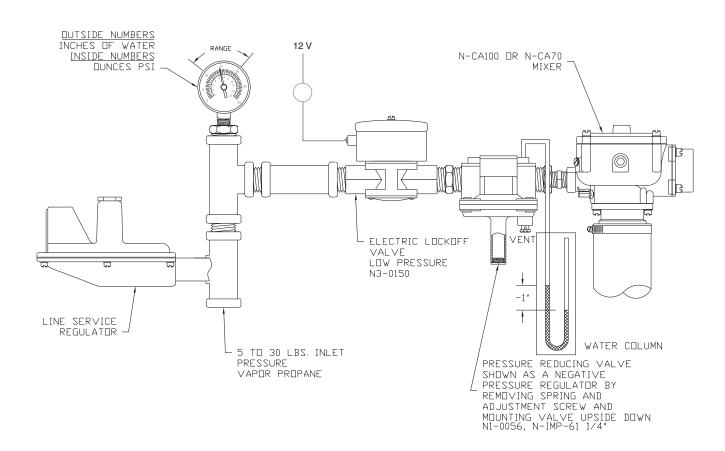


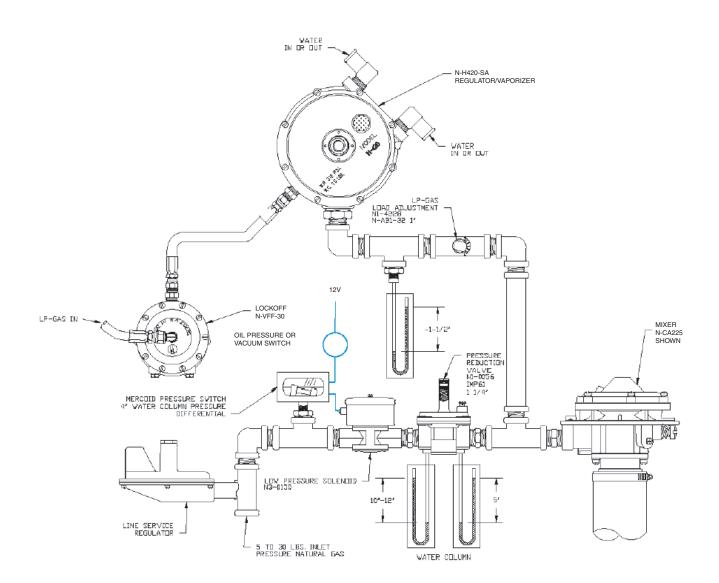


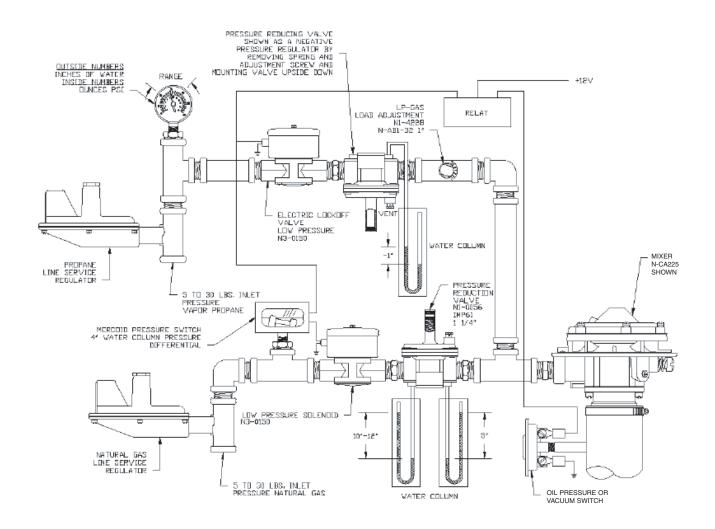


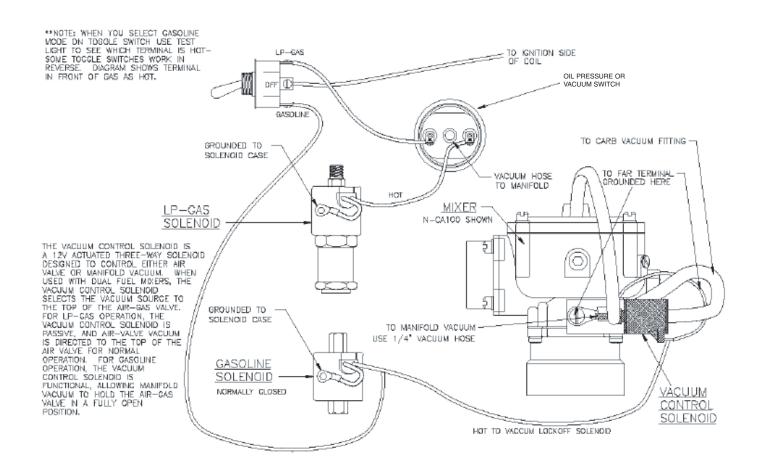


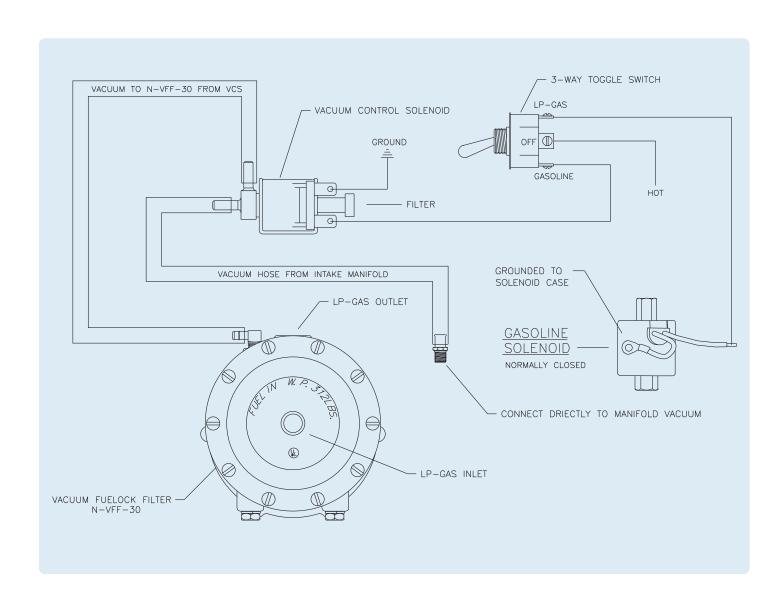


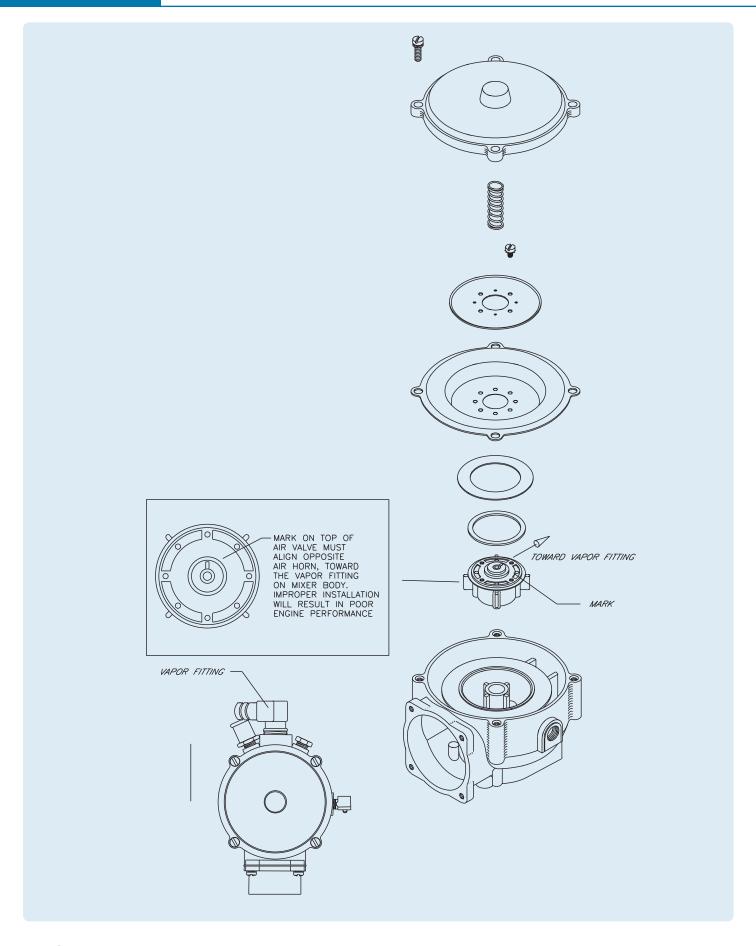












### **FUEL CHARACTERISTICS OF VARIOUS FUELS**

	Methane	Propane	LNG	Gasoline	Diesel
Formula	CH <sub>4</sub>	$C_3H_8$	CH <sub>4</sub>	$C_8H_{16}$	$C_{12}H_{26}$
Research Octane	130	112	130	91-98	_
Motor Octane #	130	97	130	83-90	
Cetane #	-10	5-10	-10	8-14	40-65
Density of Liq. Fuel (lbs/ft³) / (kg/L)	_	31.78 / .509	26.28 / .421	46.57 / .746	50.44 / .808
Density of Gas (lbs/ft³) / (kg/m³)	.041/.6512	.032 / .508	_	.275/ 4.4	_
Boiling Point (°F)/(°C)	-259/ -162	-44 / -42	-259/ -162	(81-464)/ (27-240)	_
Lower Heating Value (BTU/lb) / (kJ/L)	21,463/ 49,913	19,882/ 46,238	21,463/ 49,913	18,334/ 42,661	18,670/ 43,419
Energy Content (by Volume) (BTU/ft³) / (kJ/L)	213,300/ 7875	637,500/ 25,535	569,200/ 21,013	862,100/ 31,825	950,400/ 35,082
Energy (wrt) Gasoline	25%	74%	66%	100%	110%
Energy (wrt) Diesel	22%	67%	60%	91%	100%
Stoichiometric A/F Ratio (mass)	17.30	15.70	17.30	14.70	15.00
Heat of Vaporization (BTU/lb) / (kJ/kg)	218 / 507	182 / 423	218 / 507	153 / 355	123 / 286
Energy of Stoich. Mixture (BTU/lb) / (kJ/L)	97.0 / 3.58	103 / 3.79	97.0 / 3.58	106 / 3.91	_
Auto Ignition Temp. (°F)/(°C)	1004 / 540	842 / 450	842 / 450	428 / 220	437 / 225
Peak Flame Temp. (°F)/(°C)	3254 / 1790	3614 / 1990	3254 / 1790	3591 / 1977	3729 / 2054
Flammability Limits (Vol %)	5.3-15	2.1-10.4	_	1.4-7.6	_
Detonation Limits (Vol %)	6.3-13.5	3.4-35	6.3-13.5	1.1-3.3	_
Flame Spread Rate (ft/s) / (m/s)	_	_	_	(13.1-19.7)/ (4-6)	_
Max. Burning Vel. in STP Air (ft/s) / (cm/s)	(1.21-1.48)/ (37-45)	(1.41-1.71)/ (43-52)	(1.21-1.48)/ (37-45)	(1.21-1.41)/ (37-43)	_
Specific Gravity at STP (lbs/ft³) / (kg/m³)	.034 / .55	.095 / 1.52	.034 / .55	(.125250)/ (2-4)	(.250375)/ (4-6)
Quenching Gap in STP Air (in.)/(mm)	.080 / 2.03	.070 / 1.78	.080 /2.03	.078/2	_
Flame Visibility, Relative	0.60	0.60	0.60	1.00	1.00
Flash Point (°F)/(°C)	_	_	-306 /-188	_	125 / 52

**COMPARISON OF AUTO-IGNITION TEMPERATURE.** The autoignition temperature is the temperature at which fuel will ignite without a flame or spark. In respect to auto-ignition temperatures, LPG, CNG, and LNG are safer than gasoline or diesel because the auto-ignition temperature is much higher.

**COMPARISON OF PEAK FLAME TEMPERATURE** The flammability range is the distance from the leanest (LEL) to the richest (UEL) mixture of fuel and air that will burn. Fuel with narrower ranges are safer to work with, but are less versatile because they offer less choice of air-fuel ratios. CNG has a peak flame temperature of 1790°C/3254°F, which is 187°C/337°F (9.5%) cooler than the peak flame temperature of gasoline at 1977°C/3591°F. The peak flame temperature of LPG at 1991°C/3614°F is only 13°C/23°F (less than 1%) higher than gasoline.

**COMPARISON OF ENERGY CONTENT** Energy content per unit of fuel (energy density) is an important factor affecting range and power output of internal combustion engines. The higher the energy content of the fuel, the more power the engine will make.

**VOLUMETRIC EFFICIENCY** The amount of air entering an engine at a particular throttle angle and load is fixed. Any fuel added to the air before it enters the cylinder will displace an equal volume of air and will reduce the volumetric efficiency and power output of the engine. Reductions are as follows:

Diesel - less than 1% (approx.) Gasoline - 1-2% (approx.)

LPG - 4% (approx.) CNG - 9% (approx.)

### What is LPG?

LPG is "liquefied petroleum gas" commonly known as propane (C<sub>3</sub>H<sub>8</sub>), a combustible hydrocarbon based fuel. It comes from the refining of crude oil and natural gas. At normal pressure (29.92" Hg) and temperatures above -44°F/-45°C, propane remains in its gaseous form. At lower temperatures and/or higher pressures, propane becomes a liquid.

Propane is colorless and odorless. For safety reasons propane is required to be odorized. There are currently three grades of propane available: HD5 for internal combustion engines, commercial propane, and propane/butane mixture for other uses. The exact composition of propane varies slightly between different parts of the country and different refineries. Compared to gasoline, the energy content of LPG is 74%.

### What is CNG?

CNG is "compressed natural gas." Natural gas (CH<sub>4</sub>) is a naturally occurring mixture of combustible hydrocarbon gases found in porous formations beneath the earth's surface. Natural gas is created by the decomposition of plant and animal remains, under great heat and pressure, over very long periods of time.

Natural gas can be found as:

Non-associated gas - free gas not in contact with significant amounts of crude oil in the reservoir.

Associated gas - free gas in contact with crude oil in the reservoir.

Dissolved gas - gas in solution with crude oil in the reservoir.

For safety reasons CNG is required to be odorized. Compared to gasoline, the energy content of CNG is 25%.

#### **PROPANE**

Compo	nent	Volume
Propane	$C_3H_8$	90.00% min.
Propylene		up to 5.00%
Butane	$C_4H_{10}$	2.00%
Iso-Butane		1.50%
Methane	$CH_4$	1.50%
	Total	100%

#### **NATURAL GAS**

Compone	nt	Volume
Methane	CH <sub>4</sub>	90.00%
Ethane	$C_2H_6$	3.60%
Propane	$C_3H_8$	1.00%
Butanes	$C_4H_{10}$	0.30%
Pentanes	$C_4H_{10}$	0.10%
Hexanes	$C_6H_{14}$	0.10%
Carbon Dioxide	CO <sub>2</sub>	1.00%
Nitrogen	$N_2$	1.60%
	Total	100.00%

VAPOR WITHDRAWAL LP FUEL TANKS Vapor withdrawal LPG fuel tanks are designed for fuel systems that require fuel to be supplied to the pressure regulator in vapor form. Since propane expands 270 times as it changes from a liquid to a vapor, far less fuel can flow through the fuel line to the engine. As a result, vapor withdrawal systems are used primarily on small displacement engines.

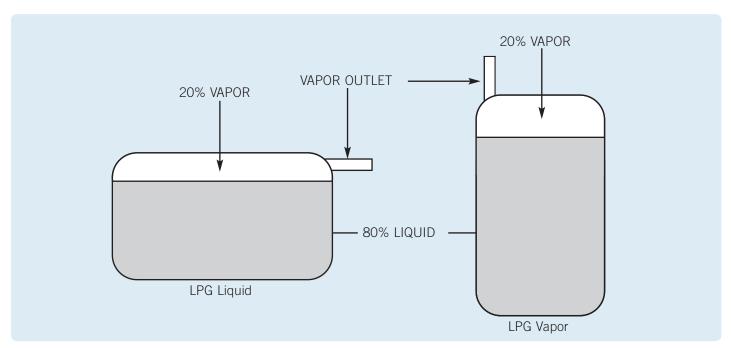
Inside the fuel tank is a dip tube attached to a vapor outlet port. This dip tube is designed so that the open end is positioned in the vapor space above the 80% liquid level of the fuel tank when the tank is properly positioned horizontally or vertically. It is very important that the fuel tank not be filled with LPG to more than 80% of total water capacity. Over-filling and/or incorrect positioning of the fuel tank may allow liquid propane to enter the vapor fuel system through the vapor outlet port of the tank, causing the fuel system to malfunction. Frost forming on the vapor pressure regulator may be an indication that the fuel tank is over-filled and/or incorrectly positioned.

On vapor withdrawal fuel systems, the propane, stored as a liquid in the fuel tank, is allowed to vaporize in the tank before entering the fuel system. Since propane

absorbs heat when it vaporizes, the surface area of the fuel tank must be capable of supplying enough heat from the surrounding air to support the vaporization process. If the surface area of the fuel tank is not large enough to support the vaporization process, fuel pressure will drop and a reduction of engine power output may result. Frost forming on the outside of the fuel tank is an indication that the surface area of the fuel tank is not large enough to support the rate of vaporization.

LIQUID WITHDRAWAL LP FUEL TANKS Liquid withdrawal LPG fuel tanks are designed for fuel systems that require fuel to be supplied to the pressure regulator in liquid form. Inside the fuel tank is a dip tube attached to a liquid outlet port. This dip tube is designed so that the open end reaches the bottom of the fuel tank when the tank is positioned properly. Incorrect positioning of the fuel tank may allow propane vapor to enter the liquid outlet port of the tank. A lack of engine power output and/or frost on the fuel tank may be an indication that the tank is not positioned properly.

The schematic below shows the proper tank orientation.



Proper tank orientation for LPG liquid and LPG vapor fuels.

### SELECTING THE CORRECT CARBURETOR SIZE

Match your engine cubic inch displacement (CID) and engine RPM to determine your required cubic feet/minute (CFM), then choose the correct carb on the charts below.

### **ENGINE RPM (REVOLUTIONS PER MINUTE)**

						E	NGINE I
Engine CID	400	600	800	1000	1200	1400	1600
50	5	7	10	12	15	17	20
100	10	14	18	23	28	33	37
150	14	21	28	35	42	49	56
200	19	28	37	46	56	65	74
250	23	35	47	58	70	78	93
300	28	42	56	70	84	98	112
350	32	49	65	81	98	114	130
400	37	56	74	93	111	130	148
450	42	63	83	109	129	149	169
500	46	84	93	116	139	162	185
550	51	76	102	128	153	177	203
600	56	84	112	138	166	194	221
650	61	91	121	151	181	211	241
700	65	98	130	462	195	227	260
750	70	109	139	174	209	244	279
800	74	112	149	186	223	261	299
850	79	119	158	197	237	277	316
900	84	125	167	209	252	294	336
950	89	133	177	221	266	310	355
1000	93	139	186	233	280	327	374
1050	97	146	195	245	294	343	392
1100	102	156	202	253	305	357	409
1150	106	164	214	268	322	375	428
1200	111	172	223	279	335	391	447
1250	115	180	232	290	349	408	467
1300	120	187	244	304	364	425	485
1350	125	194	250	315	378	440	503
1400	130	196	260	326	392	457	523
1450	134	202	270	338	404	469	537
1500	140	208	279	350	420	489	559
1550	144	216	289	362	434	506	579
1600	149	224	299	373	448	522	596
1650	152	232	307	385	459	538	616
1700	158	240	316	396	476	556	636
1750	163	244	325	407	489	571	653
1800	168	250	333	419	500	586	666
1850	172	258	345	430	517	603	690
1900	177	266	354	442	531	619	707
1950	181	272	360	453	544	634	725
2000	186	279	372	466	549	651	744
2050	191	285	380	476	572	667	763
2100	195	293	390	490	588	685	783
2150	200	300	400	500	600	700	800
2200	205	306	410	510	614	718	822
2250	210	313	420	525	630	735	840
2300	215	320	430	535	643	750	858
2350	219	329	440	545	657	768	879
2400	223	334	450	559	671	780	890
2450	228	341	460	570	684	798	912
2500	232	349	466	583	698	813	928
2550	238	356	473	595	711	827	943
2000	230	550	7/3	535	/ 1.1	027	243

Engine air flow requirements listed on this chart are at 85% of volumetric efficiency for four-cycle engines.

For two-cycle engines, double the cubic feet/minute figure shown.

To convert liters to cubic inches, multiply by 61.02.

# CARB SIZING BY AIR-FLOW VEHICLE ENGINE APPLICATIONS WIDE OPEN THROTTLE 1-1/2" HG MANIFOLD DEPRESSION

Model	Rated Horsepower	Cubic Feet/Minute	Cubic Feet/Hour
N-CA55	67 HP	108 CFM	6,480 CFH
N-CA100	106 HP	170 CFM	10,200 CFH
N-CA125	126 HP	202 CFM	12,120 CFH
N-CA200	172 HP	276 CFM	16,560 CFH
N-CA225	205 HP	329 CFM	19,740 CFH
N-CA300 (Standard)	217 HP	348 CFM	20,880 CFH
N-CA300-50	290 HP (High Flow)	450 CFM	27,000 CFH

## CARB SIZING BY AIR-FLOW INDUSTRIAL ENGINE APPLICATIONS WIDE OPEN THROTTLE 2" HG MANIFOLD DEPRESSION

Model	Rated Horsepower	Cubic Feet/Minute	Cubic Feet/Hour
N-CA55	77 HP	124 CFM	7,80 CFH
N-CA100	123 HP	197 CFM	11,820 CFH
N-CA125	146 HP	235 CFM	14,100 CFH
N-CA200	215 HP	345 CFM	20,700 CFH
N-CA225	237 HP	380 CFM	22,800 CFH

#### **AIR-FLOW CAPACITIES.**

It is important to size correctly the air-flow capacity of the conversion carburetor to the engine airflow requirement. Specifying the correct carburetor is vital because a carburetor too small for a given engine limits horsepower. Up to a specific RPM, normal torque is obtained. Beyond that point, as air-flow is limited by the carburetor, torque falls off, with consequent diminishing of performance.

A carburetor excessively large for an engine may cause starting troubles. Idle will not be stable, and fuel mixture will not be consistent. As a general rule, the air-flow capacity of the carburetor should be reasonably close to the air-flow requirement of the engine being converted. However, the type of service the engine performs is a necessary consideration in selecting the appropriate carburetor (or mixer). Keep in mind the following:

Engines which are never operated at wide open throttle give the best performance and service with under carburetion. Services typical of this situation include lift trucks and passenger car applications.

Engines with a degree of under carburetion are easier to start and will develop the low end torque required in these types of service.

### DETERMINING ENGINE AIR-FLOW REQUIREMENTS WITH THE CHARTS.

The charts give engine air-flow requirements for some common displacements at various RPMs. Find the value (air-flow requirement) for the engine with which you are concerned at the point where nearest size and speed (CID and RPM) intersect.

### FORMULAS FOR CUBIC-FEET-PER-MINUTE (CFM) AIR FLOW REQUIREMENTS.

Determining specific air-flow requirement for any engine requires only the application of the following formulas:

### NATURALLY ASPIRATED ENGINES (CARBURETED)

### CID x RPM / $1728 / 2 \times .85 = CFM$ Required

The engine air-flow requirement determined by this formula is at 85% of volumetric efficiency for four-cycle engines. For two-cycle engines double the cubic feet/minute value.

- 1. Determine the cubic inch displacement of the engine from the identification plate or the user's manual. (If the displacement is known in cubic centimeters, convert to cubic inches by multiplying cubic centimeters by .06102. If in liters, convert to cubic inches by multiplying liters by 61.02.)
- 2. Multiply the figure by the RPM figure corresponding to the maximum engine speed at wide open throttle. (Use the point at which the tachometer is redlined. If the engine is not equipped with a tachometer, refer to the user's manual supplied with the vehicle or engine).
- 3. Divide this CIM (cubic inches per minute) by 1728 to

obtain cubic feet per minute.

- 4. Divide the result by 2 (for four-stroke engines).
- 5. Multiply the figure you obtain by .85 (for 85% volumetric efficiency.
- 6. This figure is the precise air-flow requirement for the engine, accurate to one cubic foot/minute.

### Example:

351 CID x 4000 RPM = 1,404,000 cubic inches perminute

1,404,000 / 1728 = 812.5 CFM (2 stroke) 812.5 / 2 = 406.25 CFM (4 stroke)

406.25 / .85 = 345 CFM (at 85% volumetric efficiency)

#### **FUEL INJECTED ENGINES**

Due to the improved intake manifold design, use 100% of volumetric efficiency for fuel injected engines.

### CID x RPM / 1728 / 2 = CFM Required

### Example:

351 CID x 4000 RPM = 1,404,000 cubic inches perminute

1.404.000 / 1728 = 812.5 CFM (2 stroke) 812.5 / 2 = 406.25 CFM (4 stroke) 406.25 = 406.25 CFM (at 100% volumetric efficiency)

#### **TURBOCHARGED ENGINES**

(with mixer upstream of turbocharger)

### CID x RPM / $1728/2 \times \%$ boost pressure + 1.00 = CFM Req'd

Normal air inlet pressure to the engine is 14.7 PSI (one atmosphere). Adding a turbocharger merely serves to increase the inlet pressure. For example, p PSI boost equates to 14.7 plus 6 PSI, or a combined inlet pressure of 20.7 PSI (or 140% of on atmosphere) at sea level. Here is how this works starting with the above formula:

- I. One atmosphere equals 14.7 PSI.
- II. 6 PSI boost equals 40% of one atmosphere.
- III. Thus you must multiply the normal CFM by 1.4 to establish the requirement for six pounds of boost pressure.

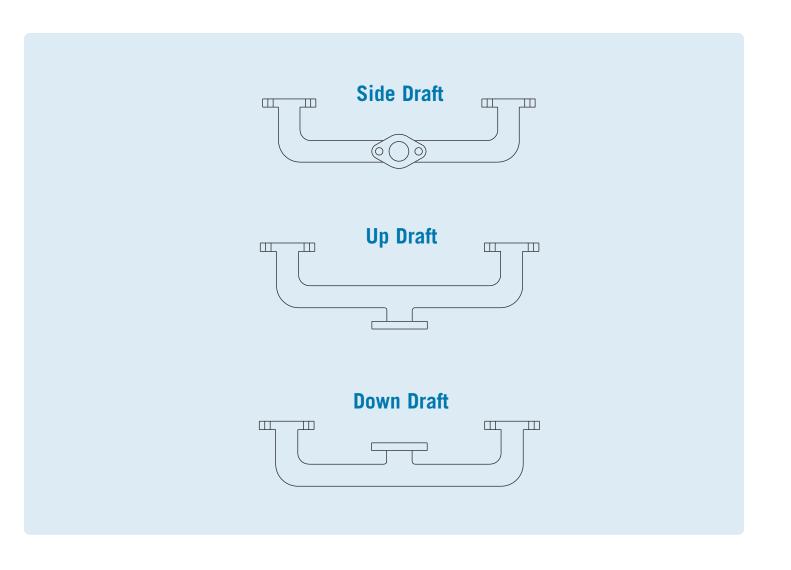
#### Example:

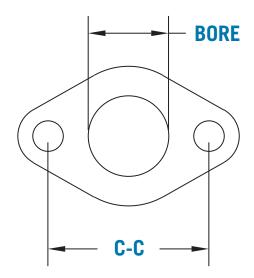
351 CID x 4000 RPM = 1,404,000 cubic inches per minute 1,404,000 / 1728 = 812.5 CFM (2 stroke) 812.5 / 2 = 406.25 CFM (4 stroke)  $406.25 \times 1.4 = 568.75 \text{ CFM (at 6 PSI boost)}$ 

In selecting the correct carburetor or mixer from the listing, bear in mind whether the conversion is to be straight propane or duel fuel (propane and gasoline). All models listed are available for straight fuel or duel fuel applications.

#### KEY:

CFM: Cubic feet per minute CID: Cubic inch displacement CIM: Cubic inch per minute PSI: Pound per square inch RPM: Revolutions per minute





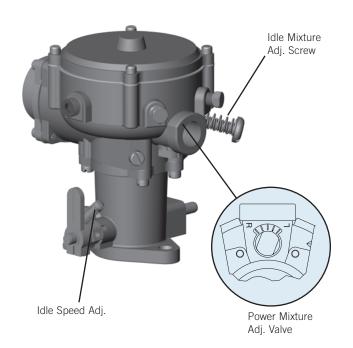
THROTTLE		BOLT SPACING					
BODY	BORE SIZE	CENTER TO CENTER (C-C)					
N1-7251	1/2"-5/8" (12.7-15.9 mm)	1-13/16" (46.04 mm)					
N1-7201, N1-7253	3/4" (19.1 mm)	2-1/4" (57.15 mm)					
N1-7206 N1-7255	1" (25.4 mm)	2-3/8" (60.36 mm)					
N1-7208 N00-7239	1-1/4" (31.75 mm)	2-11/16" (68.26 mm)					
N1-7210 N1-7212 N00-7239	1-1/2" (38.1 mm)	2-15/16" (74.61 mm)					
N1-7214 N1-7216	1-3/4" (25.4 mm)	3-5/16" (84.14 mm)					
N1-7220	2" (50.8 mm)	3-9/16" (90.49 mm)					

# FUEL SYSTEM ADJUSTMENT USING AN AIR-FUEL RATIO ANALYZER

- 1. Start the engine and allow it to warm to its normal operating temperature.
- 2. Install the air-fuel ratio analyzer sampling tube into the exhaust pipe.
- 3. Adjust the engine idle to the OEM specifications. To do this, turn the screw located on the throttle stop "IN" to increase idle speed, and "OUT" to decrease idle speed.
- 4. Adjust the idle mixture. Using the air/fuel ratio analyzer, turn the idle mixture screw out slowly in 1/2 turn increments, pausing after each turn to allow the analyzer to read the sample (about 30-45 seconds). Turning the screw "OUT" will lean the mixture, turning it "IN" will richen the mixture. Set the mixture (14.0-14.9 to 1 air/fuel ratio for propane and 15.5 to 16.5 air/fuel ratio for natural gas) by adjusting the idle mixture. You may have to reset the idle speed, as it may increase or decrease by this adjustment.
- 5. To adjust the power valve, accelerate to full throttle and introduce a maximum load to the engine (depending on the equipment you are working on, this could be a hydraulic, electric or a transmission stall). With the sample tube still in the exhaust pipe, move the power valve to the maximum lean setting. The engine should lose power, and CO should drop. At that point, begin turning the power valve slightly towards the rich position. Set the mixture (14.0-14.9 to 1 air/fuel ratio for propane and 15.5 to 16.5 air/fuel ratio for natural gas), and when you have reached manufacturer's maximum load speed, allow the engine to return to idle. Then, reintroduce the load and check the air/fuel ratio analyzer. It should remain within the previous set specification. If you are unable to achieve this setting, check the gas valve and mixer body for wear.
- 6. Once you have achieved your desired setting on the power valve, allow the engine to return to idle. You may need to readjust the idle setting, as adjusting the power valve may affect the idle settings. Refer to Steps 3 and 4 for idle setting.
  - If you were unable to reach any of these settings, check the air valve to ensure proper size and application.

# FUEL SYSTEM ADJUSTMENT USING AN EMISSIONS ANALYZER

- 1. Run the engine and allow it to warm up to its normal operating temperature.
- 2. Install the emission analyzer sampling tube into the exhaust pipe.
- 3. Adjust engine idle RPM to the OEM specifications. To do this, turn the screw located on the throttle stop "IN" to increase idle speed, and "OUT" to decrease idle speed.
- 4. Adjust the idle mixture using the emissions analyzer. Turn the idle mixture screw out slowly in 1/2 turn increments, pausing after each turn to allow the analyzer to read the sample (about 30-45 seconds). Turning the screw "OUT" will lean the mixture, turning it "IN" will richen the mixture. Set the mixture (.50%-.90% CO for propane and natural gas) by adjusting the idle mixture. You may have to reset the idle speed, as it may increase or decrease by this adjustment. If you are unable to adjust below the 1% CO level you may need to inspect the mixer. The body may be worn or the gas valve may need replacing. If you are unable to richen the mixture, check for vacuum leaks or reinspect the mixer for body wear.
- 5. To adjust the power valve, accelerate to full throttle and introduce a maximum load to the engine (depending on the equipment you are working on, this could be a hydraulic, electric or a transmission stall). With the sample tube still in the exhaust pipe, move the power valve towards the lean setting until you obtain .50% to 1.0% CO reading. At that point, begin turning the power valve slightly towards the rich position.



#### PRELIMINARY INSPECTION

Before any engine is converted to run on propane, it should be carefully inspected to determine its condition.

It does not make sense to spend a lot of time and money installing a propane fuel system on an engine that isn't in good mechanical condition. Such an engine will not deliver satisfactory performance, and any subsequent problems or mechanical failures the engine experiences will probably be unjustly blamed on the use of propane fuel.

A summary of the items that should be checked are listed below. Checking each and every item described below is not necessary on every conversion. Keep in mind, however, that checking the engine beforehand is good insurance in preventing trouble later on. The more thorough the inspection, the less likely problems are to appear afterwards. If the engine you're starting with is mechanically sound, you can be reasonably sure it will continue to perform well regardless of the fuel used.

#### PRELIMINARY INSPECTION OF ENGINE CONDITION

1. Engine Mileage or Hours \_\_\_

#### 2. Service History

Regular oil and filter change intervals? Regular tune ups? Past compression readings? Other problems?

# 3. Engine Performance

Exhaust smoke? Noises? Oil pressure? Operating Temperature?

#### 4. Engine Oil

Appearance? Contamination?

#### 5. Spark Plugs

Oil Fouling? Overheating?

#### 6. Compression

Cylinder #1	psi
Cylinder #2	psi
Cylinder #3	psi
Cylinder #4	psi
	psi
Cylinder #6	psi
Cylinder #7	psi
Cylinder #8	nsi

#### **CHECK MILEAGE**

One of the first things to check is the engine's mileage or accumulated hours of running time. On most vehicles, the mileage can be determined by simply reading the odometer. If the engine has been replaced or overhauled at some point in the past, find out when and figure only the mileage since then. On forklifts, industrial or off-road vehicles, and stationary engines, use the engine hour meter as your guide.

If an engine has more than 60,000 miles (96,560.64 km), chances are it may need a valve job in the near future.

Since propane can aggravate existing valve problems, it is extremely important that the valves be in good condition. High mileage engines should therefore receive a close inspection, including a compression check.

Another factor to consider when checking engine mileage is the type of use the engine has been subjected to during its life. Light-duty highway miles are not as hard on an engine as short trip stop-and-go miles or heavy-duty use.

#### **SERVICE HISTORY**

Determining the service history of a privately-owned passenger car or light truck can be difficult especially if the vehicle has changed owners. Fleet vehicles, on the other hand, typically have a detailed service record that includes dates and mileages for tune-ups, oil and filter changes, repairs, etc. If a service history is available, a quick scan can tell you whether the engine has been properly maintained.

If the oil and filters have been changed at regular intervals and the engine has no history of high oil consumption, the bearings, rings and other wear surfaces inside the engine should be in good shape. But if oil changes have been haphazard or infrequent, there's a strong possibility that trouble may be lurking in the crankcase.

# PRELIMINARY ENGINE INSPECTION BEFORE CONVERSION

#### **OBSERVE PERFORMANCE**

An experienced mechanic can often judge an engine's condition after observing how it runs and sounds for a few minutes. Start the engine and note how it behaves. Is it slow to start? Does it idle rough or miss? Either problem could indicate valve trouble. Watch the oil pressure and temperature gauges if the vehicle is so equipped. A low oil pressure reading is a clue that the main bearings are worn. A high temperature reading signals trouble in the cooling system. A buildup of mineral deposits on the inside of the engine block and heads may cause cooling problems if the engine is converted to propane. Check out the reason for the high temperature reading before converting the engine.

Listen for unusual noises. A deep metallic sounding rap that increases in intensity with engine speed is characteristic of a bad rod bearing. Piston slap when the engine is cold tells you there is excessive piston-to-cylinder clearance.

Rev the engine several times and observe the exhaust. Blue or black smoke may mean the engine is burning oil because of worn valve guides and/or piston rings.

If your observations reveal any suspicious clues, check them out carefully to find the cause.

#### **CHECK THE OIL**

Pull out the dipstick and examine the condition of the oil. If it has a muddy, frothy appearance with yellow or white foam present, it indicates moisture contamination. This can be a typical situation for engines that are operated for short periods of time and never reach normal operating temperature, but it can also signal neglected oil change intervals or a coolant leak.

Antifreeze contamination of the crankcase oil will quickly ruin bearings and cylinders. If you suspect a coolant leak, check the coolant level and pressure test the system. A hairline crack in the engine block or cylinder head, or a leaky head gasket can cause problems if not corrected.

Many fleets rely on periodic oil analysis to identify trace elements in crankcase oil resulting from engine wear, oil contamination and so on.

#### **READ THE SPARK PLUGS**

The spark plugs can also provide many clues about the engine's overall condition and state of tune. "Reading" the color and appearance of the deposits on the firing tip of the spark plugs will tell you what's happening inside the combustion chamber. The spark plugs must be removed for a compression test anyway, so this step does not require extra effort.

If an engine is in good condition and is properly tuned, the ceramic insulator around the electrode in the tip of the spark plug will have light brown, tan or gray deposits on it. Heavy black, oily deposits on the electrode insulator or plug shell are caused by oil burning (worn valve guides, piston rings or faulty PCV valve). These are not to be confused with fluffy black deposits which indicate a rich air/fuel condition. If the plug tips appear blistered, glazed or melted, it signals overheating, detonation or pre-ignition, any of which can cause engine damage.

#### **CHECK COMPRESSION**

After removing all the spark plugs from the engine, wedge the accelerator pedal or linkage to hold the carburetor throttle wide open. Install a compression gauge into one of the spark plug holes and crank the engine until you feel four or five "puffs." Write down the compression reading, and then repeat the test for each of the remaining cylinders. When you're through, the compression readings should not vary by more than 25 percent from the highest cylinder to the lowest.

Most engines in good condition will show compression readings between 110 and 160 psi. If the readings are substantially lower, down around 60 to 80 psi, the rings and/or valves are worn and should be repaired prior to converting the engine to run on propane.

To determine if the rings or valves are at fault, pour about an ounce of engine oil into the cylinder through the spark plug hole. Crank the engine over several times so the oil can temporarily seal the rings, then repeat the compression test. If the readings are now higher, the rings are worn. If there is little or no change, the valves are leaking.

A very low compression reading in two adjacent cylinders is a typical symptom of a blown or leaking head gasket. A zero reading in a cylinder usually indicates a bad valve.

## **Preliminary Inspection**

The ignition system plays a key role in determining engine performance regardless of the type of fuel used. It must provide sufficient firing voltage at precisely the right instant to ignite the air/fuel mixture in the cylinders. Any weakness in the system that reduces the available firing voltage can cause hard starting and misfiring as well as reduced fuel economy and performance.

Since propane is a "dry" fuel and because it runs with a leaner air/fuel ratio than gasoline, it takes more voltage to fire the spark plugs. A lean air/fuel mixture does not conduct electricity as well as a rich one so more voltage is needed to "push" the spark across the plug gap. Generally speaking, the plugs need a reliable 28,000 to 32,000 volts to fire consistently with the propane. If sufficient voltage is not available, misfiring will result.

Today's electronic ignition system can produce more than enough voltage, as can older point-type ignition systems. But for peak voltage output to be achieved, all the components in the ignition system must be in top condition. The ignition coil, distributor cap, rotor, plug wires and spark plugs, must all be up to specs as should the primary voltage in the ignition circuit that fires the coil. A one volt drop in the primary voltage, for example, can result in a 5,000 volt drop in coil output.

A faulty ballast resistor, resistance wire, ignition coil or excessive resistance in the plug wires can reduce the available firing voltage to the point where misfiring becomes a problem. Arcing around the coil high voltage tower, between the terminals inside the distributor cap, between the rotor and distributor housing or shaft, or from a plug wire to ground can also cause misfiring. Routing adjacent plug wires too close together or parallel to one another can induce cross-firing and backfiring.

It is very important, therefore, to make sure the ignition system is in good working condition before converting the engine to run on propane. Any weakness or problems should be corrected beforehand since propane will increase the demands on the system.

A preliminary inspection of the ignition system should include the following:

#### 1. FIRING VOLTAGE AND PATTERN

Observing ignition performance on an oscilloscope is the best way to detect ignition faults. The scope will identify common problems such as inadequate firing voltage, excessive point resistance, fouled spark plugs, bad plug wires, etc.

If an oscilloscope is not available, firing voltage can be checked with an old spark plug. Remove the outer electrode from the firing tip. This creates a 1/4" (6.35mm) gap across which spark must jump. To test the ignition system, remove a plug wire from one of the spark plugs and attach it to a modified spark plug. Then, ground the shell of the plug against the engine and have a helper attempt to start the engine. If the spark jumps across the 1/4" (6.35mm) gap on the end of your modified spark plug, the ignition system has sufficient firing voltage. If no spark is observed, the ignition system should be carefully inspected to diagnose the cause of the weak spark condition.

#### 2. IGNITION COIL

The ignition coil should be visually inspected for cracks or signs of carbon arcing around the high voltage tower and primary terminals. Coil output should be checked on the oscilloscope or with a spark tester as described above. If a weak coil is suspected, check the primary and secondary coil resistance with an ohmmeter. If it is not within specs, replace the coil.

#### 3. DISTRIBUTOR CAP AND ROTOR

The distributor cap and rotor should be removed and closely inspected for signs of wear, corrosion, cracking, or carbon tracking. If any problems are found, a new premium quality cap and/or rotor should be installed. On older point-type ignition systems, substituting a distributor cap made from high-dielectric strength plastic for the original bakelite cap is recommended, especially if any modifications are made such as installing a high output ignition coil or capacitive discharge ignition control.

#### 4. SPARK PLUG WIRES

The plug wires should be visually inspected for cracks, broken insulation or burns. The terminals should fit snugly into the distributor cap, and the boots should fit tightly around the spark plugs to keep out dirt, oil and moisture. Check each plug wire's resistance from end to end with an ohmmeter. If resistance exceeds factory specifications, a new set of premium quality wires should be installed.

The 8mm silicone resistance wiring found on most late model high voltage ignition systems will provide good service with propane. It requires no upgrading. Solid core wiring offers no performance advantage over resistance wiring, and substituting solid core for resistance wiring will create radio interference and may affect the operation of certain electronic components in some vehicles. On the older point-type ignition systems, upgrading to silicone wiring and boots is recommended though not necessary.

#### 5. SPARK PLUGS

The spark plugs should be removed and inspected. If the center electrodes are worn so that the tips appear round instead of flat, the spark plugs should be replaced. If the center electrodes are not worn much, the spark plugs can be cleaned and re-gapped. Spark plugs should be in good condition and gapped to .030" to .032" (.762mm to .813mm).

# **IGNITION MODIFICATIONS FOR LP-GAS**

#### **SPARK PLUGS (CONT.)**

Spark plugs are not an expensive item, and considering the fact that new plugs require less firing voltage than used plugs installing a new set of spark plugs is recommended for every propane conversion. The use of extended tip plugs can also enhance performance slightly because the firing tip is positioned further into the combustion chamber. Extended tip plugs are readily available for most engines and cost no more than standard plugs.

#### **IGNITION TIMING AND ADVANCE**

Ignition timing is another item that deserves close attention because many of the so-called problems that supposedly result from using propane are in fact due to incorrect timing. The most serious problem is detonation, which results from too much *total* spark advance.

#### **DETONATION**

During normal combustion the flame front inside the combustion chamber expands outward from the point of ignition like a balloon. Pressure increases quickly inside the combustion chamber and forces the piston down. Detonation can occur when there's too much spark advance. Igniting the fuel too far ahead to top dead center starts the fuel burning while it is still being compressed. Pressure builds up too rapidly inside the combustion chamber, causing some of the remaining portions of unburned fuel to ignite spontaneously. When multiple flame fronts collide, they generate sharp pressure waves which can be heard as knocking or pinging noises outside the engine. The pressure waves are like hammer blows to the engine, and are extremely hard on pistons, rings and rod bearings. Over time, severe detonation will ruin the engine. That's why detonation must be guarded against by carefully controlling ignition advance.

#### **TIMING ADVANCE**

Ignition timing advances with increasing engine speed because more time is needed for the fuel to burn. The rate at which the timing advances is determined by the centrifugal advance mechanism inside the distributor. On many late model passenger cars advance is now controlled electronically by the engine computer.

Propane runs with a leaner air/fuel ratio than gasoline so it needs more advance to burn completely. At the same time, however the total amount of advance provided by the distributor centrifugal advance mechanism must be limited to compensate for the increased initial timing change. This is where inexperienced mechanics can get into trouble.

If the mechanic fails to check total timing advance, he has no way of knowing how much advance the engine has at higher RPMs. If he has changed the initial timing adjustment without reducing the amount of centrifugal

advance added by the distributor, the engine will have too much total advance at high speed and will likely suffer detonation problems.

As a rule of thumb, total spark advance for propane should not exceed 27 to 30 degrees in heavy-duty engines. This is about 10 to 20 percent less than that for gasoline.

#### **CHECKING TOTAL ADVANCE**

Total ignition advance equals the initial timing adjustment plus the centrifugal advance added by the distributor.

Distributor advance specs are generally available in shop repair manuals but in some instances the specs don't always match the distributor. The exact number of degrees of advance added by the distributor can be measured by pulling the distributor and putting it on a distributor machine, or by using a timing meter or timing light.

If an adjustable timing light or magnetic timing meter is available, checking total advance is fairly simple. Disconnect the vacuum advance hose from the distributor and plug it. Start the engine and check the basic timing at the specified idle speed. Then increase engine speed to maximum cruise RPM and read the total degrees of advance on the meter or timing light.

If an adjustable timing light or mag timer are not available, an ordinary timing light can be used if additional timing marks are made on the crankshaft pulley, harmonic balancer or flywheel. Measure the spacing between the TDC or 0° and 10° timing marks. Then mark off additional 10° increments on the crank pulley, balancer, or flywheel in the opposite direction from which the timing mark advances. When the engine is revved up to maximum cruising RPM, the original timing mark will probably be advanced out of range, but one of the new marks will line up so total timing can be determined. For example, if the new 30° mark lines up with the 2° mark on the timing indicator, total advance is 30° plus 2°, or 32°.

#### **MODIFYING THE ADVANCE CURVE**

For distributors with mechanical centrifugal advance mechanisms, the total amount of advance the distributor provides can be altered by installing a limiter plate or different sized advance control bushing. The limiter plate or bushing reduces the amount of flywheel travel thus limiting the amount of advance.

Changing the weights and springs will alter the rate at which timing changes. Heavier flyweights and/or weaker springs will allow the timing to advance more quickly. A faster advance curve can enhance performance and low speed torque on light-duty engines but may cause detonation problems on heavy-duty applications. Changing the advance curve typically requires some experimentation to find the right combination that works best.

On engines with electronic timing and no centrifugal advance mechanism in the distributor, modifying the advance curve and/or total advance requires changing the computer PROM or installing a "black box" unit that alters timing electronically.

#### **DUAL-FUEL APPLICATIONS**

In a straight propane fuel conversion, the ignition system should always be tailored for optimum performance on propane, but in dual-fuel conversions, the optimum timing curve for propane creates too much advance if gasoline is used. Such an engine would likely experience detonation problems with gasoline unless the ignition curve is changed.

If the timing is adjusted to a "compromise" setting somewhere between the optimum settings for propane and gasoline, the engine will not perform as well as it could on either fuel. A compromise setting would still be overadvanced for gasoline and under-advanced (retarded) for propane.

One solution to this dilemma is to adjust the engine to whichever fuel is to be used the majority of the time. This approach gives good performance on the primary fuel, but less than desirable performance on the backup fuel.

The best solution is to install one of the "black box" units that electronically tailors the ignition curve to the fuel being used. Such units automatically advance the timing for propane and retard it for gasoline.

#### **VACUUM ADVANCE**

The vacuum advance diaphragm should be retained on light-duty vehicles because additional spark advance under light load and part throttle conditions help improve fuel economy and reduce exhaust temperatures. If timing is not advanced during such operating conditions, the air/fuel mixture can still be burning when it exits the combustion chamber. This causes exhaust temperatures to soar and the exhaust valves to turn excessively hot. The result can be pre-ignition and premature exhaust valve failure.

Total timing advance with the vacuum diaphragm connected should not exceed 40° with propane. Going beyond 40° does not improve mileage and greatly increases the risk of detonation. Check the vacuum advance by connecting a hand-held vacuum pump to the diaphragm. Read the degrees of timing advance when maximum vacuum is applied with the engine running.

#### **COMPENSATING FOR ALTITUDE**

Another factor to consider when making timing modifications is altitude. At higher elevations, the air is thinner so the resulting air/fuel mixture is less dense. To compensate, an additional 4° of timing advance can be added for every 5,000 ft. (1,524m) of increased altitude.

For vehicles that must operate over a range of elevations, such as a delivery truck that starts out in a valley, but must climb mountain roads, some experimentation will be necessary to find a timing setting that provides sufficient power at higher elevations yet does not detonate at lower altitudes.

# **ENGINE STARTING PROBLEMS**

Starting has never been a serious problem when dealing with straight alternate fueled engines. However, with dual fuel applications, especially those under 250 CID, there are many factors that can contribute to hard starting. These are: (1) Vacuum and air leaks, (2) Incorrect carburetor sizing, (3) Improper idle mixture, (4) Incorrect location of carburetor, regulator, and/or fuelock, (5) Improper location of electric fuelock lead, (6) Poor engine condition, (7) Incorrect spark plug gap, (8) Cold ambient air temperatures, (9) Idle air controller.

(1) VACUUM AND AIR LEAKS In dual fuel applications on small displacement engines, an air leak which would not bother a larger engine becomes critical, especially at cranking speed. Any leak downstream of the air/gas valve will reduce the amount it will rise off its seat during cranking.

In extreme conditions, air enters through the leak during the entire intake stroke, while the gas valve is lifted only during part of the stroke. This creates a mixture too lean to burn. A primer may furnish the added fuel around the metering valve to allow the engine to start, and with more numerous intake cycles the leak may be overcome.

Vacuum leaks may be detected by spraying gasket sealed surfaces with a soapy solution. If a leak is located, the engine will speed up due to the richer mixture. This technique is quite effective around the gasoline carburetor area.

Air leaks may also be found in the engine, through intake valve seals or past rings which are not seated. The orifice in the PCV valve, which is open during cranking and closed under vacuum, can add a sizeable amount of air. Be sure the PCV valve does close properly after the engine starts.

- (2) INCORRECT CARBURETOR SIZING Use of a mixer that is too large for the engine displacement make idle adjustment extremely sensitive. When larger mixers are applied to smaller engines, enrichment for acceleration occurs too high in the RPM range to be practical. The small engine cannot lift the large air valve quickly or as high as a larger engine will.
- (3) IMPROPER IDLE MIXTURE Correct idle mixture adjustment is critical to ease of starting. This is compounded if the mixer is oversize for the engine. When the idle mixture (air bypass) adjustment is closed, the air valve will open farther at cranking, thus the air flow volume remains the same, but gas is increased.

If the engine starts hard, check the idle mixture adjustment following this procedure. Tighten the idle mixture screw "IN." If the engine starts more easily, slow the engine down while adjusting the idle mixture to prevent stalling from an over rich mixture.

Setting the idle mixture to the best idle (high vacuum) cold will give a reasonably lean but satisfactory mixture after the engine warms.

If the idle adjustment must be backed out excessively in order to obtain a smooth idle, this may be compensated for by installing a spacer ring on the air valve. Placed between the air valve ring and the air valve shoulder it raises the air valve ring by about .003" (.076mm), thereby decreasing air

flow at idle. This allows the idle screw to be adjusted in to richen the mixture, shutting off most of the bypass air and lifting the air valve farther off the seat during cranking.

Setting the idle on a N-CA300A mixer is touchy on a small engine because of the large gas valve. With the gas inlet elbow removed, screw the idle adjustment "IN" until the rubber valve contacts the seat and stops turning. Back the adjustment out 3/4 turn, reinstall the elbow. Advance the idle speed adjustment screw a turn or so to keep the engine running, then start engine. The idle should be set cold or cool. Adjust the valve in and out gently to determine where the engine speeds up (best vacuum). For final setting, slow idle speed to desired setting. When testing between adjustments, place finger over the opening to the idle mixture screw to prevent air entry. Install idle adjustment plug after desired idle is obtained.

**(4) LOCATION OF COMPONENTS** Mounting the regulator and fuelock off the engine is desirable when carbureting 4-cylinder engines. The vibration of the engine moves the regulator rapidly back and forth while the secondary diaphragm tends to stay still. This causes the gas pressure to pulse, and can cause excessive fuel consumption.

The added weight of an LP-gas mixer and adapter on a gasoline carburetor, if not properly braced, can combine with the vibration of a 4-cylinder engine to cause the gasoline carburetor bolts and screws, etc., to loosen, causing air leaks.

Keep the atmospheric vent of the regulator out of the direct stream of the engine fan. This can also cause fluctuation of the secondary diaphragm and result in gas pressure pulsations.

- **(5) ELECTRIC FUELOCK CONNECTION** The electric fuelock connection is often a source of starting trouble. Attaching the electric fuelock power lead to an ignition coil terminal is not recommended as it is a weak source of current and it robs the ignition of needed amperage.
- **(6) ENGINE CONDITION** As previously mentioned, the engine itself can be a source of air leaks. Leaking intake seals, poorly seated rings, and leakage through the PCV valve hose are problems, however, the engine must be in good working order. Check the engine for any leaks downstream of the air valve. Compression pressure of 150 psi or better at cranking is desirable to prevent hard starting.
- (7) INCORRECT SPARK PLUG GAP Spark plugs should be in good condition and gapped to .030" to .032" (.762mm to .813mm). A protruded nose plug is helpful if it will clear the piston at the top of its stroke.
- **(8) AMBIENT TEMPERATURE** At very cold ambient temperatures (-30°F, -34°C or below), there may be insufficient vapor pressure in the fuel tank to supply fuel to the regulator, resulting in no start or hard starting. Another condition which may prevent starting in cold weather involves over priming. If this condition is suspected, attempt to start the engine with the primer disconnected by removing the electrical connector or by pinching the fuel hose.
- **(9) IDLE AIR CONTROLLER** The idle air controller installed upstream of the air valve mixer could cause a leak downstream of the mixer.

# MAINTENANCE SUGGESTIONS AND CHECKS

#### **MAINTENANCE SUGGESTIONS**

Maintenance schedules for LP gas powered vehicles should be developed to suit the needs particular to the service to which the vehicles are subjected.

- A. Local climactic conditions
- B. Fuel cleanliness in the area
- C. Stop-start urban or steady state inter city traffic
- 1. In cab-over or van installations in particular, air to the carburetor should be drawn from outside the engine compartment to avoid excess heating of intake air with consequent power loss of 1% per 10° temperature rise over ambient air temperatures. The cooler air will also insure a measure of protection against detonation and allow the use of optimum spark advance curves for best fuel conservation.
- 2. In extreme cold conditions after starting the engine, it should be run at a fast idle for a period of time sufficient to raise engine coolant temperature to a slight warmth of 50°-60°F (10°-15.5°C). A slow cold idle may injure the engine due to insufficient oil circulation. Starting the engine in extreme cold to move a vehicle a short distance, and stopping the engine without warming the coolant, can result in trapping liquid propane in the heat exchanger. As this liquid vaporizes with the engine stopped, pressure in the heat exchanger will rise until excessive force is applied to closing the primary regulator valve against its seat. If this occurs frequently, the primary valve in the regulator may be damaged.
- 3. Carburetion equipment in use deteriorates very slowly. with Viton rubber seats and diaphragm frequently lasting five years. However, equipment removed from a vehicle and stored for any length of time must have repair kits installed, as diaphragms and gaskets tend to dry, shrink and harden as the light petroleum ends evaporate and the coolant dries out of the gaskets.

#### **MAINTENANCE CHECKS**

At scheduled preventative maintenance increments:

- 1. Check coolant hoses for deterioration. Hardened hoses may crack or be subject to rupture, particularly if thermostats hotter than 160° - 170°F (71°-76.6°C) are used, or if hoses are located adjacent to exhaust manifold. Also check all vacuum hoses.
- 2. If a fuel vapor hose is used between vaporizer/regulator and carburetor, remove the hose and check for undue deterioration. Particularly check the vapor outlet fitting from the regulator for tightness. A zinc fitting will almost invariably be loose.
- 3. If starting and idling have been consistently satisfactory, it should be unnecessary to disassemble the car-

buretor air valve from the bowl. If inconsistent. remove air valve cover, spring and air valve with diaphragm. Check the gas metering valve and gas jet for accumulation of foreign deposits or greasy substance and clean both with a brush and kerosene or equivalent fluid as needed.

Check air valve diaphragm for integrity and flexibility. Hold the diaphragm up against a strong light to check for small tears or pin holes. Normal life of the diaphragm and seat are five years, barring excessive backfiring or similar abnormality.

- 4. With the carburetor air-gas valve and cover removed, it is a simple matter to check the regulator and fuelock for leaks.
  - A. Turn the fuel on at the tank and check carburetor open gas jet for leakage. If fuelock and regulator are operating properly, no fuel will leak through.
  - B. Press primer button on front cover of regulator to open gas regulator valve. A small amount of gas should pass through the jet as the system is emptied back into the fuelock. If the fuelock is operating properly the gas flow will cease as soon as the fuel downstream of the fuelock is exhausted.
  - C. Next remove the vacuum hose to the fuelock from the fitting at the source of vacuum. With the primer button depressed, suck slightly on the fuelock vacuum hose. Fuel should flow immediately and stop flowing when suction is relieved.

These checks should indicate each component is operating properly.

5. With consistent starting and idling, the vaporizer/regulator need not be disassembled. If inconsistent, remove regulator front cover and diaphragm assembly to check for oil and dirt deposits. If granules of foreign matter are embedded in the Viton rubber of the secondary valve, the valve and seat may be washed clean, however, it may be wise to replace the Viton valve for a perfect seal. These granules almost invariably enter the regulator in solution in the liquid propane and drop out as the fuel is vaporized-similar to salt water through a filter, with deposits of salt left after evaporation of the water. It is seldom a sign of insufficient filtration. Foreign matter and scale from the tank generally deposit in the filter when a new tank is installed. Welding scale and rust are frequently present in new tanks, and occasionally residual water from the hydrostatic pressure testing is still in the tank. A quart of alcohol injected into the tank with the propane fuel will allow it to pass through the carburetion system without freezing.

# RETURN GOODS AUTHORIZATION (RGA) PROCEDURES

#### **RETURN GOODS AUTHORIZATION (RGA) PROCEDURES**

- 1. To receive an RGA number, call 800/451-7040 and ask for a customer service representative.
- 2. Have your customer account number and invoice number available when you call.
- 3. Give a description of the part that you would like to return.
- 4. State the problem with the defective part.
- 5. You will then be assigned an RGA number. Please write this RGA number on the outside of the box or container that you ship to us with the defective part.
- 6. Full credit will be issued after confirmation that the part is defective.

It is essential that these procedures be followed to insure that your returned goods are properly recorded and examined. Any parts returned to Woodward without an RGA number will be sent back to your company with no credit or replacement issued for them. Woodward is not responsible for damaged or misdirected goods sent back to your company.

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#### I. WOODWARD PRODUCT WARRANTY

"Woodward Products" covered under this

**WARRANTY** are warranted to be free from defects in materials and workmanship, when installed and used in the manner for which they are intended, for a period of 18 months from the date of shipment from Woodward.

Products characterized by Woodward as having been Remanufactured are covered by this

**WARRANTY** the same as newly manufactured Woodward Products.

"Woodward Products" include: (i) products manufactured by Woodward, as well as parts or components of such products as are manufactured exclusively for Woodward, by another party, to Woodward specifications and drawings, and, (ii) software produced by Woodward.

"Non-Woodward Products" not covered by this Warranty, include: (i) products supplied by Woodward manufactured by another party, e.g. printers, computers, subsystems, etc., and, (ii) operating systems and other software installed under license in Woodward Products and Non-Woodward Products. Such Non-Woodward Products are resold by Woodward in their original form and are not modified by Woodward in any way. Purchaser's remedy for defective Non-Woodward Products shall be limited to the applicable warranty of the manufacturer or supplier.

#### **II. WOODWARD SERVICE WARRANTY**

Woodward warrants its Services, such as repairs, site supervision and installation services, including **WARRANTY** Services, to be free from defects in materials and workmanship for a period of 180 days from the date of service completion. Woodward Products installed as part of a Service provided, will be covered by this **WARRANTY** for a period of 12 months from date of installation. Following **WARRANTY** Services, the period of warranty coverage for the unexpired portion of the **PRODUCT WARRANTY** shall also apply.

#### **LIMITATIONS**

The sole obligation of Woodward hereunder is to repair or replace, at its option, and without charge, any Woodward Product which is defective, or, in the case of defective Services, to reperform such Services. Other than the foregoing repair, replacement, or reperformance, the purchaser

shall have no other remedy against Woodward, and Woodward shall not be liable for loss or damage arising from statute, law, strict liability in tort, or negligence resulting from any defect in a Woodward Product or in Woodward Services, even though the defect was caused by negligence, breach of warranty or strict liability in tort of Woodward. In any event, Woodward shall not be liable for incidental and/or consequential damages including loss of income or profits, lost sales, or economic loss.

#### CONDITIONS

Such repair, replacement, or reperformance will be effected at a location of Woodward's choice (including Woodward plants and service facilities, Woodward subsidiary plants, or authorized service facilities). In replacing any Woodward Product pursuant to this **WARRANTY**, Woodward may replace such Woodward Product with a modified or improved product or component.

Purchasers claiming warranty service should contact the service department of the Woodward location or Woodward distributor where the item was purchased.

#### OTHER EXCLUSIONS

#### This WARRANTY does NOT APPLY TO:

- Prototypes and test units. These units or the transactional documentation will be marked as experimental, prototype, test, beta, or other similar marking. Woodward grants no warranty to such products and/or software, either expressed or implied, as the purpose of these products is research and development testing.
- Woodward Products which, in Woodward's opinion, have been damaged by misuse, negligence, or accident.
- Woodward Products on which disassembly and/or repairs have been attempted without prior authorization from Woodward.
- Any Woodward Product if any component part has been repaired or replaced by any part not manufactured or furnished by Woodward.

Apart from the obligations set forth herein (unless otherwise agreed in writing) Woodward makes no other warranty or condition, expressed or implied (by statute, common law, trade usage or otherwise), and specifically excludes the implied warranties of merchantability and fitness for a particular purpose, as well as all other warranties expressed or implied.

Streamine.

**₩**woodward

# Streamine

# **Fuel Systems for LPG and Natural Gas Engines**

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