conEdison	LAST REVIEW DATE: 3/24/2023	REVIEW CYCLE:
	EFFECTIVE DATE: 5/15/2023	5 Years

SPECIFICATION: **G-2040-12a**

TITLE: **REQUIREMENTS FOR THE INSTALLATION OF GAS BOOSTERS, MICROTURBINES AND ASSOCIATED SYSTEM PROTECTIVE DEVICES**

VOLUME: **4 and Yellow Book**

★ **COURSE ID:** **GAS5011**

★ **REQUIRED TRAINING GROUPS:** **GAS Distribution Services (GDS), Energy Services, Customer Connection Ops, Maps and Records**

Administrative Revisions

Rev 12a (4/14/2023)
Reworded section 5.1 item 1 for clarity to state:
"Each additional booster must have its own individual low pressure switch, piping and accessories to conform to the requirements of this specification.

Each group listed is responsible for its own training which may be specific to a title/individual and not to the group in its entirety. Please check with your local training coordinator/department.

SUBSTANTIVE REVISIONS: (See ★)

1) Front Page - **Replaced** Core and Target Groups to Required Training Groups.
Added Course ID: GAS5011

2) Section 3.0 - **Updated** "Gas Conversion Group" to "Customer Connection Ops"

3) Section 4.1 - **Reworded** Section to indicate Customer's responsibility

REVISIONS: (Continued)

4)	Section 4.2	-	**Clarified** responsibilities of Customer Connection Ops and Energy Services as it relates to Appendix A, B and one line drawing 311296
5)	Section 4.3 (former)	-	**Deleted** and renumbered subsequent section
6)	Section 5.1	-	**Included** criteria to install additional boosters
7)	Section 5.4	-	**Added** “Installed and mounted securely to a level base or adequate structural support frame“
8)	Section 5.5(A)(1) NEW	-	**Included** “Inlet check valve shall be installed per the manufacturer’s specification” and **renumbered** subsequent sections
9)	Section 5.5(B) 3(a)	-	**Added** “or other control functions”
10)	Section 5.10	-	**Included** in submittals “or Customer Connection Ops”
11)	Section 5.10(B) 1	-	**Added** “and other piping accessories.”
12)	Section 5.11(A)	-	**Replaced** Company’s Energy Services Representative with Con Edison Company Representative
13)	Section 7.0(new)	-	**Added** Notification “Maps and Records must be notified when a booster is installed”
14)	Section 10.0	-	**Reformatted** Section to display Attachments
15)	Attachment		Attachment C: Drawing 311296 **replaced** with new drawing to reflect Review No Revision

Gas Operations Standards

TITLE: REQUIREMENTS FOR THE INSTALLATION OF GAS BOOSTERS, MICROTURBINES AND ASSOCIATED SYSTEM PROTECTIVE DEVICES

TABLE OF CONTENTS

conEdison	EFFECTIVE DATE: 5/15/2023				
	EH&S REVIEW BY: Craig Little		OPERATIONS REVIEW BY: Robert McGrath, Frank Stauss		
	AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUME: 4 and Yellow Book	PAGE 1 OF
	David Heron	Nickolas Hellen Chief Engineer Gas Distribution Engineering	3/24/2023	Application and Design; Yellow Book	14 PAGES
	Paper copies of operating documents are uncontrolled and therefore may be outdated. Verify current version prior to use.				

TITLE: REQUIREMENTS FOR THE INSTALLATION OF GAS BOOSTERS, MICROTURBINES AND ASSOCIATED SYSTEM PROTECTIVE DEVICES

1.0 SCOPE

This specification covers the requirements for the installation of gas boosters, microturbines and associated system protective devices to be designed and installed by the customer, on customer owned piping, downstream of the Con Ed meter and the connection to the customer piping.

2.0 LEGAL REQUIREMENTS

2.1 New York City: New York City Fuel Gas Code; NYC Department of Buildings

2.2 Westchester County: The municipality having jurisdiction.

★ 3.0 ORGANIZATIONS APPLICABLE

Westchester, Manhattan, Bronx and Queens Gas Operations; Customer Connection Ops; Energy Services.

4.0 RESPONSIBILITIES

★ 4.1 The Customer shall indicate on the electronic Service Determination Request in Project Center, each item of customer utilization equipment that will require gas pressure in excess of 4 inches water column (w.c.).

★ 4.2 The Customer Connection Ops or Energy Services shall be responsible for reviewing the booster installation by ensuring that Appendix A and the customer one-line diagram are done in accordance with G-2040 and latest revisions. During a field inspection, Appendix B shall be used as a reference to ensure all information is accurately matching what Appendix A and customer's one line drawing indicates with reference 311296 for minimal design standards.

4.3 The customer, the customer's engineer or customer's contractor shall be responsible to have the booster manufacturer's representative prepare the submittals indicated in Section 5.10 of this specification.

5.0 GAS BOOSTER INSTALLATIONS

★ 5.1 Con Edison is required to supply a minimum gas pressure of 4 inches w.c. at the outlet of the gas meter (for indoor meter installations) or the outside building wall (for outdoor meter installations). A gas booster may be installed by the customer when Con Edison-supplied gas pressure is not sufficient to supply new gas utilization equipment. Only gas boosters listed by a nationally recognized testing laboratory (e.g. UL, CSA) shall be used with natural gas in the Con Edison gas system. Where required by code, all related appurtenances required for the gas booster operation shall be listed by a nationally recognized testing lab. Boosters installed in parallel for redundancy purposes are considered one booster for this purpose. Multiple gas boosters are allowed as long as the following criteria are met:

1. Each additional booster must have its own individual low pressure switch, piping and accessories to conform to the requirements of this specification.
2. Each individual booster must have its own submission package as per Section 5.10
3. Gas boosters shall be installed in accordance with the manufacturer's specifications, and to all local, state, and federal codes.

5.2 A) For **indoor installations**, the gas booster design shall be:

1) Hermetically sealed;

and

2) A direct-drive type with motor enclosed within the booster canister. The motor shall be explosion-proof; or

or

3) A magnetic-coupled type with an external motor. The motor need not be explosion-proof, unless it will be installed in a NEMA 7 location.

B) For **outdoor installations**, a non-hermetically-sealed booster may be used.

5.3 Acceptable locations for gas boosters shall be determined by local codes and authorities having jurisdiction.

5.0 **GAS BOOSTER INSTALLATIONS** (Continued)

★ 5.4 The gas booster shall be mounted and installed as per the manufacturer's specifications and/or drawings and to a level base or adequate structural support frame. This may include the installation of stainless steel braided hose connections.

5.5 Required Protective Equipment

A) Check Valve

A check valve shall be installed by the customer between the gas meter and the gas booster as shown in drawing 311296, attached.

★ 1) Inlet check valve shall be installed per manufacture's specification.

2) The check valve is required to prevent flow back through the gas meter and into the Con Edison gas distribution system.

3) The booster manufacturer or its authorized representative shall specify the size and minimum distance between the check valve and the booster inlet. This information shall be indicated on Line 16 of Appendix A. See Section 5.10.

4) Only Con Edison-approved check valves that are listed by a nationally recognized testing laboratory (e.g. UL, CSA) shall be used with natural gas. See Section 5.5 (C). **NOTE:** FM (FM Global) no longer lists check valves. Check valves with the FM mark are not acceptable.

B) Low Pressure Switches

1) A low pressure switch with a ¼" diameter manometer test connection (see drawing 311296) shall be installed between the gas meter and the check valve, as close as possible to the gas service point of entry.

a) The switch shall be set and wired to shut the booster off at a minimum of 3 inches w.c.

5.0 **GAS BOOSTER INSTALLATIONS** (Continued)

5.5 Required Protective Equipment (Continued)

B) Low Pressure Switches (Continued)

b) The booster manufacturer or its authorized representative shall specify the make, model and the NEMA rating of the switch on Line 14 of Appendix A.

c) Only Con Edison approved low pressure switches listed by a nationally recognized testing laboratory shall be used. See Section 5.5 (C).

2) Where installation of the low pressure gas switch near the gas service point of entry is impractical or prohibitive due to the location of the gas service head valve relative to that of the gas booster, the switch may be installed at an alternate location if approved by the booster manufacturer or authorized representative, **and the local Gas Distribution Services (GDS) Department**.

a) See Note in Section 5.10 (B).

b) If an alternate location is approved, two permanently engraved signs shall be installed by the customer: one at the booster, indicating the location of the low pressure gas switch and one at the gas head of service indicating the location of the gas booster and the location of the low pressure gas switch.

3) A second low pressure switch may be installed on the outlet pipe of the gas booster.

★ a) This second switch is at the customer's option and may be used to alarm upon booster failure or other control functions.

b) This switch need not be a Con Edison-approved switch.

C) Con Edison approved check valves and low pressure switches are found in Table 23 of Con Edison's "A Customer Guide to Natural Gas Service Installation" (Gas Yellow Book).

5.0 **GAS BOOSTER INSTALLATIONS** (Continued)

5.6 Branch Supply

Supply of gas to equipment not requiring "boosted pressure" shall be located on the upstream side of the check valve. Branch supply may be connected through the same meter or separate meter(s) depending on the service classifications involved. See drawing 311296 attached.

5.7 Piping

Piping from the gas point of entry (POE) to the booster(s) shall be designed by the customer or the customer's authorized representative so as to allow a maximum pressure drop of 1 inch w.c. (excluding the gas meter).

5.8 By-Pass

Some booster installations may require the installation of a by-pass around the booster. A by-pass shall be installed when specified by the booster manufacturer or its authorized representative. When required, the inlet connection to the by-pass shall be installed downstream of the check valve.

5.9 Re-circulation Loop and Heat Exchanger

Some booster installations may require a re-circulation loop with a heat exchanger and associated sensors and controllers. Such equipment shall be installed when specified by the booster manufacturer or its authorized representative. In general, this arrangement will be called for to keep the booster motor cool under low flow conditions.

5.0 **GAS BOOSTER INSTALLATIONS** (Continued)

5.10 Submittals

★ The booster manufacturer or its authorized representative shall submit to the Energy Services Representative (ESR) or Customer Connection Ops, the following:

A) a completed Gas Booster Design Data Sheet (Appendix A of this specification). **NOTE**: The booster manufacturer or its authorized representative shall first verify the data contained in the "Load and Piping Information" section of the Appendix A prior to completing and forwarding it to Con Edison.

B) a job specific one-line drawing of the proposed booster installation. The drawing shall indicate:

★ 1. the location and size of all piping, isolation valves, check valves (including the minimum distance from the booster inlet), pressure switches, pressure gauges, boosters, gas meters, type of connections (e.g. flanged; threaded; welded; or stainless steel braided hose) and other piping accessories.

NOTE: If the low gas pressure switch is shown on the one-line sketch to be in a location other than near the gas service point of entry [See 5.5 (B)(2)], the local GDS Department shall be contacted by the ESR for concurrence.

2. the size and configuration of by-pass piping, re-circulation loop, and heat exchanger, if required.

5.0 **GAS BOOSTER INSTALLATIONS** (Continued)

5.11 Field Verification

★ A) Preliminary Field Check

Prior to issuing a turn-on request for the gas meter(s) that feeds the gas booster, the Con Edison Company Representative shall perform the field checks called for in Appendix B of this specification.

B) Deficiencies

1) If the field checks reveal any deficiencies, the Energy Services Representative shall notify the customer or customer's authorized representative. The turn-on request for gas meters that feed the gas booster shall not be issued until all deficiencies are corrected.

2) Gas shall not be supplied to a booster that lacks the required protective equipment called for in Section 5.5 (A & B). In such case, in lieu of shutting down or denying gas to the entire building, the booster inlet valve may be closed and locked so that other branches of gas distribution piping not fed by the booster may be or remain supplied.

6.0 **MICROTURBINE INSTALLATIONS**

Gas boosters associated with microturbine installations are subject to all requirements of this specification including the Con Edison-approved check valve and low-pressure switch called for in Section 5.5. These requirements will not be waived even if microturbine units are supplied with integral check valves and low-pressure switches.

In the City of New York, microturbines are to be installed in accordance with Section 3510 of the New York City Fire Code. In addition, in the City of New York, microturbines shall be designed and installed in accordance with the local construction codes, including Building Code, Mechanical Code and Electrical Codes of the City of New York. A copy of the design and installation documents for microturbine installations approved by the New York City Department of Buildings shall be submitted to the Fire Department of New York (FDNY) prior to installation.

★ 7.0 **NOTIFICATION**

Maps and Record must be notified when a booster is installed

8.0 **RECORDS RETENTION**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction CI-870-1 "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the Records Management intranet site.

9.0 **REFERENCES**

Table 23 of Con Edison's "A Customer Guide to Natural Gas Service Installation" (Yellow Book)

CI-870-1 - Records Management

★ 10.0 **ATTACHMENTS**

Attachment A: Appendix A: Gas Booster Design Data Sheet

Attachment B: Appendix B: Field Verification Checklist

Attachment C: Drawing No. 311296 "Typical Gas Booster Installation"

★ ATTACHMENT A

Appendix A
Gas Booster Design Data Sheet

To Be Completed By the Booster Manufacturer or Its Authorized Representative

Project Address (POE): _____

LOAD & PIPING INFORMATION

1. A) Total # of Boilers_____ Total CFH (Min)_____ (Max)_____

B) # and Type of Other Gas-Fired Appliances _____- Total CFH (Min) _____ (Max) _____

2. Gas Service Diameter (From Con Ed Form 2-80) _____

3. Gas Meter Size & Type (From Con Ed Form 2-80) _____

4. Gas Pressure Available at Booster Inlet _____
(4" W.C. @ Outlet of Meter (for indoor meter installations)
or outside building wall (for outdoor meter installations)
Minus Pressure Losses.

5. Gas Pressure Required at Manifold Inlet _____

6. Discharge Piping Diameter _____

7. Total Equivalent Length of Discharge
Gas Piping Including Fittings _____

8. Total Discharge Piping Pressure Loss _____

ADDITIONAL INFO

BOOSTER / EQUIPMENT INFORMATION

9. Mfr_____ Model_____ Flow Capacity (CFH)_____ NEMA Location _____
National Lab Listing: _____ (e.g. UL, CSA or equivalent) Certificate No. _____

10. Booster Inlet Size_____ Outlet Size_____

11. Booster Motor HP_____ Voltage_____ Ph_____ Hz_____

12. Booster Differential Pressure (W.C.) _____

13. Total Discharge Pressure (W.C.) _____
(Differential Pressure + 4" W.C.)

14. Low Pressure Switch (See Note*) Make _____Model_____ NEMA_____
National Lab Listing _____ (e.g.: UL, CSA or equivalent) Certificate No. _____

15. Control Panel Make_____ Model_____ NEMA_____

16. Check Valve (See Note*) Mfr _____Size_____ Min. Allowable Dist. To Booster Inlet _____

National Lab Listing: _____ (e.g.: UL, CSA or equivalent) Certificate No. _____

17. Manifold Required: Y/N _____ If Yes: # of Valves_____

18. Heat Exchanger Required: Y/N_____ If Yes: Piping Size_____ Check Valve Size_____

****

Submitted By: _____ Date: _____ Rev #_____

Company: _____ Phone: _____
(Booster Manufacture or Authorized Representative)

_____/_____/_____/_____
Name of Con Edison ESR Phone Fax E-Mail Address

***Note: Equipment must be listed in Table 23 of the "A Customer Guide to Natural Gas Service" (Yellow Book) AND with a nationally recognized testing laboratory.**

Appendix B
Field Verification Checklist
To be completed by the Company's Energy Services Rep prior to release of the gas meters.

Project Address (POE):_____

GAS BOOSTER			
		Yes	**No (Indicate Action Taken)**
1	Has the gas booster been installed?		
2	Does the make and model of the booster match the booster specified on **Appendix A (Line 9)?**		
PIPING			
3	Is the size of the booster piping (from the check valve to the booster inlet) in accordance with the booster manufacturer's one-line sketch for this job?		
4	Have the booster isolation valves (if called for on the one-line sketch) been installed? [Note: these need not be Con Edison approved valves.]		
5	If the one-line sketch calls for by-pass lines or re-circulating lines, have they been installed in accordance with the sketch?		
LOW PRESSURE SWITCH			
6	Has the low pressure switch been installed?		
7	Does the make, model, NEMA rating and listing (ex. UL, FM, CSA) of the switch match the switch specified on **Appendix A (Line 14)?**		
8	Is the switch located between the gas meter and the check valve at the booster inlet as close as possible to the gas service POE?		
9	Where there is a branch supply to other gas equipment not requiring boosted pressure, is the switch located on the downstream side of the branch connection as shown on Con Ed drawing 311296, attached?		
CHECK VALVE			
10	Has the check valve at the booster inlet been installed?		
11	Does the make, model, and size of the check valve match the check valve specified on **Appendix A (Line 16)?**		
12	Does the check valve have a permanent marking (casting, affixed nameplate) indicating its listing? (Usually UL, or CSA). **NOTE:** FM is not acceptable.		
13	Does the listing indicated on the check valve match the listing info indicated on **Appendix A (Line 16)?**		
14	Is the check valve located at least the minimum distance away from the inlet of the booster as indicated on **Appendix A (Line 16)?**		
15	Does the arrow on the check valve point toward the booster?		

Name of C.E. Energy Services Representative **:** _____

Date and Time of Inspection **:** _____/_____

311296

REVISIONS

M. BALDOVIN 3/8/06	1
REVISED NOTES. RAJ 5/17/06	
M. BALDOVIN 6/22/11	2
ADDED FLEX CONNECTOR AND NOTE 5. D.J. 6/22/11	
M. BALDOVIN 3/31/16	3
REVISED NOTE 2. A.S. 1/20/16	
J. MOAWAD 3/17/23	–
REVIEW – NO REVISION D.T. 3/17/23	

NOTES:

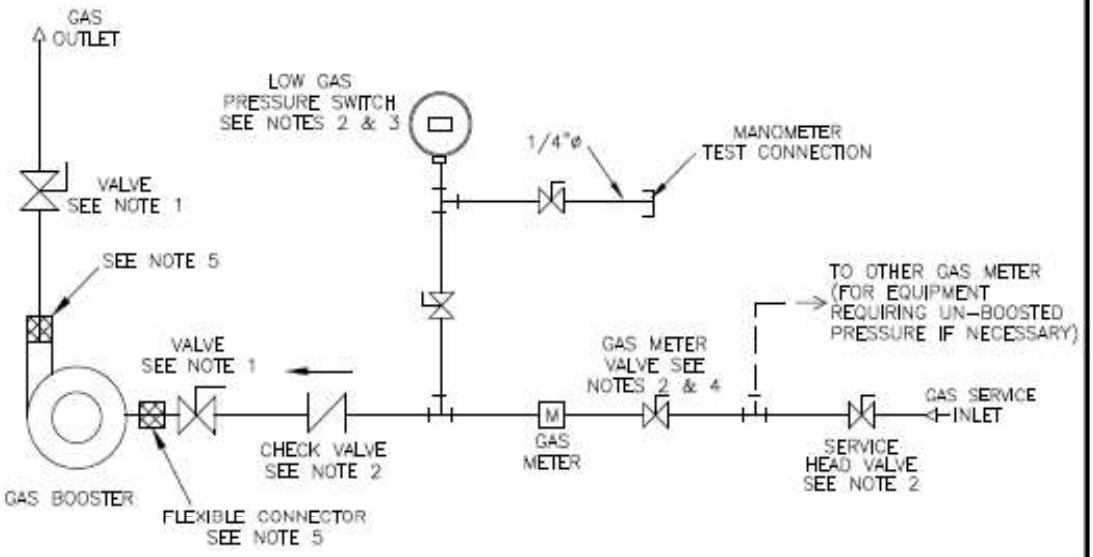
1– THIS VALVE MAY BE OMITTED IF THE BOOSTER IS IN CLOSE PROXIMITY TO ANOTHER DEDICATED SHUTOFF VALVE. THE SERVICE HEAD VALVE OR METER VALVE MAY REPLACE THE VALVE UPSTREAM OF THE BOOSTER. THE GAS TRAIN VALVE MAY REPLACE THE VALVE DOWNSTREAM OF THE BOOSTER. THIS NEED NOT BE A CON EDISON APPROVED VALVE.

2– CON EDISON APPROVED EQUIPMENT. SEE TABLE 23 OF CON EDISON'S "A CUSTOMER GUIDE TO NATURAL GAS SERVICE" (YELLOW BOOK)

3– THE LOW PRESSURE SWITCH SHALL BE WIRED TO THE BOOSTER CONTROL PANEL. THE SWITCH SHALL HAVE A MANUAL RESET AND BE SET TO OPEN AT 3" WC TO SHUT THE BOOSTER OFF.

4– THIS VALVE MAY BE OMITTED IF THE LINE IS FED FROM A DEDICATED SERVICE AND APPROVED IN WRITING BY CON EDISON.

5– FLEXIBLE CONNECTOR (E.G. STAINLESS STEEL BRAIDED HOSE) IF SPECIFIED BY THE BOOSTER MFR OR REPRESENTATIVE.



REFERENCE SPECIFICATION G - 2040

TYPICAL GAS BOOSTER INSTALLATION

CONSOLIDATED EDISON COMPANY OF N.Y., INC.
GAS ENGINEERING DEPT

DATE 1/7/98
LAST REVISED 3/31/16

DWG. NO. 311296 REV. 3