

# Section 1 Overview

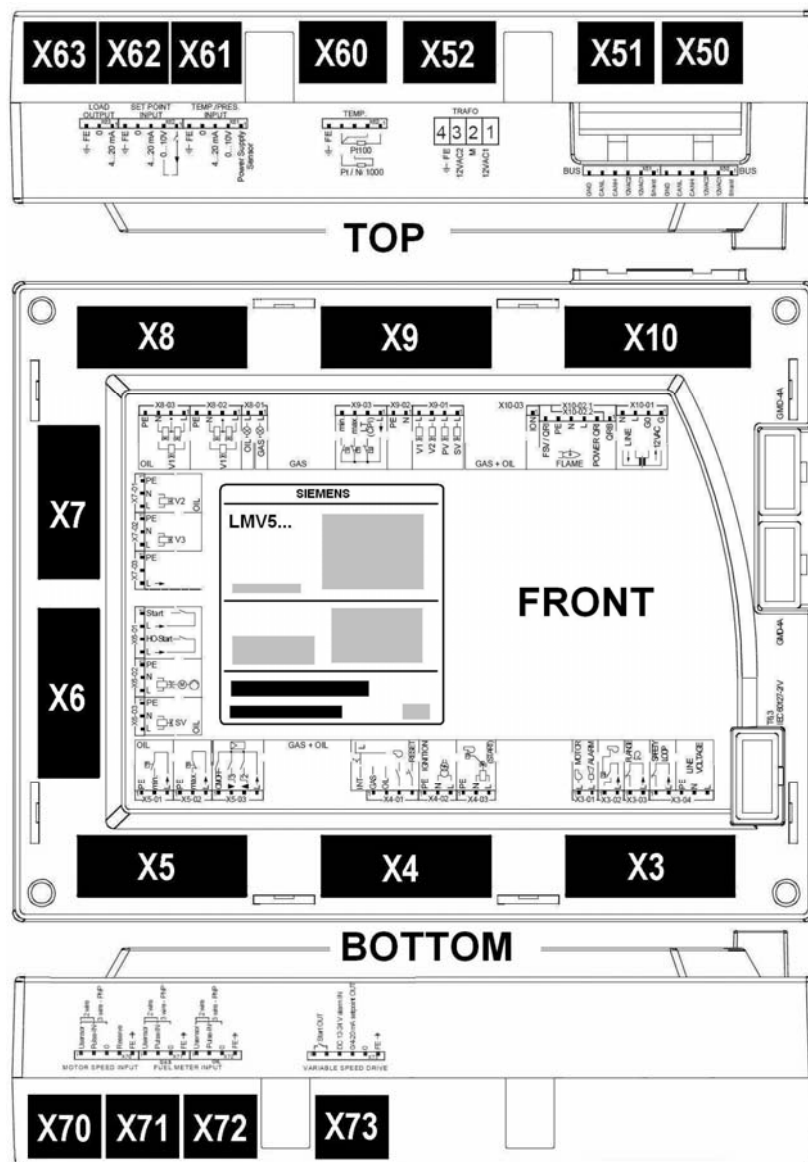
## Introduction 1-1

The Siemens LMV5 Burner / Boiler Management System (BMS) combines the functionalities of a flame safeguard and a fuel-air ratio control when it is used in its most simple form.

This BMS is modular, and can be expanded to encompass features such as load control, integrated O2 trim, Differential Pressure (DP) based feedwater control, Variable Speed Drive (VSD), fuel usage monitoring, efficiency monitoring, simultaneous operation of 5 rotary actuators, Lead / Lag control, Touch Screen Human Machine Interfaces (HMI), ModBUS communications and other advanced features.

These features make the LMV5 extremely flexible, and ideally suited for use with most steam boilers, hot water boilers, thermal fluid heaters, and industrial burners.

Figure 1-1.1 Typical LMV5 Base Unit



## Product Offering 1-2

### Base Unit Options (All are 120VAC)

- LMV51.040C1 The most basic unit contains:  
A flame safeguard  
Highly accurate fuel air ratio control  
A floating-bumping external load controller is necessary for modulation (RWF40)  
Actuators are connected on a CANbus  
Can be wired to 4 actuators  
Can run 3 actuators simultaneously
- LMV51.140C1 Same features as above, plus:  
A load controller capable of reading temperature and / or pressure  
Modulates according to setpoint  
Thermal shock protection (low fire and / or ramping start)  
Remote modulation function
- LMV52.240B1 Same features as above, plus:  
Integrated O2 trim with efficiency calculation  
Closed loop VSD control  
Fuel meter reading (gas and oil)  
Can be wired to 6 actuators  
Can run 5 actuators simultaneously



### Display Options

- AZL52.40B1 Backlit display connects to the base unit via a 9 pin cable using CANbus protocol and is required for operation of the base unit. ModBUS communication via an RJ45 female jack on the back of the display, using RS-232 protocol, is standard.

One AZL is necessary for each burner.



- HMI (Human Machine Interface) Touch Screen display communicates to the required AZL5 via ModBUS communications.

The HMI can provide lead / lag control, trending, internet communications, and boiler room efficiency optimization in addition to many other advanced features.



One HMI can be used to interface with multiple AZL5s.  
The HMI is not necessary for operation of the base unit.

## Actuator Options

SQM45.295A9	27 in / lb of torque	10-120 seconds	10 mm "D" shaped shaft
SQM48.497A9	177 in / lb of torque	30-120 seconds	14 mm round keyed shaft
SQM48.697A9	310 in / lb of torque	60-120 seconds	14 mm round keyed shaft

**Note:** All actuators offer:  
 The same case size  
 Identical actuator mounting holes  
 Have a 90 degree operating range  
 Positioning accuracy of 0.1 degree  
 Rotate either clockwise or counterclockwise



Inquire about TAK and Ruland part numbers Actuator brackets and zero lash flexible actuator shaft couplings are available and highly recommended to ensure trouble-free operation.



## Flame Detector Options and Accessories

QRI2A2.B180B Sensor is self checking, forward viewing (IR) detector (continuous use)



AGG2.110 3/4" threaded holder for QRI2A2. B180B forward viewing scanner having an insulated, protective lens



QRI2B2.B180B Sensor is self checking, side viewing (IR) detector (continuous use)



AGG2.120 Conduit connection adapter for QRI 3/4" NPSM thread



5002-01 Self checking forward viewing Ultra Violet (UV) flame detector (designed for continuous use)



**UV  
Self  
Check**

5002-01NC-120V Non-self checking forward viewing UV flame detector



**UV**

5000-02/5 5 feet of premade cable for either of the UV detectors

5000-02/10 10 feet of premade cable for either of the UV detectors



**Note:** All of the above flame detectors are wired directly to the LMV5 and utilize integral flame signal amplifiers.

## Temperature / Pressure Sensor Options

7MF1564 Covers pressures up to 300 PSIG Output signals of 4-20 mA or 0-10 VDC  
Sensor connection is male 1/4" NPT

PSIG	4-20 mA	0-10 VDC
0-15	7MF15644 <b>BB0</b> 03EA1	7MF15644 <b>BB1</b> 03EA1
0-30	7MF15644 <b>BE0</b> 03EA1	7MF15644 <b>BE1</b> 03EA1
0-60	7MF15644 <b>BF0</b> 03EA1	7MF15644 <b>BF1</b> 03EA1
0-150	7MF15644 <b>CA0</b> 03EA1	7MF15644 <b>CA1</b> 03EA1
0-200	7MF15644 <b>CB0</b> 03EA1	7MF15644 <b>CB1</b> 03EA1
0-300	7MF15644 <b>CD0</b> 03EA1	7MF15644 <b>CD1</b> 03EA1



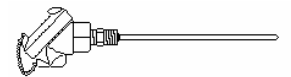
QAE2020.005 Two wire Nickel 1000 Ohm RTD immersion temperature sensor, includes thermowell and 3" wire leads.  
Can also be used for ambient temperature.  
Operating Range is -13 to 266 °F (Replaces 556-541)



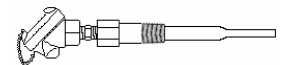
QAC22 Two wire Nickel 1000 Ohm RTD sensor for ambient temperature. Operating Range is -20 to 125 °F



Stack Sensor Recommend: Pyromation # RBF195M482-010-00-8HN31  
1000 ohm 2 wire platinum RTD with weather head  
Needed for stack alarm and efficiency calculations  
Range -40 to 900 °F



Temp Sensor Recommend: Pyromation # R1T185M483-004-00-6HN31-SL  
100 ohm 3 wire platinum RTD spring loaded w/ weather head  
Thermowell, Stainless Steel, Pyromation # SD0408  
Needed for temperature based cold start Range -40 to 900 °F



**Note:** These sensors can be directly wired to an LMV5 provided it has an internal load controller (at least LMV51.140).

## Oxygen Trim Accessories (LMV52)

PLL52.110A100 O2 Module, CANbus module that is necessary to connect the flue (stack) mounted O2 sensor (QGO20) to the LMV52.  
Sensors for flue temperature and ambient temperature, when used, are also wired to this module.



**Note :** In most cases, a second transformer will be necessary when using the O2 module.

QGO20.000D17 Internally heated Zirconium Dioxide Oxygen sensor that is mounted into the flue. 575°F max flue gas temp.  
(Measures the wet Oxygen content in the flue.)



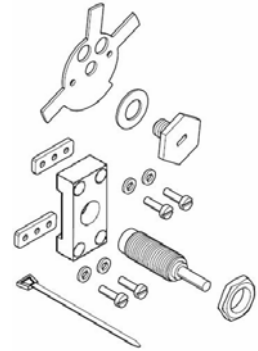
AGO20.001A Stainless Steel Flue Gas Collector  
7-1/4" long for stack diameters up to 16"  
AGO20.002A 10-1/2" long for stack diameters larger than 16"



## Variable Speed Drive (VSD) Accessories (LMV52)

AGG5.310 VSD kit includes a speed wheel and sensor, which mounts to a blower motor for the closed loop VSD. (One kit is required)

**Note :** The sensor wheel normally mounts to the motor cooling fan on the back of the blower motor  
This kit is much more difficult to use on motors that do not have a rear mounted cooling fan



## General Accessories

AGG5.210 120 VAC to 12VAC Transformer  
At least one transformer is required on each BMS  
Additional transformers may be necessary depending on the number of actuator / modules connected to the CANbus



AGG5.643 Special cable for use with the CANbus connections between the LMV5, actuators, and PLL52 module, supplied in a 500' roll



AGG5.635 A pre-made cable approximately 9 ft for connecting the AZL to the LMV5

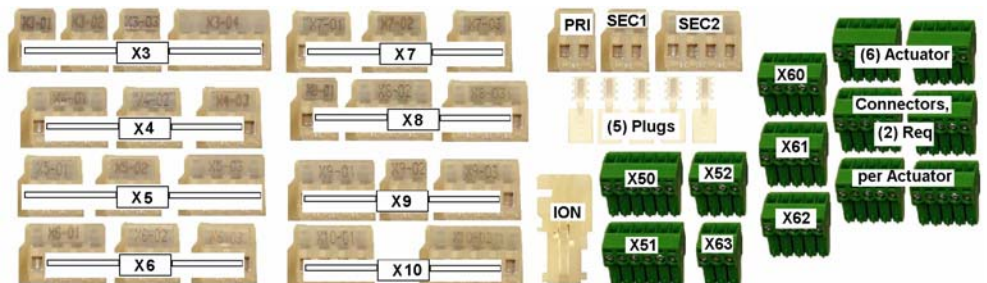


AGG5.110 CANbus strain relief.  
If AZL cable AGG5.635 is used only one is required.



AGG5.720

Base plug kit



AGG5.721

Extension Plug kit



Inquire about p/n  
Inquire about p/n

Cord grip, (2) Req per Actuator, PG11- CANbus cable  
Cord grip, (6) Req per PLL52, M16 - CANbus cable



544-023  
Inquire about p/n

Conduit adapter, (2) Req per Actuator, PG11-1/2" NPSM  
Conduit adapter, (6) Req per PLL52, M16 -1/2" NPSM



## Typical BMS system 1-3

### Typical LMV51 BMS System

A typical LMV51 BMS system will include the following components :

LMV51.140xx	Basic unit with load controller
AZL52.xxxx	Display
SQM4x	Actuator for Gas metering valve
SQM4x	Actuator for Oil metering valve
SQM4x	Actuator for Air damper
SQM4x	Actuator for FGR (if equipped)
AGG5.210	Transformer (See CANbus Loading table, Section 3, Figure 3-1.2)
QRI2A2.B180B	Forward viewing IR flame scanner
AGG2.110	Flame scanner adapter
AGG2.120	Conduit connector
	Temperature Sensor and /or Pressure Sensor (both can be used for cold start)
AGG5.643	CANbus cable
AGG5.110	CANbus strain relief
AGG5.720	RAST 5 plug kit
AGG5.635	Pre-made CANbus cable for AZL
	Flexible zero lash actuator shaft couplings (TAK or Ruland)
	Actuator mounting brackets (TAK)
	Cord grips or liquid tight conduit adapters

### Typical LMV52 BMS System

A typical LMV52 BMS system will include all of the components of the LMV51 system with the exception of the LMV51.140 base unit. The LMV52 unit can be used the same as a LMV51 BMS system is used, with the additional features disabled.

If the additional features are utilized, additional components typically include:

LMV52.240xx LMV52 required for O2 Trim or VSD (Replaces the LMV51.140)

#### **O2 Trim:**

PLL52.110A100 O2 trim module  
QGO20.000D17 O2 Sensor

Depending on flue size:  
AGO20.001A Flue Gas Collector (up to 16" Dia)  
AGO20.002A Flue Gas Collector (over 16" Dia)  
Flue Gas (Stack) PT-1000 sensor, Pyromation RBF195M482-010-00-8HN31  
QAC22 Ambient temperature sensor

#### **VSD:**

VSD unit (supplied separately)  
AGG5.310 Closed loop VSD control kit (speed wheel and sensor)  
AGG5.210 Transformer (See CANbus Loading table, Section 3, Figure 3-1.2)

SQM4x Actuators for additional valves / dampers  
AGG5.721 Extension Plug kit (VSD, additional actuators, transformer, etc.)

## **Important Safety Notes 1 - 4**

The LMV5 is a safety device. Under no circumstances should the unit be modified or opened. Siemens Building Technologies, Inc. will not assume responsibility for damage resulting from unauthorized modification of the unit.

After commissioning, and after each service visit, the flue gas values should be checked across the firing range.

All activities (mounting, installation, service work, etc.) must be performed by qualified staff.

Before performing any work in the connection area of the LMV5, disconnect the unit from the main supply (all-polar disconnection).

Protection against electrical shock hazard on the LMV5, and on all connected electrical components must be ensured through good wiring and grounding practices.

Fall or shock can adversely affect the safety functions of an LMV5. Such units must not be put into operation, even if they do not exhibit any apparent damage.

When the LMV5 is running in automatic mode, actuators are continuously monitored by the LMV5.

During commissioning, when the ratio-control curves are being set, the actuator positions are NOT continuously monitored by the LMV5.







The technician is solely responsible for verifying the correct position of each actuator during the ratio-control curve commissioning.

The coupling that is used between the actuator and the driven valve / damper is safety related, and must be of a robust and flexible design. Should this coupling fail during operation, the LMV5 will no longer have control of the burner's combustion bringing about a hazardous condition.

Condensation and the entry of water into the unit must be avoided.

## Approvals 1- 5

**Table 1- 5.1 Standards and certificates**

	Conformity to EEC directives		
	- Electromagnetic compatibility EMC (immunity)		89 / 336 EEC
	- Directive for gas appliances		90 / 396 EEC
		- Low-voltage directive	73 / 23 EEC
			
ISO 9001: 2000	ISO 14001: 1996		
Cert. 00739	Cert. 38233		
			
<b>LMV51.040C1</b>	X	X	X
<b>LMV51.140C1</b>	X	X	X
<b>LMV52.240B1</b>	X	X	X