SIEMENS

7550

Burner Management System

LMV5...

LMV50	**Burner management system with integrated fuel / air ratio control and load control for use with forced draft burners. With specific functions for industrial applications.**
LMV51	**Burner management system with integrated fuel / air ratio control and load control for use with forced draft burners.**
LMV52	**Burner management system with integrated fuel / air ratio control and load control for use with forced draft burners including oxygen trim control.**
	The LMV5 and this Data Sheet are intended for use by OEMs which integrate the burner management systems in their products!

Use

LMV5 is a microprocessor-based burner management system with matching system components for the control and supervision of forced draft burners of medium to high capacity.

Notes

Warning!
The safety, warning and technical notes given in the Basic Documentation on the LMV5 (P7550) apply fully to the present document also!

Based on the following software versions:

LMV50:	V10.30
LMV51:	V05.20
LMV51.3:	V05.20
LMV52.2..:	V05.20
LMV52.4:	V10.30
Int. LR module:	V02.10
Int. VSD module:	V01.50
AZL52:	V05.10
PLL52:	V01.50

CC1N7550en
22.05.2017

Applied directives:

- Low-voltage directive 2014/35/EC
- Directive for gas-fired appliances 2009/142/EC
- Directive for pressure devices 2014/68/EC
- Electromagnetic compatibility EMC (immunity) *) 2014/30/EC

*) The compliance with EMC emission requirements must be checked after the burner management system is installed in equipment

Compliance with the regulations of the applied directives is verified by the adherence to the following standards / regulations:

- Automatic burner control systems for burners and appliances burning gaseous or liquid fuels DIN EN 298
- Safety and control devices for gas burners and gas burning appliances - Valve proving systems for automatic shut-off valves DIN EN 1643
- Gas/air ratio controls for gas burners and gas burning appliances
  Part 2: Electronic types DIN EN 12067-2
- Safety and control devices for gas burners and gas burning appliances - General requirements DIN EN 13611
- Safety and control devices for gas and/or oil burners and gas and/or oil appliances -- Particular requirements
  Part 1: Fuel-air ratio controls, electronic type ISO 23552-1
- Automatic electrical controls for household and similar use
  Part 2-5:
  Particular requirements for automatic electrical burner control systems DIN EN 60730-2-5

The relevant valid edition of the standards can be found in the declaration of conformity!

Note on **DIN EN 60335-2-102**
Household and similar electrical appliances - Safety - Part 2-102:
Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections.
The electrical connections of the LMV5 and the PLL5 comply with the requirements of EN 60335-2-102.

EAC Conformity mark (Eurasian Conformity mark)

ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

China RoHS
Hazardous substances table:
http://www.siemens.com/download?A6V10883536

Standards and certificates (cont'd)

	Europe				Eurasian	USA			Australia	Ships	
Type	TÜV	TÜV CERT	DIN Geprüft	DVGW	EAC	UL	CSA US	FM APPROVED		Lloyd's Register	GL
LMV50.320B2	●	●	●	●	●	---	---	---	---	●	●
LMV51.000C2	●	●	●	●	●	---	---	●	●	●	●
LMV51.040C1	●	---	●	●	●	●	●	●	●	●	---
LMV51.100C1	●	●	●	●	●	---	---	●	●	●	●
LMV51.100C2	●	●	●	●	●	---	---	●	●	●	●
LMV51.140C1	●	---	---	---	●	●	●	●	●	●	---
LMV51.300B1	●	●	●	●	●	---	---	●	●	●	●
LMV51.300B2	●	●	●	●	●	---	---	●	●	●	●
LMV51.340B1	●	---	---	---	●	●	●	●	●	●	---
LMV52.200B1	●	●	●	●	●	---	---	●	●	●	●
LMV52.200B2	●	●	●	●	●	---	---	●	●	●	●
LMV52.240B1	●	---	●	●	●	●	●	●	●	●	---
LMV52.240B2	●	---	●	●	●	---	---	●	●	●	---
LMV52.400B2	●	●	●	●	●	---	---	●	●	●	●
LMV52.440B1	●	---	---	---	●	●	●	●	●	●	---
LMV5 system components:											
AZL52	●	●	●	●	●	●	●	●	---	●	●
SQM45/SQM48	●	●	●	●	●	●	●	●	●	●	●
SQM9	●	●	●	●	●	●	●	●	---	---	---
QRI2	●	●	●	●	●	●	●	●	●	●	●
QRA7	●	●	●	●	●	●	●	●	---	●	●
PLL52	●	●	●	●	●	●	●	●	●	---	---
QGO20	●	●	●	●	●	●	●	●	---	---	---

Note!
When using the LMV5 in Australia, we strongly recommend that you use a *BASE PAR GAS.par* file to adapt the parameter set to the specific requirements of the Australian market. Please direct any queries to Siemens Australia.

Note!
With regard to the use of the LMV5 in safety-related systems up to SIL3, a manufacturer's declaration from Siemens AG is available.

Supplementary documentation

Type of product	Type of documentation	No. of documentation
AZL5	User Documentation	A7550
LMV5	User Manual Basic diagram of LMV5 for 2 types of gas	A7550.1
LMV5	User Manual Basic diagram of LMV5 for 2 types of liquid fuel	A7550.3
LMV5	User Manual Assembly of VKF41.xxxC gas damper with ASK33.4 mounting kit to the SQM45.295A9 actuator	A7550.4
LMV52	User Manual COx supervision and control	A7550.5
LMV5	Setting Lists (parameter and error list)	I7550
ACS450	Installation Guide	J7550
LMV5	Installation Guide	J7550.1
LMV5	Basic Documentation	P7550
LMV5	Product Range Overview This document contains a complete overview	Q7550
AZL52 / LMV51	User Manual	U7550
AZL52 / LMV51	User Manual	U7550.1
AZL52 / LMV52	User Manual	U7550.2
AZL52 / LMV52	User Manual	U7550.3
AZL52 / LMV50	User Manual	U7550.4
AZL52 / LMV50	User Manual	U7550.5
SQM45 / SQM48	Data Sheet	N7814
SQM9	Data Sheet	N7818
QGO20	Data Sheet	N7842
QGO20	Basic Documentation	P7842

Life cycle

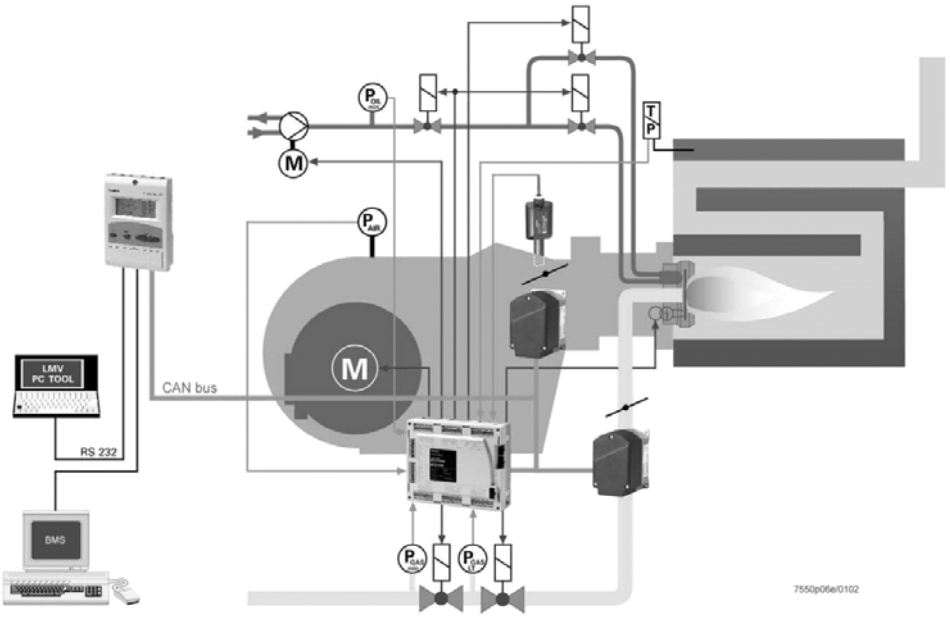
The LMV5 burner control has a designed lifetime* of 250,000 burner startup cycles which, under normal operating conditions in heating mode, correspond to approx. 10 years of usage (starting from the production date given on the type field).
This is based on the continuous tests specified in standards EN 298.
A summary of the conditions has been published by the European Control Manufacturers Association (Afecor - www.afecor.org).

The designed lifetime is based on use of the LMV5 according to the manufacturer's Data Sheet and Basic Documentation. After reaching the designed lifetime in terms of the number of burner startup cycles, or the respective time of usage, the LMV5 is to be replaced by authorized personnel.

* The designed lifetime is not the warranty time specified in the Terms of Delivery

The following components are integrated in the LMV5:

- Burner control with gas valve proving system
- Electronic fuel-air ratio control for:
  - A maximum of 4 actuators for LMV50 / LMV51
  - A maximum of 6 actuators for LMV52
- Optional PID temperature or pressure controller (boiler controller / load controller)
- Optional VSD module



Example:
Dual-fuel burner
- Gas: Modulating
- Oil: 2-stage

The system components (AZL5, actuators, O2 module, etc.) are interconnected via a bus system. Communication between the bus users takes place via a safety-related, system-bound data bus (for safety reasons, integration of the bus into external CAN bus systems is not possible). All safety-related digital outputs of the system are permanently monitored via a contact feedback network. For flame supervision in connection with the LMV5 and continuous operation, the infrared flame detector type QRI / flame detector QRA7 or an ionization probe can be used, for intermittent operation, optical flame detectors QRB / QRA2 / QRA4 / QRA10 with AGQ1 (AC 230 V).

The LMV5 is operated and programmed with the help of the AZL5 or a PC software. The AZL5 with LCD clear text and menu-driven operation affords straightforward operation and targeted diagnostics. For making diagnostics, the LCD shows the operating states, the type of fault and the point in time the fault occurred. The parameter setting levels for the burner / boiler manufacturer and heating engineer are password-protected to prevent unauthorized access.
Basic settings that the plant operator can make on site do not require a password. Also, the AZL5 is used as an interface for superposed systems such as a building automation and control system (BACS), or for a PC using the ACS450 software. Among other features, the unit affords convenient readout of settings and operating states, parameterization of the LMV5, and trend recording. When replacing the LMV5, all parameters can be saved in a backup memory of the AZL5 to be loaded back into the LMV5.
This means that reprogramming is not required.

When designing the fuel trains, the burner / boiler manufacturer can choose from a total of 7 valve families. The large number of individual parameterization choices (program times, configuration of inputs / outputs, etc.) enable him to make optimum adaptions to the specific application.

The universal SQM4 / SQM9 actuators are driven by stepper motors and can be positioned with high resolution. The characteristics and settings of the actuators are defined by the LMV5.

Type summary

Type reference	Mains voltage	Parameter set	Max. number of actuators	Automatic adaptation of controller's characteristics	Limit thermostat	Fuel meter input	Integrated gas valve proving	Integrated PID load controller	Control of VSD	Analog output	O2 trim control	Safety time TSAmax. **)	
												Gas	Oil
LMV50.320B2	AC 230 V	LMV50	5 *)	●	●	●	●	●	●	●	---	10 s	15 s
LMV51.000C2	AC 230 V	Europe	4	---	---	---	●	---	---	---	---	10 s	15 s
LMV51.040C1	AC 120 V	US / Canada	4	---	---	---	●	---	---	---	---	10 s	15 s
LMV51.100C1	AC 120 V	Europe	4	●	●	---	●	●	---	●	---	10 s	15 s
LMV51.100C2	AC 230 V	Europe	4	●	●	---	●	●	---	●	---	10 s	15 s
LMV51.140C1	AC 120 V	US / Canada	4	●	●	---	●	●	---	●	---	10 s	15 s
LMV51.300B1	AC 120 V	Europe	5 *)	●	●	●	●	●	●	●	---	10 s	15 s
LMV51.300B2	AC 230 V	Europe	5 *)	●	●	●	●	●	●	●	---	10 s	15 s
LMV51.340B1	AC 120 V	US / Canada	5 *)	●	●	●	●	●	●	●	---	10 s	15 s
LMV52.200B1	AC 120 V	Europe	6	●	●	●	●	●	●	●	●	10 s	15 s
LMV52.200B2	AC 230 V	Europe	6	●	●	●	●	●	●	●	●	10 s	15 s
LMV52.240B1	AC 120 V	US / Canada	6	●	●	●	●	●	●	●	●	10 s	15 s
LMV52.240B2	AC 230 V	US / Canada	6	●	●	●	●	●	●	●	●	10 s	15 s
LMV52.400B2	AC 230 V	Europe	6	●	●	●	●	●	●	●	●	10 s	15 s
LMV52.440B1	AC 120 V	US / Canada	6	●	●	●	●	●	●	●	●	10 s	15 s

*) When the VSD module is activated, only 4 SQM4/SQM9 actuators can be controlled!

**)

Attention!

The maximum safety time in the parameter set is set as follows ex works:

Parameter set	Gas	Oil
LMV50	10 s	10 s
Europe	3 s	5 s
US / Canada	10 s	15 s

On the OEM access level, it is possible to make parameter settings that differ from application standards. For this reason, check whether the parameter settings made are in compliance with the application standards (e.g. EN 676, EN 267, etc.), or whether the respective plant requires special approval!

LMV5

Mains voltage	**AC 120 V** -15% / +10%	**AC 230 V** -15% / +10%
Note! Only for use in earthed networks!		
Transformer - Primary side - Secondary side 1 - Secondary side 2	AGG5.210 AC 120 V 12 V~ 2 x 12 V~	AGG5.220 AC 230 V 12 V~ 2 x 12 V~
Mains frequency	50 / 60 Hz ±6%	50 / 60 Hz ±6%
Power consumption	<30 W (typically)	<30 W (typically)
Safety class	I, with parts according to II and III to DIN EN 60730-1	
Terminal loading «Inputs»		
• Perm. mains primary fuse (externally)	Max. 16 AT	Max. 16 AT
• Unit fuse F1 (internally)	6.3 AT to DIN EN 60127 2/5	6.3 AT to DIN EN 60127 2/5
• Mains supply: Input current depending on operating state of the unit		
Undervoltage		
• Safety shutdown from operating position at mains voltage	<96 V~	<186 V~
• Restart on rise in mains voltage	>100 V~	>188 V~
Oil pump / magnetic clutch (nominal voltage)		
• Nominal current	1,6 A	2 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Air pressure switch test valve (nominal voltage)		
• Nominal current	0.5 A	0.5 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Status inputs (KRN): Status inputs (with the exception of the safety loop) of the contact feedback network (CFN) are used for system supervision and require mains-related input voltage		
• Input safety loop	Refer to «Terminal loading outputs»	
• Input currents and input voltages - UeMax - UeMin - IeMax - IeMin	 UN +10% UN -15% 1.5 mA peak 0.7 mA peak	 UN +10% UN -15% 1.5 mA peak 0.7 mA peak
• Contact material recommendation for external signal sources (LP, DWmin, DWmax, etc.)	Gold-plated silver contacts	
• Transition / settling behavior / bounce - Perm. bounce time of contacts when switching on / off	 Max. 50 ms (after the bounce time, the contact must stay closed or open)	
• UN	AC 120 V	AC 230 V
• Voltage detection - On - Off	 90...132 V~ <40 V~	 180...253 V~ <80 V~
Terminal loading «Outputs»		
Total contact loading:		
(nominal voltage)	**AC 120 V** -15 % / +10 %	**AC 230 V** -15 % / +10 %
• Unit input current (safety loop) total contact current from: - Fan motor contactor - Ignition transformer - Valves - Oil pump / magnetic clutch	Max. 5 A	Max. 5 A

Individual contact loading:

Fan motor contactor		
• Nominal voltage	**AC 120 V**	**AC 230 V**
• Nominal current	1 A	1 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Alarm output (nominal voltage)		
• Nominal current	1 A	1 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Ignition transformer (nominal voltage)		
• Nominal current	1.6 A	2 A
• Power factor	Cosφ >0.2	Cosφ >0.2
Gas valves-gas (nominal voltage)		
• Nominal current	1.6 A	2 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Oil valves-oil (nominal voltage)		
• Nominal current	1.6 A	1 A
• Power factor	Cosφ >0.4	Cosφ >0.4
Cable lengths		
• Mains line	Max. 100 m (100 pF/m)	Max. 100 m (100 pF/m)
• HCFN line	Max. 100 m (100 pF/m) [1)]	Max. 100 m (100 pF/m) [1)]
• Analog line	Max. 100 m (100 pF/m)	Max. 100 m (100 pF/m)
• Flame detector	Refer to chapter «Technical Data / Flame supervision»	
• CAN bus	Total lengths max. 100 m	

Note!

[1)] If the cable length exceeds 50 m, additional loads must not be connected to the status inputs (refer to «Power supply for the LMV5»)!

Above a certain cable length, the actuators must be powered by a separate transformer installed near the actuators.

Cross-sectional areas

The cross-sectional areas of the mains power lines (L, N, PE) and, if required, the safety loop (safety limit thermostat, water shortage, etc.) must be sized for nominal currents according to the selected external primary fuse. The cross-sectional areas of the other cables must be sized in accordance with the internal unit fuse (max. 6.3 AT).

Min. cross-sectional area	0.75 mm² (single- or multi-core to VDE 0100)

Cable insulation must meet the relevant temperature requirements and conform to the environmental conditions. The CAN (bus) cables have been specified by Siemens and can be ordered as accessory items. **Other cables must not be used. If this is not observed, the EMC characteristics of the LMV5 will be unpredictable!**

Nominal voltage	**AC 120 V** -15 % / +10 %	**AC 230 V** -15 % / +10 %
Fuses used in the LMV5		
- F1	6.3 AT DIN EN 60127 2/5	6.3 AT DIN EN 60127 2/5
- F2	4 AT GMD-4A	4 AT DIN EN 60127 2/5
- F3	4 AT GMD-4A	4 AT DIN EN 60127 2/5

Technical data (cont'd)

AZL5

Operating voltage	24 V~ -15 % / +10 %
Power consumption	<5 W (typically)
Degree of protection of housing	
- Rear	IP00 to IEC 529
- Front	IP54 to IEC 529 when installed
Safety class	I, with parts according to II and III to DIN EN 60730-1

Battery:

Supplier	**Type reference**
VARTA	CR 2430 (LF-1/2 W)
DURACELL	DL 2430
SANYO ELECTRIC, Osaka / Japan	CR 2430 (LF-1/2 W)
RENATA AG, Itingen / CH	CR 2430

Pollution degree	2

PLL52

Mains voltage «X89-01»	AC 120 V –15 % / +10 %	AC 230 V -15 % / +10 %
Safety class	I, with parts according to II to DIN EN 60730-1	
Mains frequency	50 / 60 Hz ±6%	50 / 60 Hz ±6%
Power consumption	Approx. 4 VA	Approx. 4 VA
Degree of protection	IP54, housing closed	

Cable lengths / cross-sectional areas:

• Electrical connection «X89»	Screw terminals up to 2.5 mm²
• Cable lengths	≤10 m to QGO20
• Cross-sectional areas	Refer to QGO description, twisted pairs

Analog inputs:

• Supply air temperature sensor	Pt1000 / LG-Ni1000
• Flue gas temperature sensor	Pt1000 / LG-Ni1000
• QGO20	Refer to Data Sheet N7842
• Interface	Communication bus for LMV52

AGG5.2

Transformer AGG5.220	
- Primary side	AC 230 V
- Secondary side	12 V~ (3x)
Transformer AGG5.210	
- Primary side	AC 120 V
- Secondary side	12 V~ (3x)

CAN bus cable

Cable types:	
AGG5.641	8 mm dia. +0,5 / -0,2 mm Bending radius ≥120 mm Ambient temperature -30...+70 °C (no movements of cable) Cable is resistant to almost all types of mineral oil
AGG5.631	7.5 mm dia. ±0.2 mm Bending radius ≥113 mm Ambient temperature -30...+70 °C (no movements of cable) Cable is resistant to almost all types of mineral oil

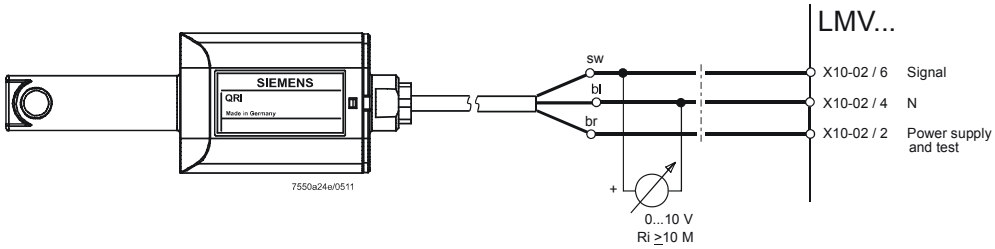
Flame supervision

Note:
All measured voltages refer to connection terminal N (X10–02, pin 4).

QRI (suited for continuous operation)

Supply voltage operation / test at terminal POWER QRI (X10–02, pin 2)	Approx. DC 14 / 21 V
Minimum signal voltage required at terminal FSV / QRI (X10–02, pin 6)	Min. DC 3,5 V Display flame approx. 50 %

Connection diagram



For detailed information, refer to Data Sheet N7719.

IONIZATION (suited for continuous operation)

No-load voltage at terminal ION (X10–03, pin 1)	Approx. U_{Mains}

Caution!
The ionization probe must be installed such that protection against electrical shock hazard is ensured!

Short-circuit current	Max. 0,5 mA~
Required detector current	Min. DC 6 µA Display flame approx. 50 % (at factory setting of *StandardFactor*) parameter)
Possible detector current	Max. DC 85 µA Display flame approx. 100 % (at factory setting of *StandardFactor*) parameter)
Permissible length of detector cable (lay separately)	100 m (wire-earth 100 pF/m)

Note!
The greater the detector cable capacitance (cable length), the lower the voltage at the ionizations probe and, therefore, the lower the detector current. In the case of extensive cable lengths and high-resistance flames, it may be necessary to use low-capacitance cables (e.g. ignition cable). The electronic circuit is designed such that impacts of the ignition spark on the ionization current will be largely eliminated. Nevertheless, it must be ensured that the minimum detector current required will already be reached during the ignition phase. If that is not the case, the connections of the ignition transformer on the primary side must be changed and / or the location of the electrodes also.

Flame supervision

QRA2 / QRA4 / QRA10 with AGQ1.xA27

For intermittent operation only.

Note!
AGQ1 is only available for AC 230 V mains voltage.

QRA

Power supply in operation	DC 280…325 V
Power supply in test mode	DC 350…450 V

Attention!
In order to ensure that a higher voltage is supplied to the UV cell for the extraneous light test in phase 21 (via fan output X3-01 pin 1), parameter *MinTmeStartRel* (minimum time for phase 21) must be parameterized to at least 5 seconds.

For more detailed information about QRA2 / QRA10, refer to Data Sheet N7712.
For more detailed information about QRA4, refer to Data Sheet N7711.

Caution!
QRA2 (QRA4 / QRA10 must not be used when extraneous light suppression is activated since detector tests will not be made in that case!

LMV5

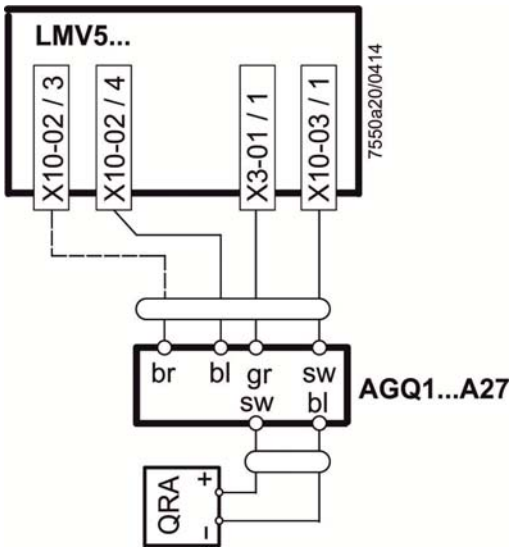
Possible ionization current	Max. 10 µA
Ionization current required	Min. 6 µA

AGQ1.xA27

In connection with the LMV5, ancillary unit AGQ1.xA27 must be used.

Power supply	AC 230 V
Possible current	Max. 500 µA
Current required	Min. 200 µA

Connection diagram



Assignment of LMV5 terminals:

X10-02 pin 3	L
X10-02 pin 4	N
X10-03 pin 1	Ionization
X3-01 pin 1	Fan

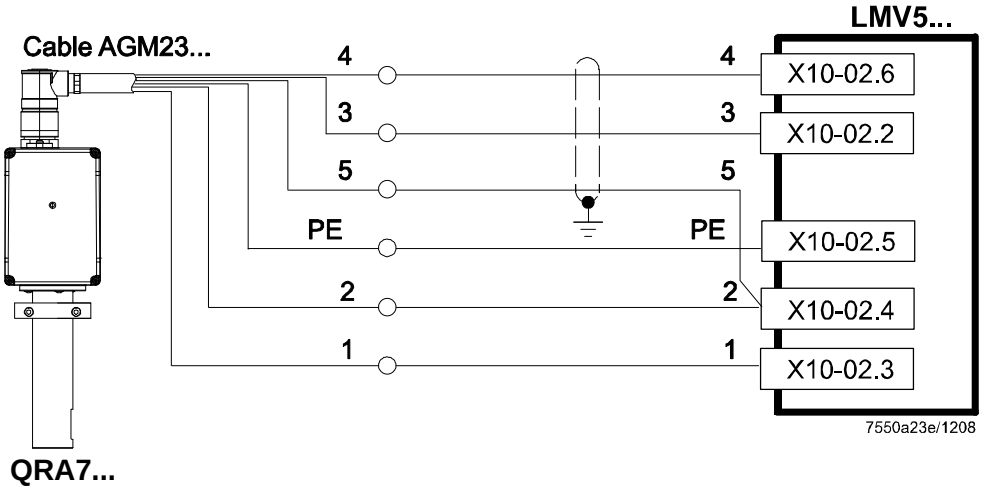
Code of color
br = brown
bl = blue
sw = black
gr = grey (old: rt = red)

When laid together with other cables (e.g. in a cable duct), the length of the 2-core cable between QRA and AGQ must not exceed 20 m. A maximum cable length of 100 m is permitted if the 2-core cable is run at a distance of at least 5 cm from other live cables. The length of the 4-core cable between AGQ and LMV5 is limited to 20 m. A maximum cable length of 100 m is permitted if the signal line (ionization / black) is not run in the same cable but separately at a distance of at least 5 cm from other live cables.

Flame supervision

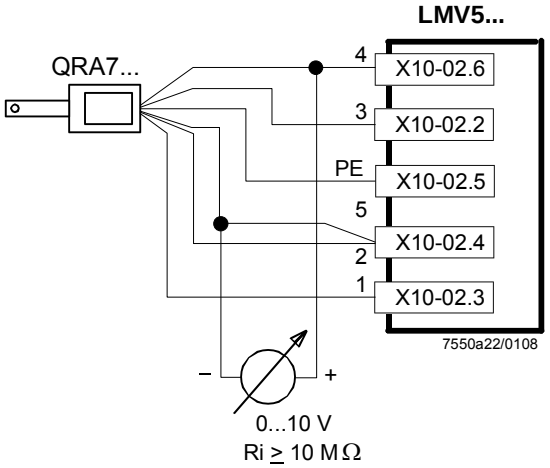
QRA7
(suited for continuous operation)

Power supply	
- QRA73A17 / QRA75A17	AC 120 V
- QRA73A27 / QRA75A27	AC 230 V
Power supply for test via increasing the power supply for QRI (X10-02 pin 2)	From DC 14 V up to DC 21 V
Required signal voltage (X10-02 pin 6)	Min. DC 3.5 V
Perm. length of detector cable	
- 6 wire cable	Max. 10
- Signal cable no. 3, 4 and 5	Max. 100 m (lay separately from L, N and PE in shielded cable)



For more detailed information about QRA7, refer to Data Sheet N7712.

Connection diagram



Assignment of LMV5 terminals:

X10-02 pin 2	QRI supply
X10-02 pin 3	L
X10-02 pin 4	N
X10-02 pin 5	PE
X10-02 pin 6	QRI signal

Flame supervision

QRB (for intermittent operation only)

No-load voltage at the QRB terminal (X10–02, pin 1)	Approx. DC 8 V
Detector current required (with flame)	Min. DC 30 µA Display flame 35 % (at factory setting of *StandardFactor*) parameter)
Permissible detector current (dark current with no flame)	Max. DC 5 µA
Permissible detector current	Max. DC 70 µA Display flame approx. 100 % (at factory setting of *StandardFactor*) parameter)
Permissible length of QRB detector cable (lay separately)	100 m (wire-wire 100 pF/m)

Note!
A detector resistance value of RF <5 kΩ is identified as a short-circuit and, in operation, will lead to safety shutdown as if loss of flame had occurred. Measurement of the voltage at terminal QRB during burner operation gives a clear indication: If voltage drops below 1 V, safety shutdown will probably occur. For that reason, before using a highly sensitive photoresistive flame detector (QRB1B, QRB3S), it should be checked whether such a detector is really required! Increasing line capacitance between the QRB terminal and mains live «L» adversely affects the sensitivity and increases the risk of damaged flame detectors due to mains overvoltages. Separate routing of detector cables as specified in Data Sheet 7714 must be observed.

For more detailed information, refer to Data Sheet N7714.

Caution!
Flame detectors QRB must not be used when extraneous light suppression is activated since detector tests are not made in that case (parameter *ExtranLightTest* = deactivated)!

Caution!
Observe the relevant standards and regulations (e.g. extra supervision of the combustion chamber temperature)!

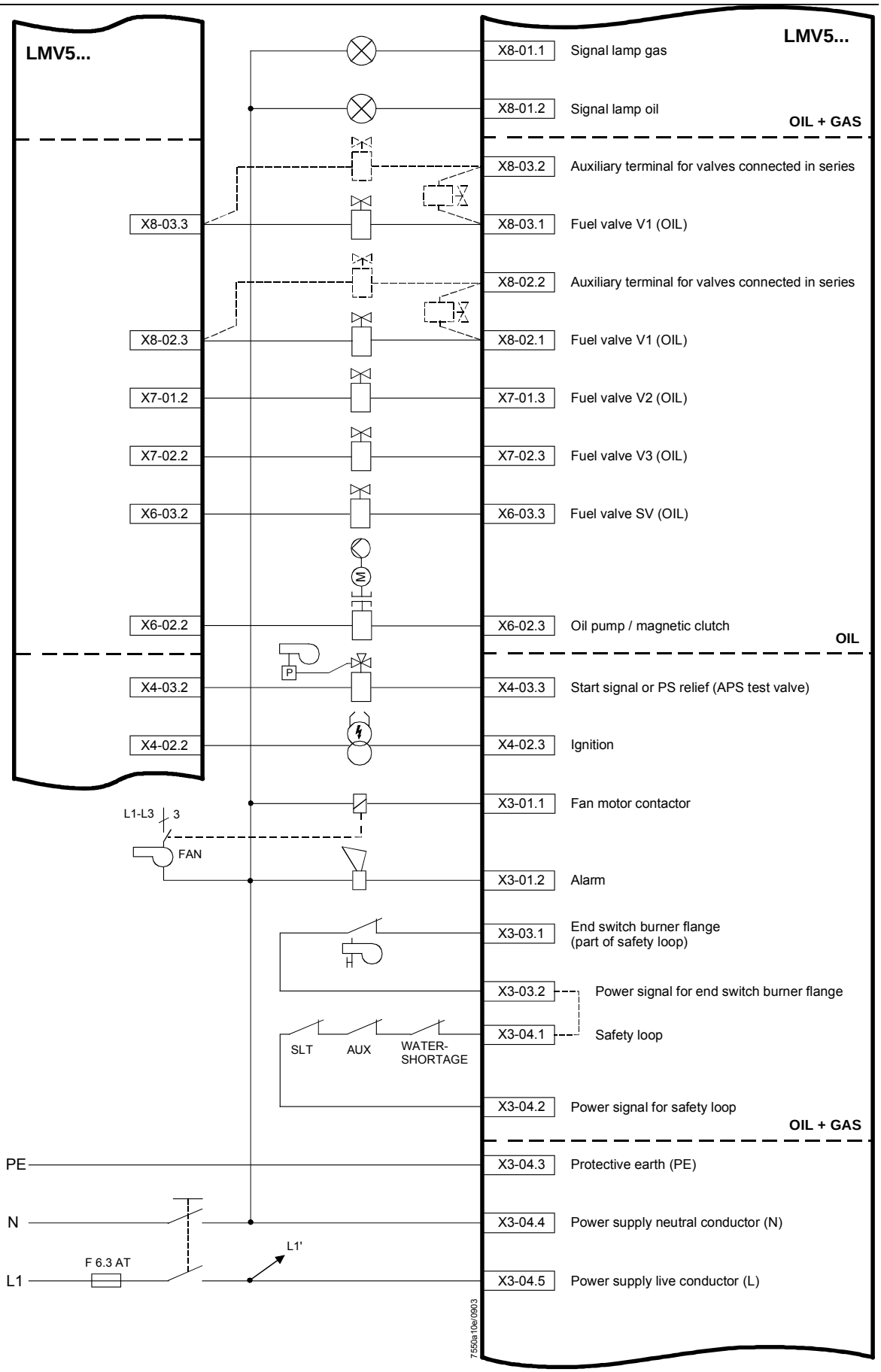
Flame signal display AZL5

The following applies in general to the **flame signal display** (AZL5 display and operating unit):
The percentages values listed above result from the factory setting of the parameter *Standardize* (standardization of flame signal display).
The display is subject to various component tolerances, with the result that deviations of ±10 % are perfectly possible.
It should furthermore be noted that for physical reasons, there is no linear connection between the display and detector signal values.
This is especially apparent in supervision of ionization**.**

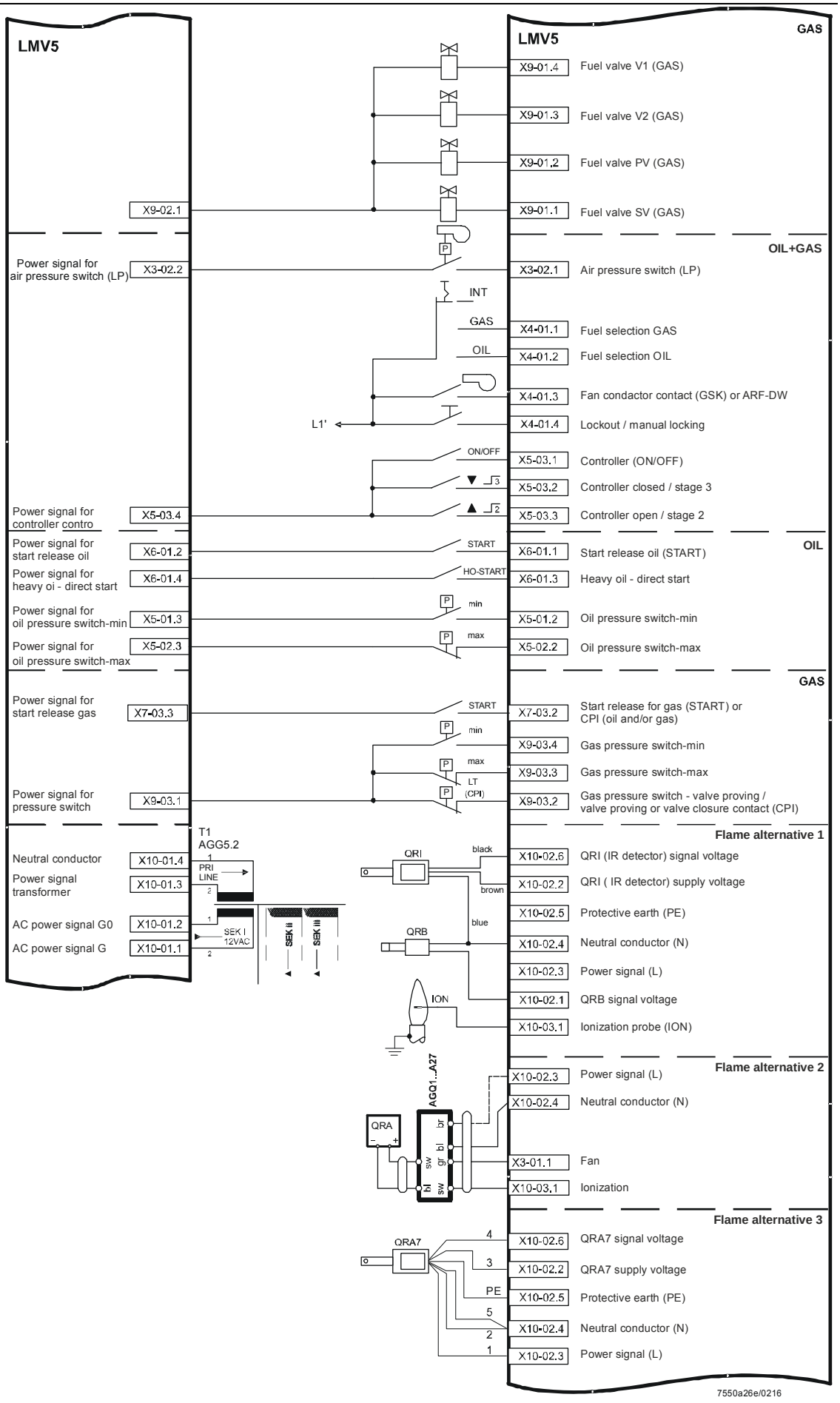
Environmental conditions (all LMV5 components)	**Storage**	DIN EN 60721-3-1
	Climatic conditions	Class 1K3
	Mechanical conditions	Class 1M2
	Temperature range	-20...+60 °C
	Humidity	<95% r.h.
	Transport	DIN EN 60721-3-2
	Climatic conditions	Class 2K2
	Mechanical conditions	Class 2M2
	Temperature range	-20...+60 °C
	Humidity	<95% r.h.
	Operation	DIN EN 60721-3-3
	Climatic conditions	Class 3K3
	Mechanical conditions	Class 3M3
	Temperature range	-20...+60 °C
	Humidity	<95% r.h.
	Installation altitude	Max. 2,000 m above sea level

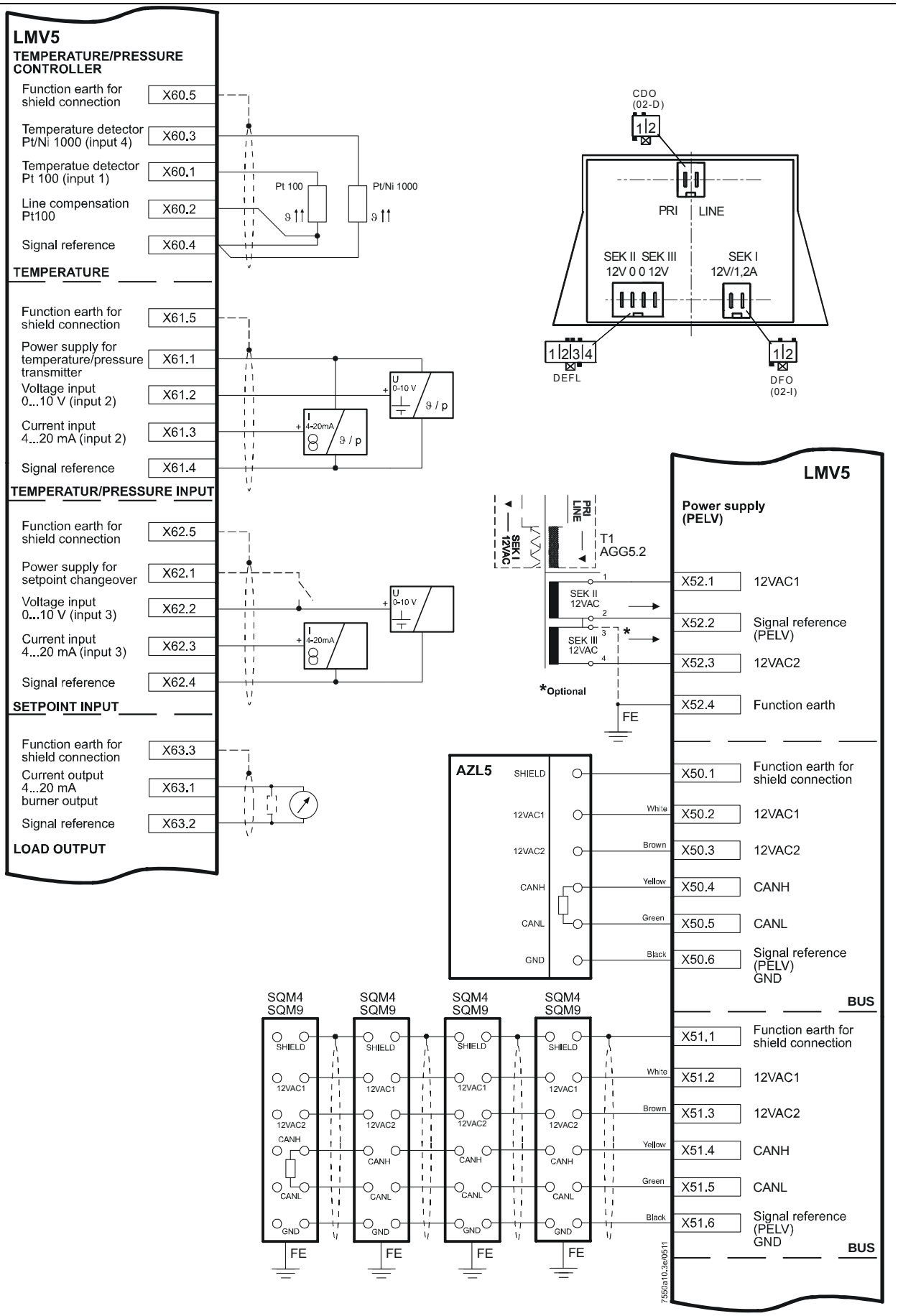
Caution!
Condensation, formation of ice and ingress of water are not permitted!

Block diagram inputs / outputs

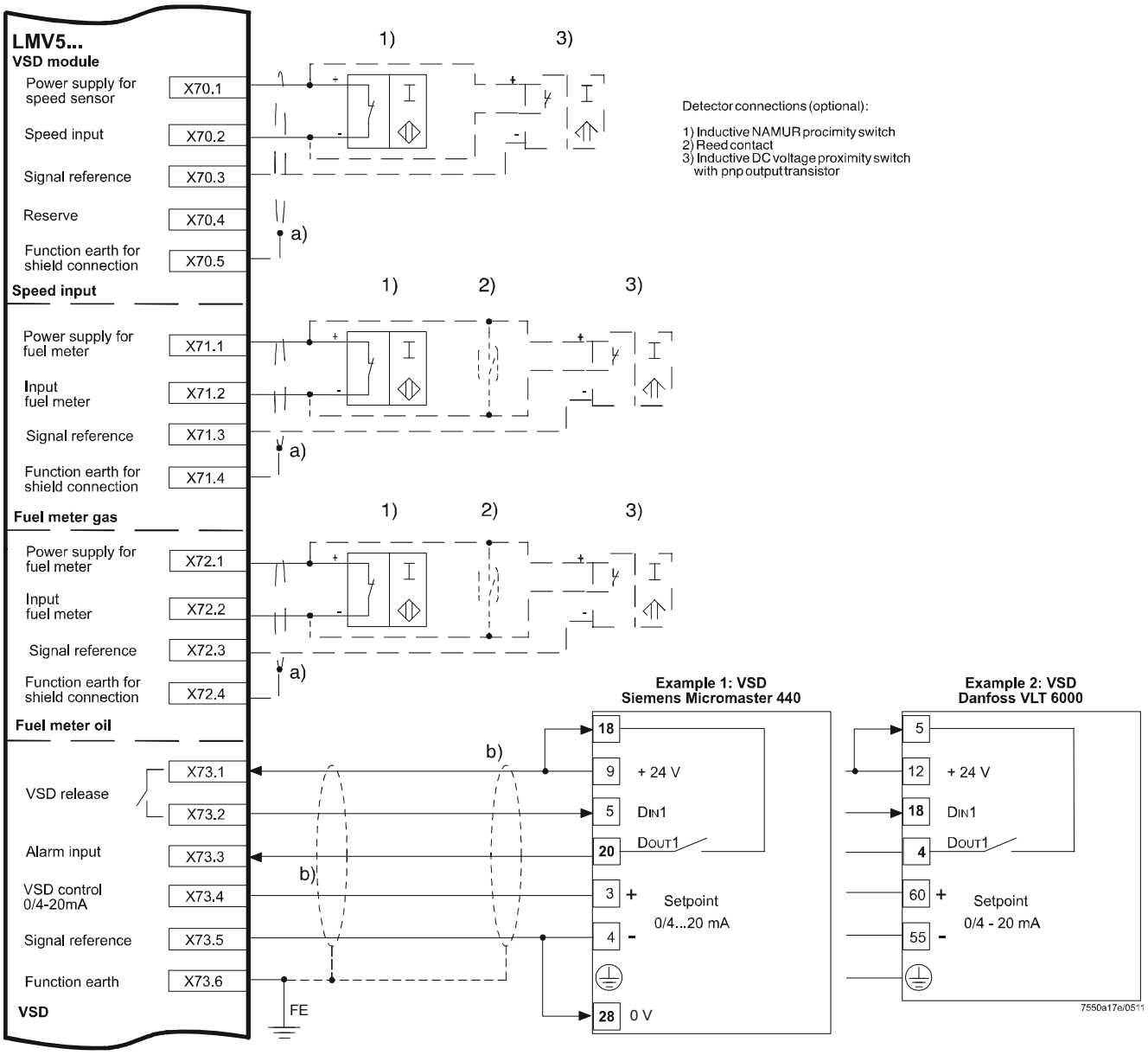


Block diagram inputs / outputs (cont'd)




LMV5
TEMPERATURE/PRESSURE CONTROLLER
Function earth for shield connection
X60.5
Temperature detector Pt/Ni 1000 (input 4)
X60.3
Temperatue detector Pt 100 (input 1)
X60.1
Line compensation Pt100
X60.2
Signal reference
X60.4
TEMPERATURE
Function earth for shield connection
X61.5
Power supply for temperature/pressure transmitter
X61.1
Voltage input 0...10 V (input 2)
X61.2
Current input 4...20 mA (input 2)
X61.3
Signal reference
X61.4
TEMPERATUR/PRESSURE INPUT
Function earth for shield connection
X62.5
Power supply for setpoint changeover
X62.1
Voltage input 0...10 V (input 3)
X62.2
Current input 4...20 mA (input 3)
X62.3
Signal reference
X62.4
SETPOINT INPUT
Function earth for shield connection
X63.3
Current output 4...20 mA burner output
X63.1
Signal reference
X63.2
LOAD OUTPUT
Pt 100
Pt/Ni 1000
CDO (02-D)
PRI
LINE
SEK II SEK III
12V 0 0 12V
SEK I
12V/1,2A
DEFL
DFO (02-I)
T1 AGG5.2
SEK I 12VAC
SEK II 12VAC
SEK III 12VAC
*Optional
FE
LMV5
Power supply (PELV)
X52.1
12VAC1
X52.2
Signal reference (PELV)
X52.3
12VAC2
X52.4
Function earth
AZL5
SHIELD
12VAC1
12VAC2
CANH
CANL
GND
White
Brown
Yellow
Green
Black
X50.1
Function earth for shield connection
X50.2
12VAC1
X50.3
12VAC2
X50.4
CANH
X50.5
CANL
X50.6
Signal reference (PELV) GND
BUS
SQM4 SQM9
X51.1
Function earth for shield connection
X51.2
12VAC1
X51.3
12VAC2
X51.4
CANH
X51.5
CANL
X51.6
Signal reference (PELV) GND
BUS
7550a10.3e/0511

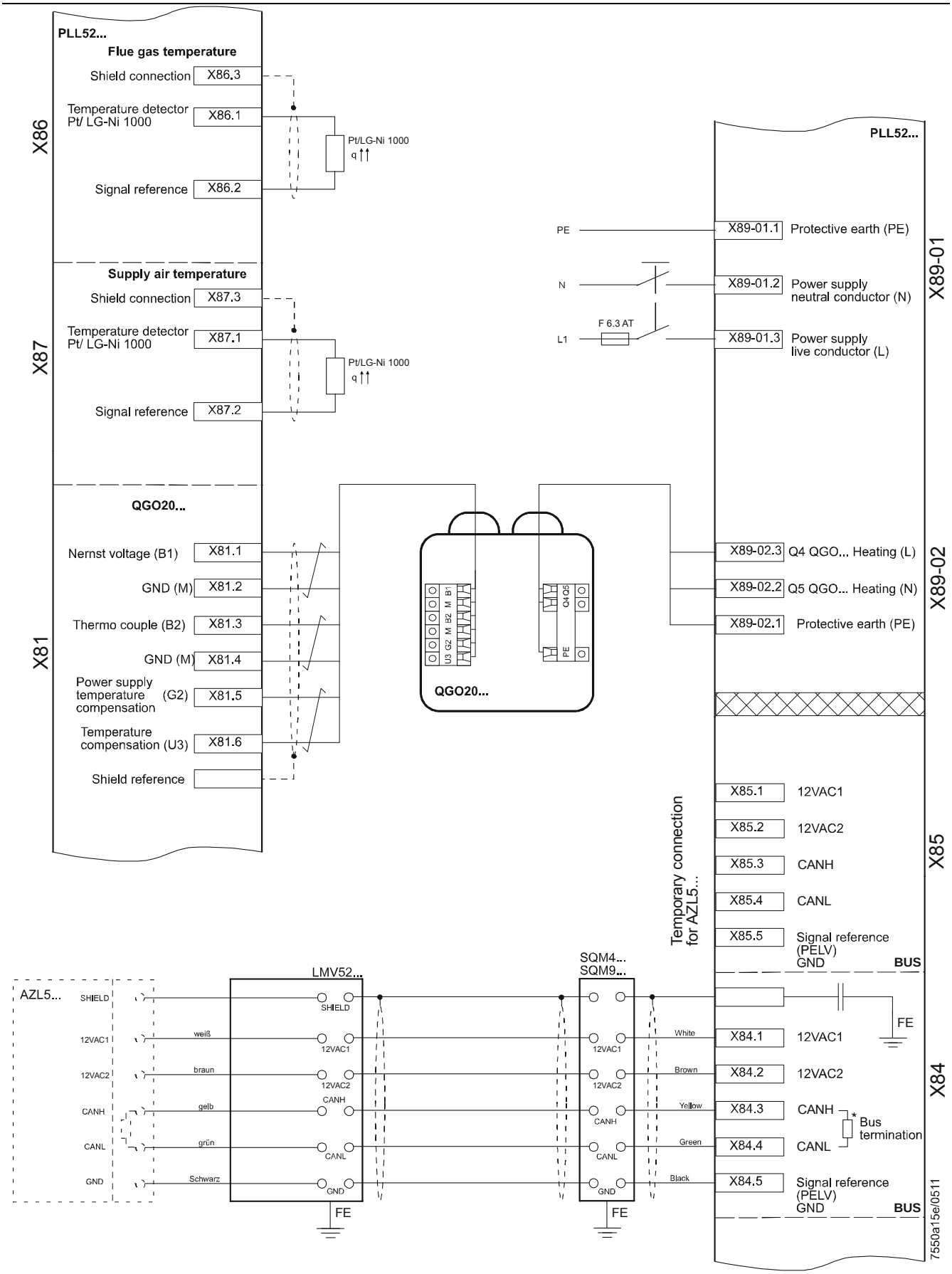
Connection terminals



Shielding:

a)	Optional shield connection for rough environmental conditions
b)	Alternative connection of VSD, refer to documentation of used VSD

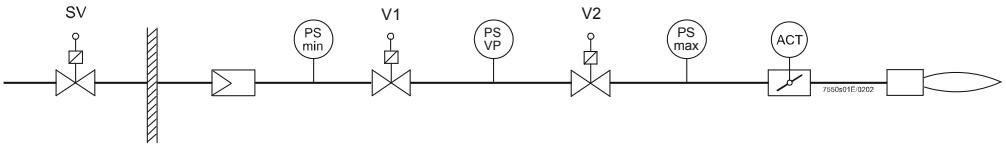
Terminal marking of LMV52 with PLL52 O2 module (cont'd)



Fuel train (examples)

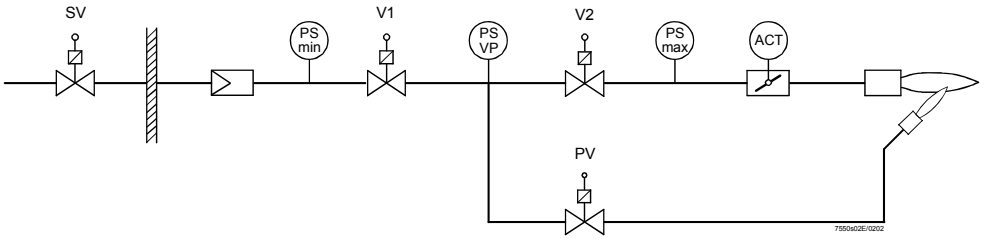
Direct gas ignition

Program G Direct ignition



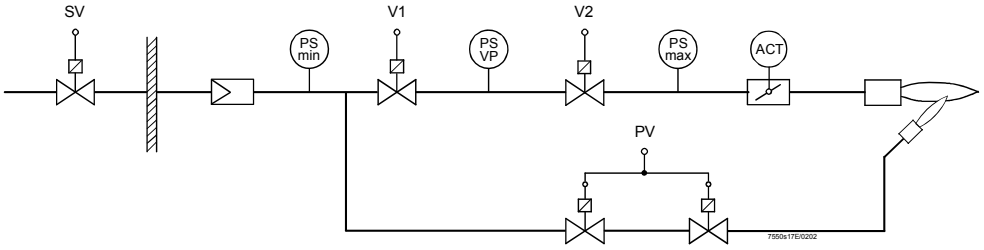
Gas pilot ignition 1

Program Gp1 Gas pilot

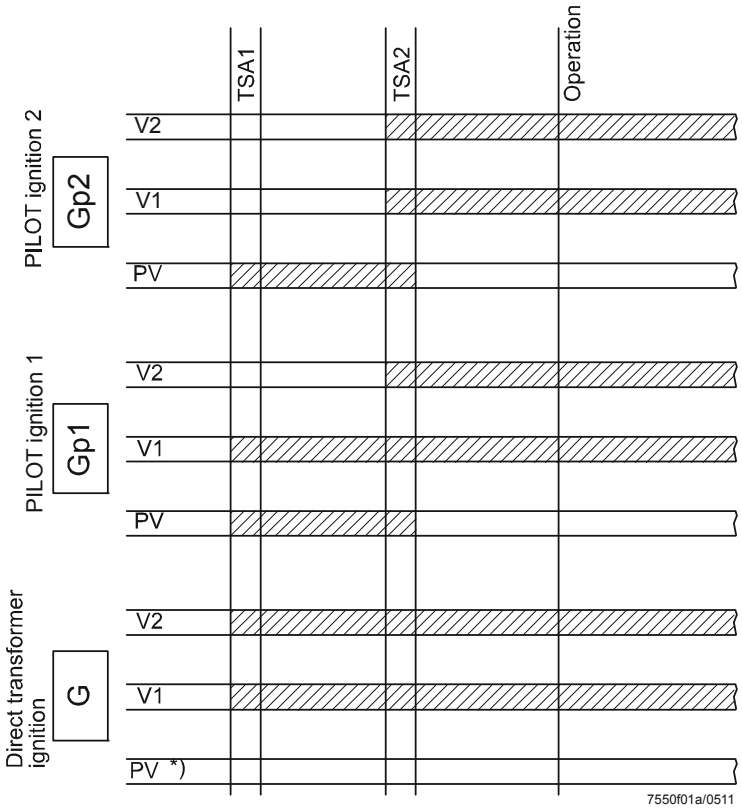


Gas pilot ignition 2

Program Gp2 Gas-Pilot



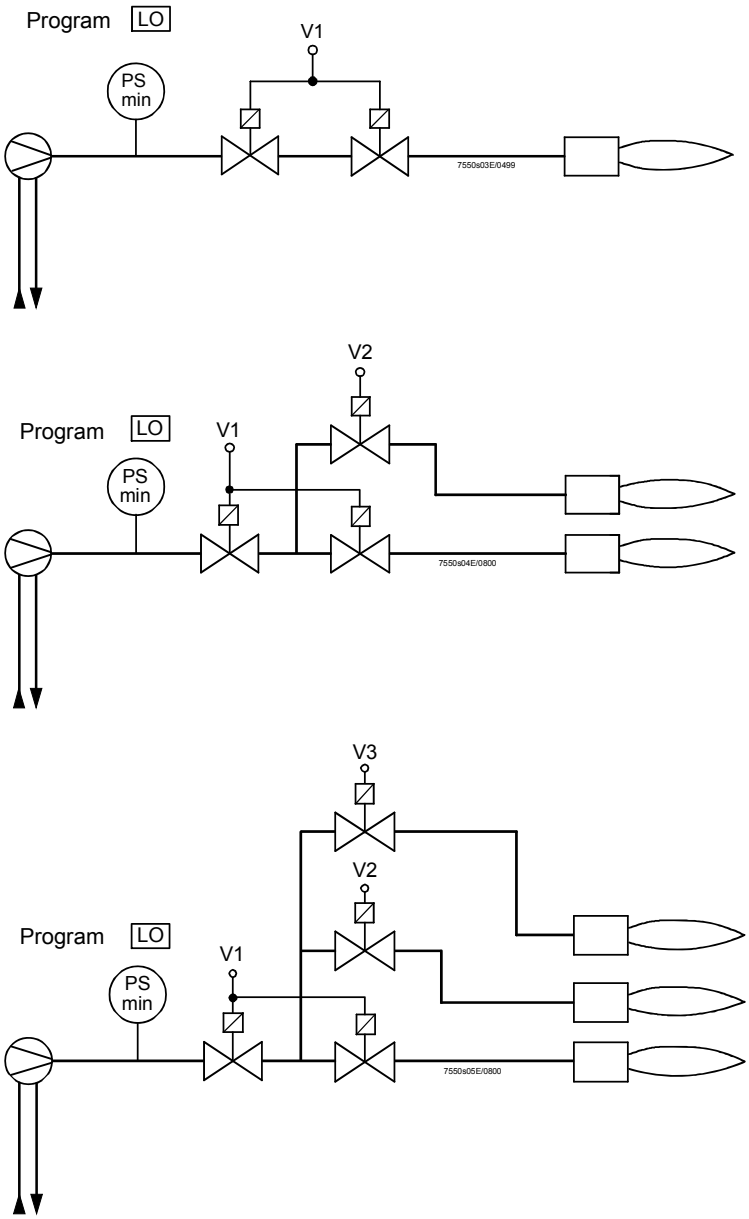
Fuel valve control Gas (always modulating)



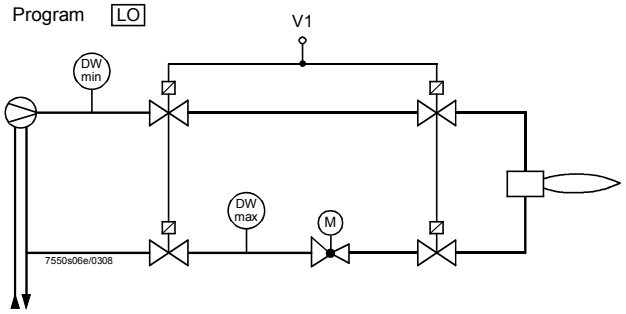
Legend (fuel trains):

*)	Not used
1)	Preheating device
HO	Heavy oil
LO	Light oil
No	**N**ormally **O**pen
DK	Gas valve proving
DW	Pressure switch
HE	Heating element
SA	Actuator
SV	Shutoff valve (outside the building)
PV	Pilot valve
V	Fuel valve

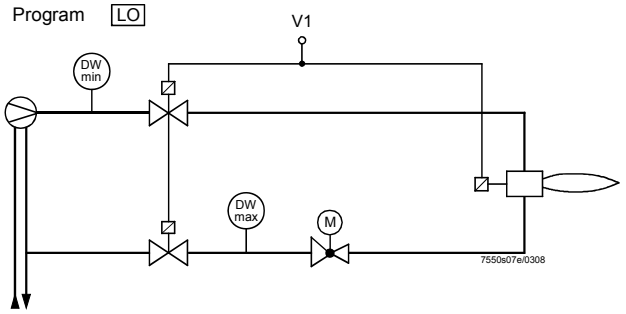
Direct ignition with light oil, multistage



Direct ignition with light oil, modulating



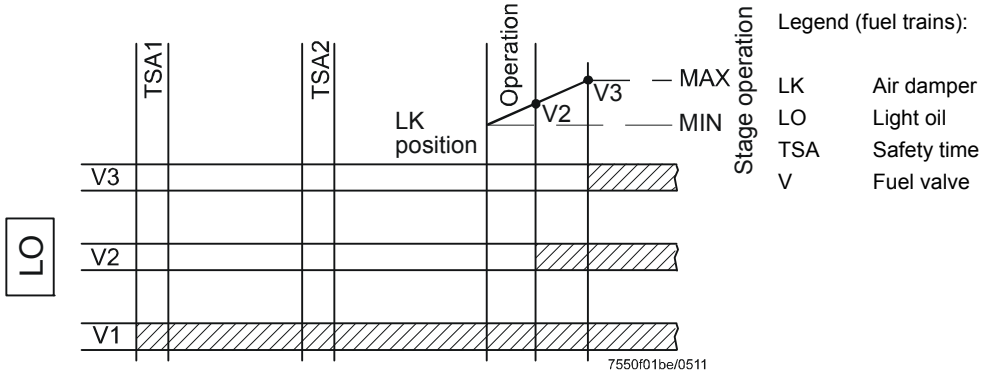
Modulating burner (without shutdown facility for adjustable head)



Modulating burner (with shutdown facility for adjustable head)

Fuel valve control

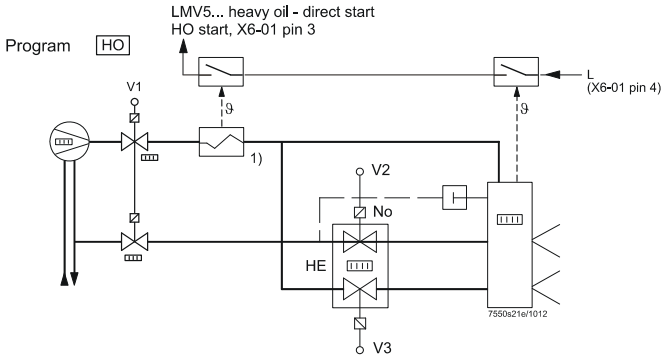
Light oil (direct transformer ignition)



Legend (fuel trains):

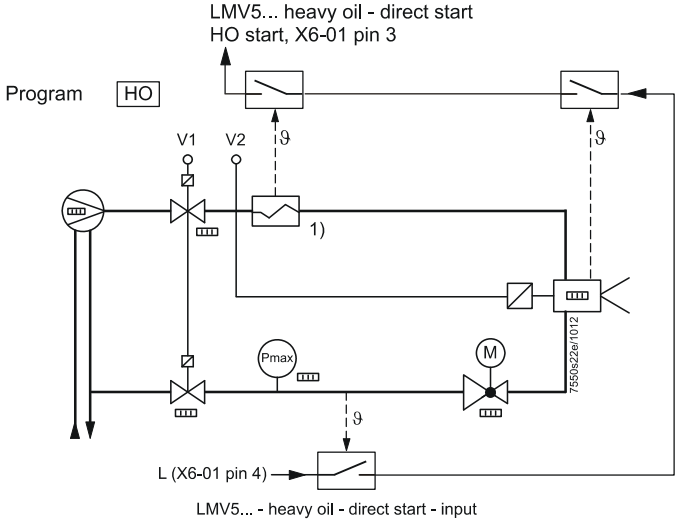
LK	Air damper
LO	Light oil
TSA	Safety time
V	Fuel valve

Direct ignition with heavy oil, multistage



2-stage burner

Direct ignition with heavy oil, modulating



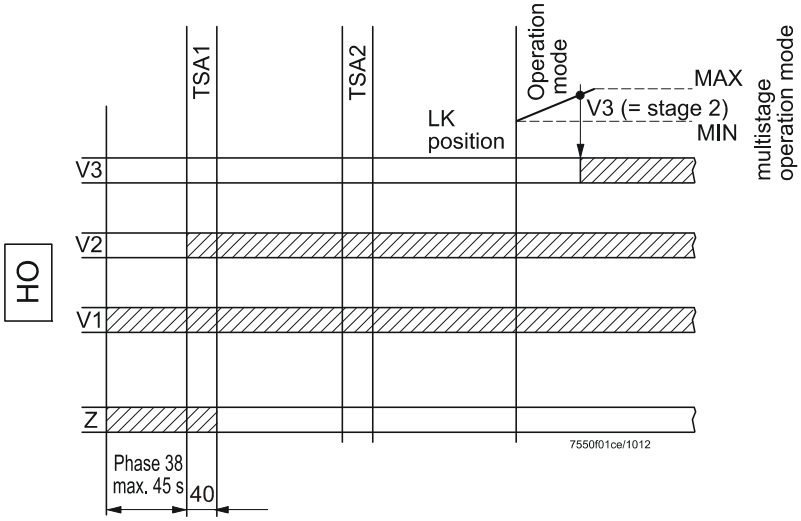
Modulating burner

Circulation from phase 38, max. 45 s, as soon as heavy oil direct start = ON in phase 38:
→ phase change in phase 40

Heavy oil direct start = OFF at the end of phase 38
→ repetition (max. 3 times in total)

Fuel valve control

Heavy oil (direct transformer ignition)



Legend (fuel trains)

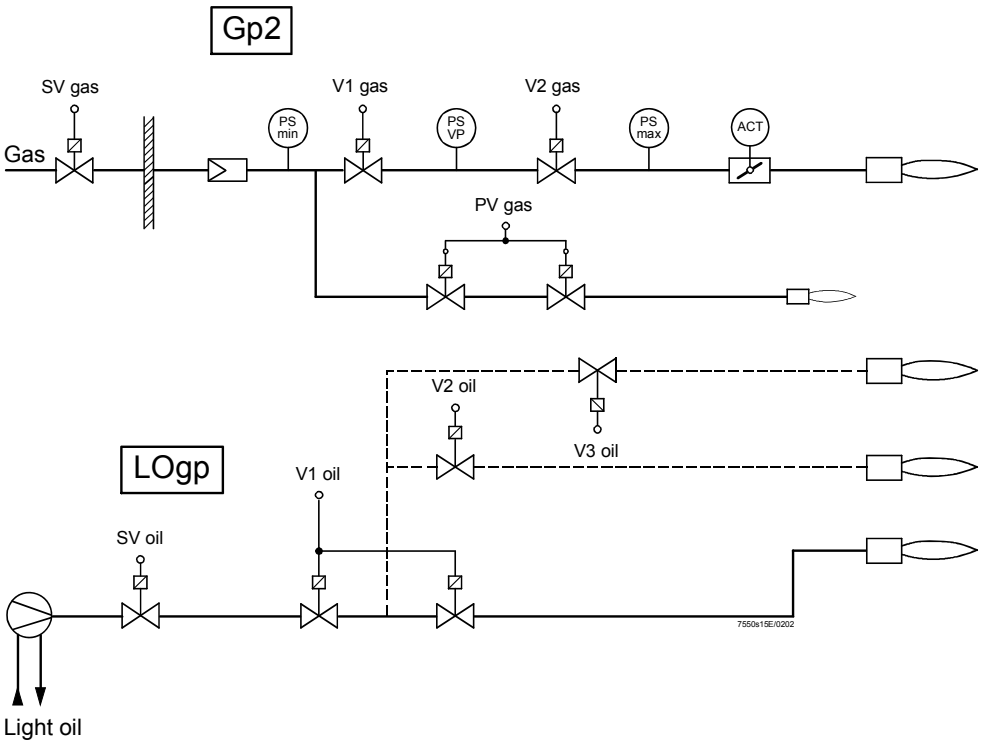
HO	Heavy oil
LK	Air damper
TSA	Safety time
V	Fuel valve
Z	Ignition

Note on dual-fuel burner!
Gas trains **G**, **Gp1** and **Gp2** [1] can be randomly combined with oil trains **LO** and **HO** for operation with dual-fuel burners since these fuel trains operate independently.

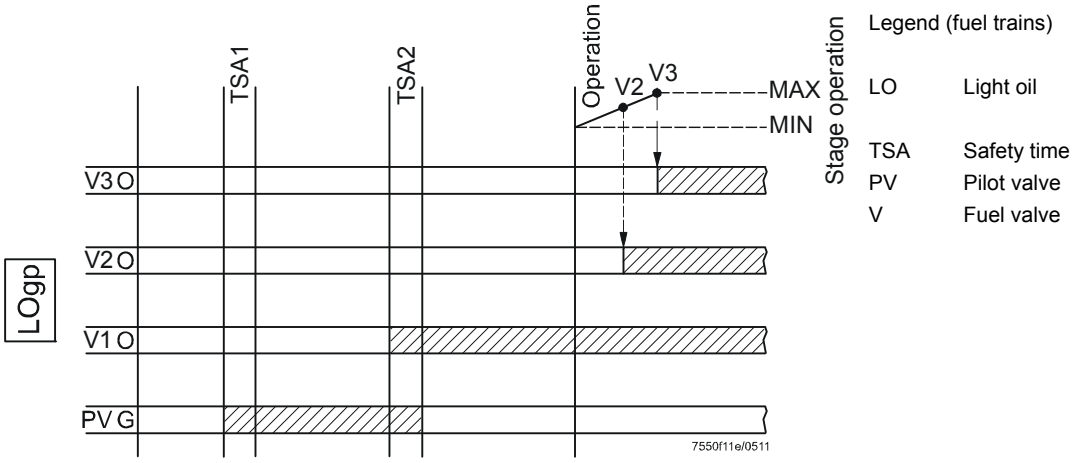
Caution!
Oil trains LOgp and HOgp are designed for ignition with a gas pilot. They must only be combined with a special gas train Gp2 for operation with a dual-fuel burner.

[1] With **Gp2** permitted with HW 01.C0, SW V01.40 or higher.

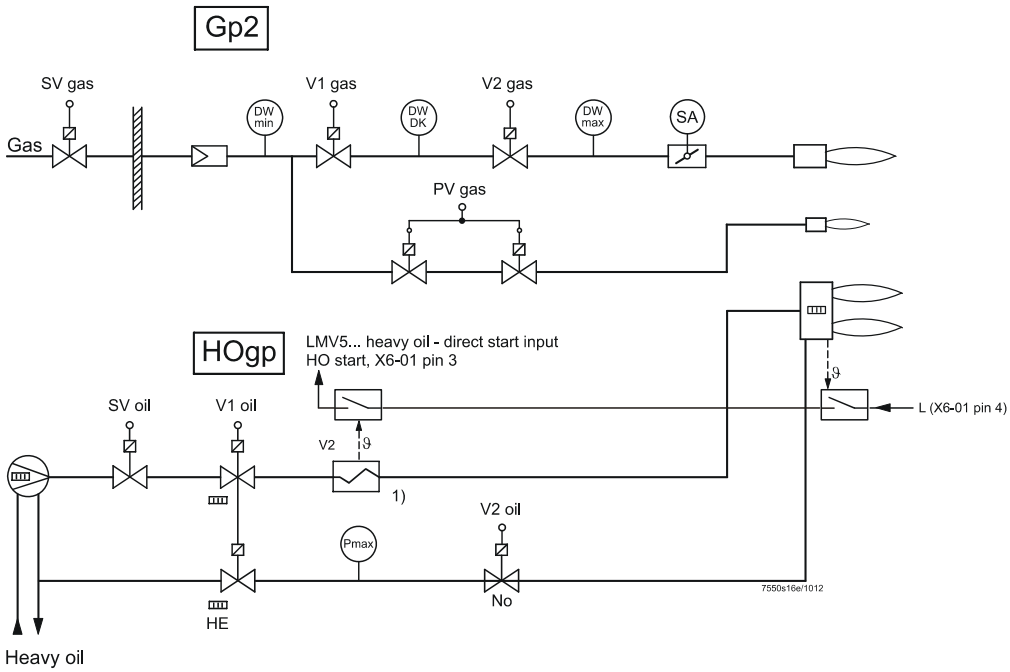
Dual-fuel burner gas / light oil with gas pilot ignition



Fuel valve control — Light oil (with gas pilot ignition)

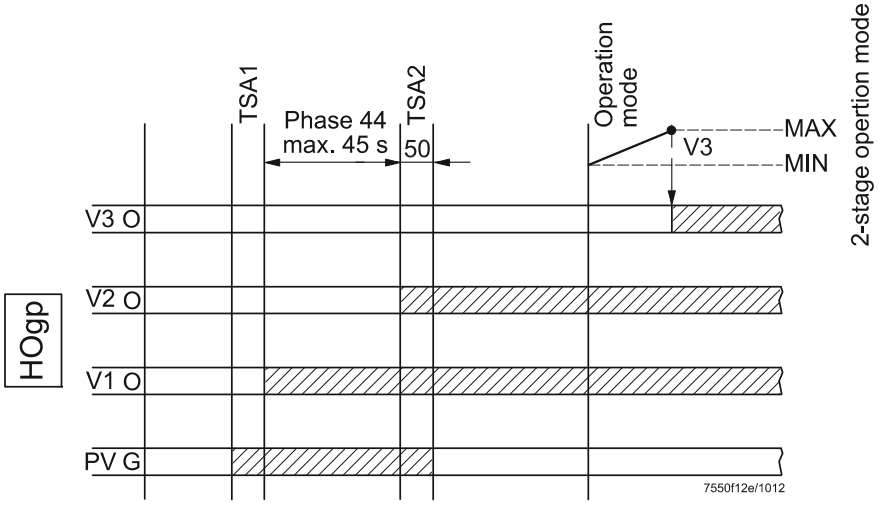


Dual-fuel burner gas / heavy oil with gas pilot ignition



Fuel valve control

Heavy oil (with gas pilot ignition)



Legend (fuel trains):

HO Heavy oil

PV Pilot valve
TSA Safety time
V Fuel valve

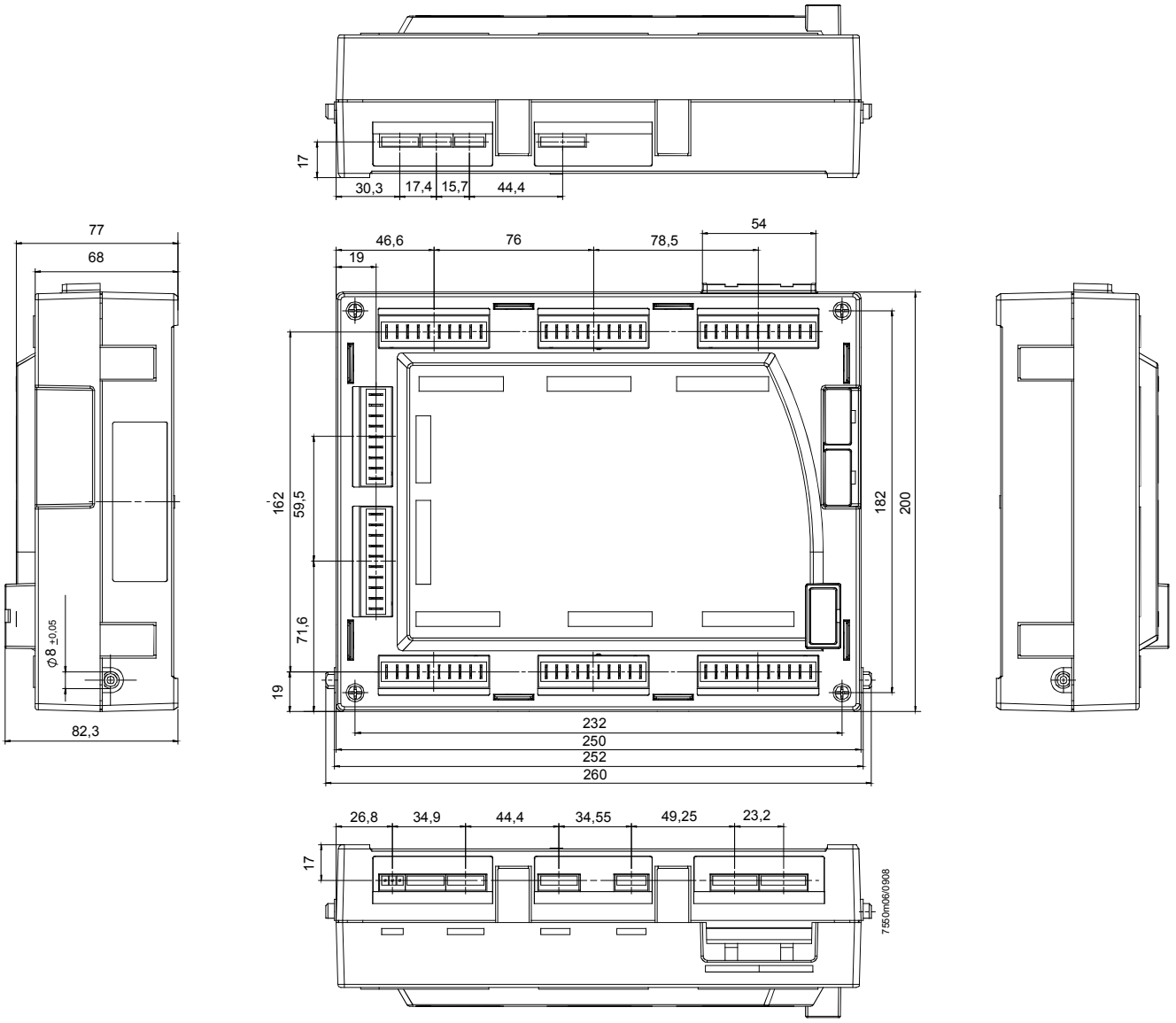
Circulation from phase 44, max. 45 s as soon as heavy oil direct start = ON in phase 44:
→ phase change in phase 50

Heavy oil direct start =
OFF at the end of phase 44
→ repetition (max. 3 times in total)

Dimensions

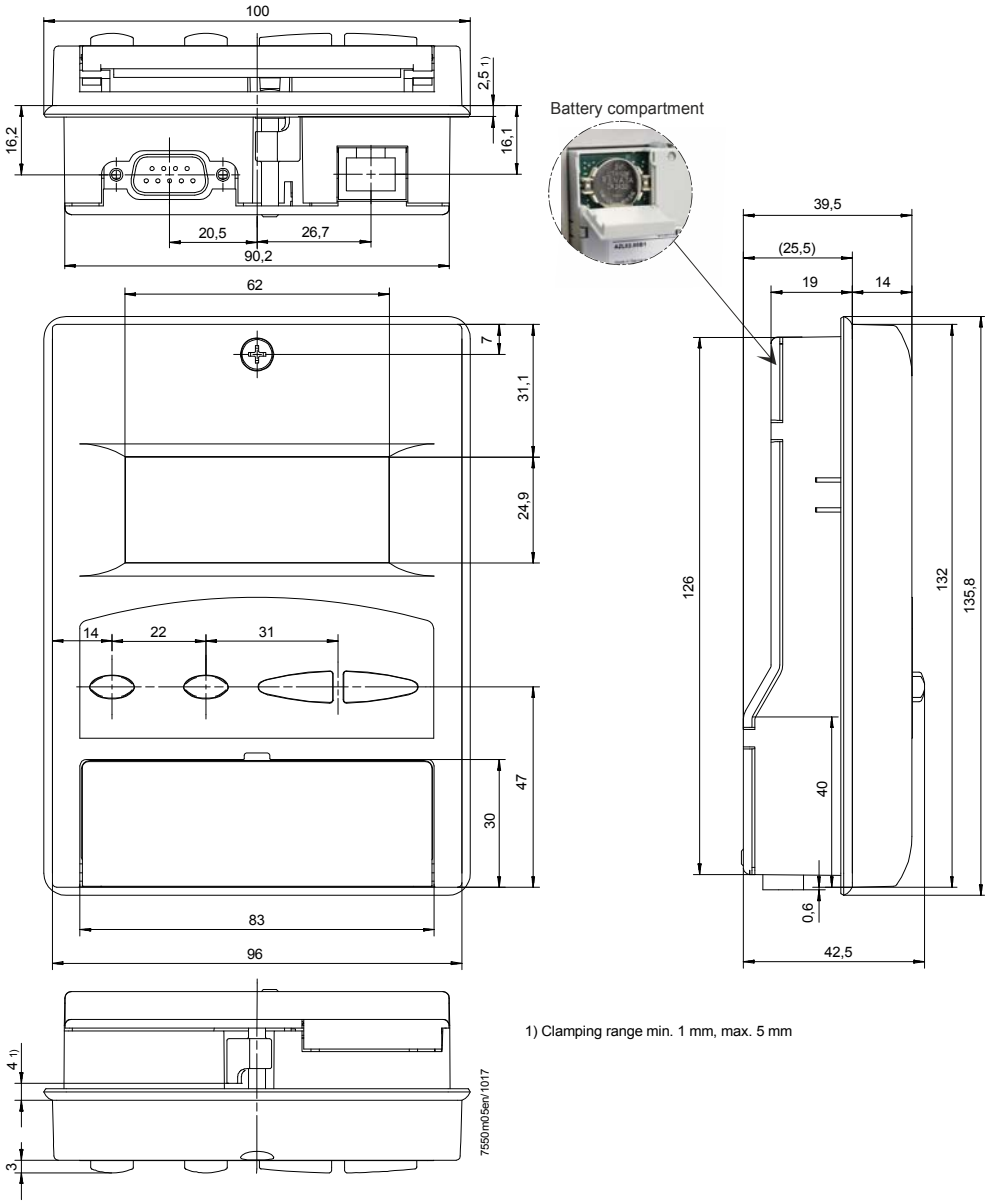
Dimensions in mm

LMV5



Dimensions in mm

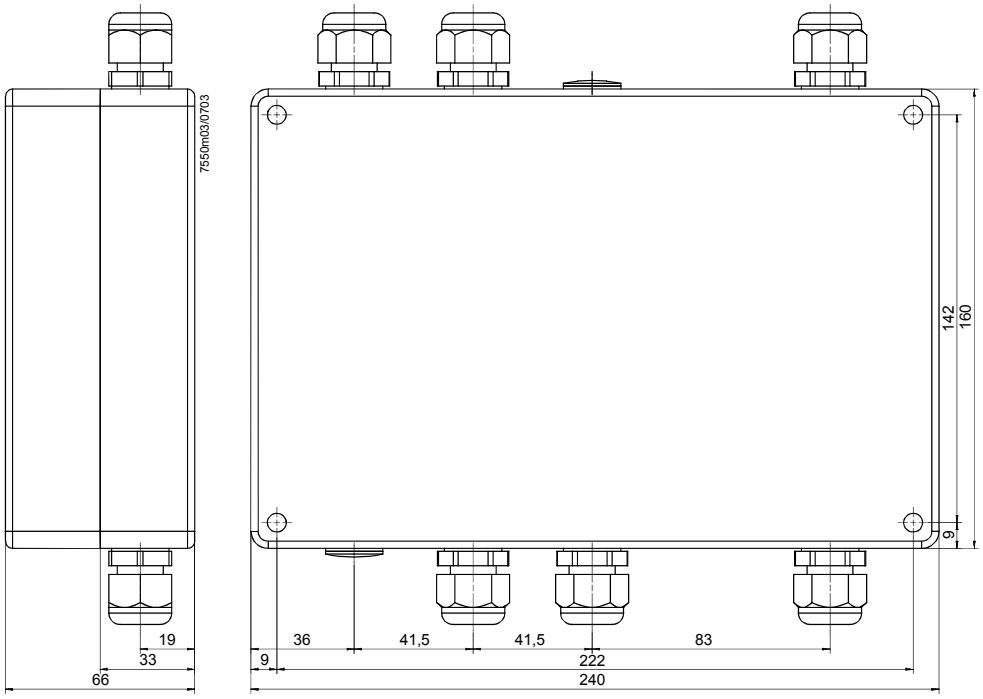
AZL5



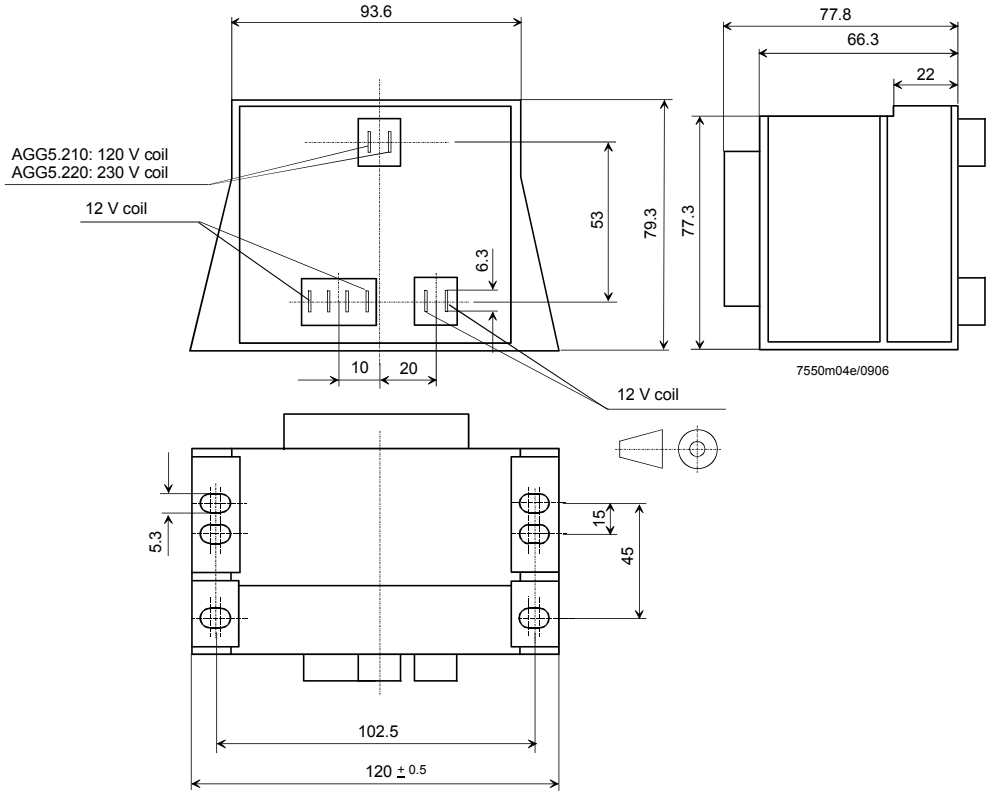
1) Clamping range min. 1 mm, max. 5 mm

Dimensions in mm

PLL52

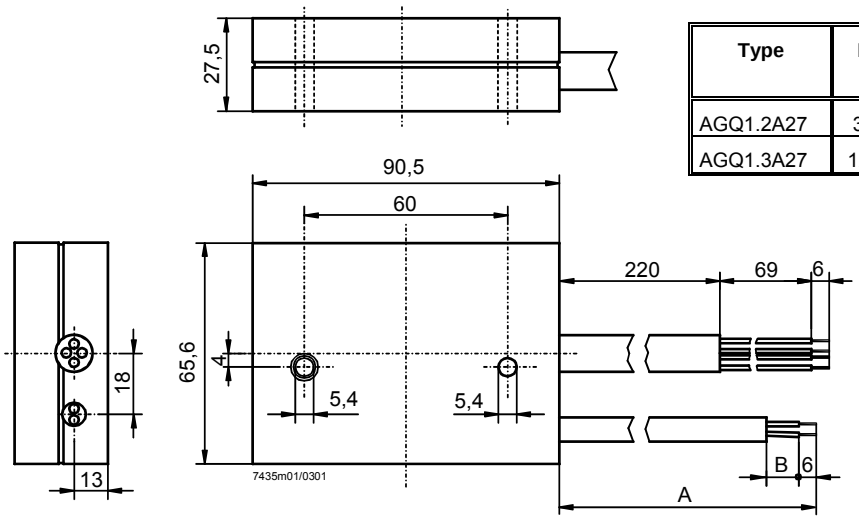


AGG5.210 / AGG5.220



Dimensions in mm

UV ancillary unit
AGQ1.xA27



Type	Measure	
	A	B
AGQ1.2A27	300	220
AGQ1.3A27	1200	350