

SIEMENS



LMV50.../LMV51... / LMV52...

Burner management system for forced draft burners with the main functions:

- Burner control
- Fuel-air ration control
- Boiler controller / load controller

LMV50...

with specific functions for industrial applications

LMV52...

with additional O₂ trim control

Addendum to User Manual OEM Setting and Error Lists

The LMV5 and these setting lists are intended for OEMs which integrate the burner controls in their products!

Applies to the following software versions

LMV50.....	V10.30
LMV51.....	V05.20
LMV51.3.....	V05.20
LMV52.2.....	V05.20
LMV52.4.....	V10.30
Internal load controller module.....	V02.10
Internal VSD module.....	V01.50
AZL52	V05.10
PLL52.....	V01.50

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1 Typographical conventions

Safety notes

These Setting and Error Lists contain information which must be observed to ensure your personal safety and to prevent damage to equipment and property. The instructions and notes are highlighted by a warning triangle or information symbol and are presented as follows, depending on the hazard level:



Warning means that death, severe personal injury or substantial damage to property **can** occur if adequate precautionary measures are not taken.



Note draws your attention to **other information** about the product and its handling contained in other pieces of documentation.

Qualified personnel

Only **qualified personnel** are allowed to commission and operate the unit. Qualified personnel in the context of the safety-related notes contained in this document are persons who are authorized to commission, ground and tag devices, systems and electrical circuits in compliance with established safety practices and standards.

Correct use

Note the following:

The unit may only be used on applications described in the technical documentation and only in connection with third-party products and components approved or recommended by Siemens.

The products can only function correctly and safely if shipped, stored, set up and installed correctly, and operated and maintained as specified.

2 Overview

2.1 Target groups

The tables in this document contain all available settings up to the service level.

- OEM development engineers

2.2 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...C gas damper with ASK33.4 mounting kit to the SQM45.295A9 actuator	A7550.4
LMV52...	User Manual COx supervision and control	A7550.5
ACS450	Installation Guide	J7550
LMV5...	Installation Guide	J7550.1
LMV5...	Data Sheet	N7550
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

3 Menu and parameter lists

AZL5... menu structure with parameter definitions

Per line a parameter is defined for the AZL5... menu.

Name of column	Description
Menu level	This parameter name or submenu level corresponds with the name on the menu
Description	Brief explanation of the parameter and submenu level
Value range	Definition of setting limits within which the parameter can be changed
Access rights	Definition of access rights. Parameters can be set by: User: Plant operator Service: Heating engineer OEM: Boiler / burner manufacturer
Basic parameter setting	Factory-set parameter
LMV50	Line marked with an x: Line displayed with the LMV50 system
LMV51	Line marked with an x: Line displayed with the LMV51 system
LMV52	Line marked with an x: Line displayed with the LMV52 system



Note!

The basic parameter settings made in the factory can vary, depending on customer- or country-specific requirements.




If required, the code or version of the parameter set can be displayed by the AZL5. In that case, select menu item *Factory ID* from the menu of the relevant unit.



Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
Operational Status						Menu level 1 for displaying normal operation									
	NormalOperation					Display of actual values, setpoints, load and flame signal		User				•	•	•	
	Status/Reset					Display of the current error (or no fault), lockout reset function		User				•	•	•	
	FaultHistory					Last 21 error messages		User				•	•	•	
	LockoutHistory					Storage of the last 9 lockout indications with date and time of day		User				•	•	•	
	Alarm act/deact					Activation / deactivation of horn in the event of an alarm	activated deactivated	User				•	•	•	
Operation						Menu level 1 for important basic functions performed by the plant operator (User)									
	BoilerSetpoint					Boiler setpoint									
		SetpointW1				Internal setpoint W1, in °C Internal setpoint W1, in bar	0...2000 °C 0...100 bar	User				•	•	•	
		SetpointW2				Internal setpoint W2, in °C Internal setpoint W2, in bar	0...2000 °C 0...100 bar	User				•	•	•	
	UserMaxload					Load limitation									
		UserMaxLoad Mod				Other restriction of max. output, modulating operation	MinLoadGas..Max LoadGas	User	100%	100%	100%	•	•	•	
		UserMaxLoad Stg				Other restriction of max. output, multistage operation	S1 S2 S3	User	S3	S3	S3	•	•	•	
	Fuel					Display and selection of fuel									
		CurrentFuel				Display of selected fuel (read only)	Gas Oil	User	---			•	•	•	
		FuelSelect				Selection of fuel via AZL5 when fuel selector is set to <i>Internal</i>	Gas Oil	User	Gas	Gas	Gas	•	•	•	
	Date/TimeOf Day					Display and setting of time of day and date									
		DisplayClock				Display clock									
			Date			Display of date (Day.Month.Year or Month-Day-	01.01.00...31.12.9	User				•	•	•	



Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						Year)	9 01-01-00...12-31-99								
			TimeOfDay			Display of time of day (Hour:Minute)	00:00...23:59	User				•	•	•	
			Weekday			Display of day of week	Sunday Monday Tuesday Wednesday Thursday Friday Saturday	User				•	•	•	
		SetClock				Set clock									
			Date			Setting of display of date (Day.Month.Year or Month-Day-Year)	01.01.00...31.12.99 01-01-00...12-31-99	User				•	•	•	
			TimeOfDay			Setting the time of day (Hour:Minute)	00:00...23:59	User				•	•	•	
			Weekday			Setting the display of day of week	Sunday Monday Tuesday Wednesday Thursday Friday Saturday	User				•	•	•	
	HoursRun					Hours run meters									
		GasFiring				Operating hours gas (selectable)	0...999999 h	User	0	0	0	•	•	•	
		OilStage1/Mod				Operating hours oil stage 1 or modulating (selectable)	0...999999 h	User	0	0	0	•	•	•	
		OilStage2				Operating hours oil stage 2 (selectable)	0...999999 h	User	0	0	0	•	•	•	
		OilStage3				Operating hours oil stage 3 (selectable)	0...999999 h	User	0	0	0	•	•	•	
		TotalHoursReset				Operating hours total (can be reset)	0...999999 h	User	0	0	0	•	•	•	
		TotalHours				Operating hours total (read only)	0...999999 h	User	0	0	0	•	•	•	
		SystemOnPower				Operating hours device live (read only)	0...999999 h	User	0	0	0	•	•	•	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
	StartCounter					Start counters									
		GasStartCount				Number of startups gas, start counter (selectable)	0...999999	User	0	0	0	●	●	●	
		OilStartCount				Number of startups oil, start counter (selectable)	0...999999	User	0	0	0	●	●	●	
		TotalStartCountR				Total number of startups, start counter (can be reset)	0...999999	User	0	0	0	●	●	●	
		TotalStartCount				Total number of startups, start counter (read only)	0...999999	User	0	0	0		●	●	
	Fuel Meter					Fuel meter									
		Curr Flow Rate				Current fuel throughput	0...6553,4	User				●	●	●	
		Volume Gas				Fuel volume gas (read only)	0...199999999,9 m ³ 0...1999999999 ft ³	User	0	0	0	●	●	●	
		Volume Oil				Fuel volume oil (read only)	0...199999999,9 l 0...199999999,9 gal	User	0	0	0	●	●	●	
		Volume Gas R				Fuel volume gas (resettable)	0...199999999,9 m ³ 0...1999999999 ft ³	User	0	0	0	●	●	●	
		Volume Oil R				Fuel volume oil (resettable)	0...199999999,9 l 0...199999999,9 gal	User	0	0	0	●	●	●	
		Reset Date Gas				Reset date fuel volume gas	01.01.00...31.12.99 01-01-00...12-31-99	User	0	0	0	●	●	●	
		Reset Date Oil				Reset date fuel volume oil	01.01.00...31.12.99 01-01-00..12-31-99	User	0	0	0	●	●	●	
		LockoutCounter				Total number of lockouts that occurred (read only)	0...65535	User	0	0	0	●	●	●	
	O2 Module					O2 module PLL52									
		Current O2 Value				Current O2 value (O2 actual value)	0...100%	User							●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
		O2 Setpoint				O2 setpoint	0...25%	User							●	
		SupplyAirTemp				Supply air temperature in °C	-100...923 °C	User								●
		FlueGasTemp				Flue gas temperature in °C	-100...923 °C	User				●	●		●	
		CombEfficiency				Combustion efficiency	0...200%	User								●
	BurnerID					Identification of burner	4...15 characters	User	invalid	invalid	invalid	●	●		●	
	OptgModeSelect					Operating mode selection with regard to the AZL52 interfaces COM1 and COM2										
		InterfacePC				Setting the serial port (RS-232) of the AZL5 to interface operation for PC tool		User				●	●		●	
		GatewayBAS on				Activation of port on the AZL5 for building automation and control system (BACS)		User				●	●		●	
		GatewayBAS off				Deactivation of port on the AZL5 for building automation and control system (BACS)		User				●	●		●	
		Gateway status				Process date for displaying gateway status only	deactivated activated	User	deactivated	deactivated	deactivated	●	●		●	
		Type of Gateway				Configure interface for COM2 building automation eBus = eBus on COM2 Modbus = Modbus on COM2 Data output = Output of trending data on COM2	eBus Modbus Data output	User	Modbus	Modbus	Modbus	●	●		●	
		O2Ctrl activate				Reactivation of O2 trim controller	deactivated activated	User								●
ManualOperation						Menu level 1 for activating manual operation with the preselected load										
	SetLoad					Preset target load	0...100%, S1, S2, S3	User				●	●		●	
	Autom/Manual/Off					Selection of manual or automatic mode Automatic = Burner starts up automatically based on load controller Manual = Burner starts up if the controller release is on X5-03 pin 1 and the start release is on X6-01 pin 1 or X7-03 pin 2	Automatic Manual Burner off	User	Automatic	Automatic	Automatic	●	●		●	



Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						Burner off = No burner startup									
Params & Display						Menu level 1 for making the parameterization & display									
	BurnerControl					Setting of burner control parameters									
		Times				Times of burner control									
			TimesStartup1			Burner control startup time 1									
				MinTmeStartRel		Min. time for start release (phase 21)	0.2...63 s	Service	1 s	1 s	1 s	•	•	•	
						 Caution! When using AGQ1 with QRA2/QRA4/QRA10, this time must be set to at least 5 seconds in order to ensure that a higher voltage is supplied to the UV cell during this time for the extraneous light test.									
				FanRunupTime		Fan run-up time (phase 22)	0.2...63 s	Service	2 s	2 s	2 s	•	•	•	
				PrepurgeTimeGas		Prepurge time gas (phase 30 + 32 +34)	MinT_PrepurgeGas...63 min	Service	20 s	120 s	20 s	•	•	•	
						 Remark! This time can be extended depending on the <i>other prepurge times</i> .									
				PrepurgeTimeOil		Prepurge time oil (phase 30 + 32 +34)	MinT_PrepurgeOil...63 min	Service	15 s	120 s	15 s	•	•	•	
						 Remark! This time can be extended depending on the <i>other prepurge times</i> .									
				MinT_PrepurgeGas		Min. prepurge time gas	0.2...63 min	OEM	20 s	20 s	20 s	•	•	•	
				MinT_PrepurgeOil		Min. prepurge time oil	0.2...63 min	OEM	15 s	15 s	15 s	•	•	•	
				PrepurgeSafeGas		Prepurge time after safety shutdown gas (50% in phase 30 + 50% in phase 34)	MinT_PrepurgeGas...63 min	Service	20 s	20 s	20 s	•	•	•	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						 Remark! This time can be extended depending on the <i>individual prepurge times</i> .									
				PrepurgeSafe Oil		Prepurge time after safety shutdown oil (50% in phase 30 + 50% in phase 34)	MinT_PrepurgeOil. .63 min	Service	15 s	15 s	15 s	●	●	●	
						 Remark! This time can be extended depending on the <i>individual prepurge times</i> .									
				PrepurgePt1 Gas		Prepurge part 1 gas (phase 30)	0,2 s...63 min	Service	0.2 s	0.2 s	0.2 s	●	●	●	
				PrepurgePt3 Gas		Prepurge part 3 gas (phase 34)	0,2 s...63 min	Service	0.2 s	0.2 s	0.2 s	●	●	●	
				PrepurgePt1 Oil		Prepurge part 1 oil (phase 30)	0,2 s...63 min	Service	0.2 s	0.2 s	0.2 s	●	●	●	
				PrepurgePt3 Oil		Prepurge part 3 oil (phase 34)	0,2 s...63 min	Service	0.2 s	0.2 s	0.2 s	●	●	●	
				PreignitionTG as		Preignition time gas (phase 38)	0.2...63 s	Service	2 s	2 s	2 s	●	●	●	
				PreignitionTO il		Preignition time oil (phase 38)	0.2...44 s	Service	2 s	2 s	2 s	●	●	●	
				MinOnTmeOil Pump		Min. on time of oil pump (phase 36)	0.2...63 s	Service	1 s	5 s	1 s	●	●	●	
			TimesStartup2			Burner control startup times 2									
				SafetyTme1G as		Safety time 1 gas (phase 40 +42)	1s...MaxSafetyTG as	OEM	3 s	5 s	3 s	●	●	●	
				SafetyTme1O il		Safety time 1 oil (phase 40 +42)	1s...MaxSafetyTOi l	OEM	3 s	5 s	3 s	●	●	●	
				Interval1Gas		Interval 1 (TSA1-TSA2) gas (phase 44)	0.2...63 s	Service	2 s	2 s	2 s	●	●	●	
				Interval1Oil		Interval 1 (TSA1-TSA2) oil (phase 44)	0.2...63 s	Service	2 s	2 s	2 s	●	●	●	
				SafetyTme2G as		Safety time 2 gas (phase 50)	1s...MaxSafetyTG as	OEM	3 s	5 s	3 s	●	●	●	
				SafetyTme2O il		Safety time 2 oil (phase 50)	1s...MaxSafetyTOi l	OEM	3 s	5 s	3 s	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
				MaxSafetyTGas		Maximum safety time gas	1...10 s	OEM	3 s	10 s	10 s	•	•	•
						 Attention! If the maximum safety times are changed, the applicable standards for this application must be complied with.								
				MaxSafetyTOil		Maximum safety time oil	1...15 s	OEM	5 s	15 s	10 s	•	•	•
						 Attention! If the maximum safety times are changed, the applicable standards for this application must be complied with.								
				Interval2Gas		Interval 2 (TSA2 operation) gas (phase 52)	0.2...630 s	Service	2 s	2 s	2 s	•	•	•
				Interval2Oil		Interval 2 (TSA2 operation) oil (phase 52)	0.2...630 s	Service	2 s	2 s	2 s	•	•	•
				PressReactTime		Response time to lack of pressure during TSA1 and TSA2	0.2s...MaxSafetyTGas	Service	2 s	2 s	2 s	•	•	•
			TimesShutdown			Burner control shutdown times								
				MaxTmeLowFire		Max. time to low-fire in operation 2 (phase 62)	0.2...630 s	Service	45 s	45 s	45 s	•	•	•
				AfterburnTme		Afterburn time (phase 70)	0.2...63 s	Service	8 s	8 s	8 s	•	•	•
				PostpurgeT1Gas		Postpurge time 1 gas (phase 74)	0.2...63 min	Service	0.2 s	30 s	0.2 s	•	•	•
				PostpurgeT1Oil		Postpurge time 1 oil (phase 74)	0.2...63 min	Service	0.2 s	30 s	0.2 s	•	•	•
				PostpurgeT3Gas		Postpurge time 3 gas (phase 78)	0.2...63 min	Service	5 s	5 s	5 s	•	•	•
				PostpurgeT3Oil		Postpurge time 3 oil (phase 78)	0.2...63 min	Service	5 s	5 s	5 s	•	•	•
				PostpurgeT3Long		Long postpurge time 3 in minutes (phase 78). Time is added to <i>PostpurgeT3Gas</i> and to <i>PostpurgeT3Oil</i> .	0..65535 min	Service	0	0	0	•		•
				MinTmeHome		Min. time in home run phase (phase 10)	0.2...63 s	OEM	1 s	1 s	1 s	•	•	•


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
				Run												
				DelayLackGas		Basic waiting time in the event of gas shortage	MinTmeHomeRun..63 s	Service	10 s	10 s	10 s	●	●	●		
			TimesGeneral			General times of burner control										
				AlarmDelay		Time to alarm in the event of start prevention and heat request in standby (phase 12)	0.4...630 s	Service	35 s	10 s	35 s	●	●	●		
				DelayStartPrev		Time until message on start prevention and heat request in standby (phase 12) is delivered	0.4...630 s	Service	35 s	0,4 s	35 s	●	●	●		
				PostpurgeLockout		Postpurge in lockout position	0.2...63 min	Service	0.2 s	120 s	0,2 s	●	●	●		
				MaxTmeStartRel		Max. phase holding time start release (timeout for phase 21)	0.2...63 min	Service	120 s	120 s	120 s	●	●	●		
		Configuration				Configuration of burner control										
			ConfigGeneral			General parameters of burner control										
				AlarmStartPrev		With / without alarm in the event of start prevention and heat request in standby (phase 12)	Deactivated Activated	Service	deactivated	deactivated	deactivated	●	●	●		
				StandbyError		Safety shutdown in standby (phase 12) when there is no heat request → deactivated Behavior same as it was before the parameter was introduced → activated Events which lead to a start prevention and display message in the event of a heat request in standby mode when this option is <i>deactivated</i> lead to a safety shutdown when it is <i>activated</i> , even if there is no heat request.	deactivated activated	Service	deactivated	deactivated	deactivated	●	●	●		
				NormDirectStart		Normal / direct start in the event of heat request in phase 78	NormalStart DirectStart	Service	NormalStart	NormalStart	NormalStart	●	●	●		
				OilPumpCoupling		Configuration of oil pump coupling	Magnetcoupl Directcoupl	Service	Magnetcoupl	Magnetcoupl	Magnetcoupl	●	●	●		
				IgnOilPumpStart		Switch-on time ignition and oil pump	on in Ph38 on in Ph22	Service	on in Ph22	on in Ph22	on in Ph22	●	●	●		


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
				ForcedIntermitt		Forced intermittent operation	deactivated activated	Service	activated	activated	activated	●	●	●
				SkipPrepurgeGas		Start without prepurge to EN 676 Only permitted if the conditions of EN 676 are satisfied.	deactivated activated	Service	deactivated	deactivated	deactivated	●	●	●
				SkipPrepurgeOil		Start without prepurge	deactivated activated	OEM	deactivated	deactivated	deactivated	●	●	●
				ContinuousPurge		Configuration for normal or continuous fan operation → deactivated Normal prepurging → activated <i>ContinuousPurge</i> = the fan operates in all phases → off Sloop The <i>ContinuousPurge</i> function is activated. If the safety loop/burner flange is open, the fan is switched off and the speed for the <i>VSD</i> is set to 0. → deac/VSD-SL The <i>ContinuousPurge</i> function is deactivated. If the safety loop/burner flange is open, the speed for the <i>VSD</i> is set to 0.	deactivated activated off Sloop deac/VSD-SL	Service	deactivated	deactivated	deactivated	●	●	●
				DriveLowfireGas		Driving of the actuators to their ratio control positions in phase 54 or as early as phase 50, for fuel trains with pilot ignition (Gp1, Gp2, LOgp, HOgp).	LowfireP50 LowfireP54	OEM	LowfireP54	LowfireP54	LowfireP54	●	●	●
				DriveLowfireOil		Driving of the actuators to their ratio control positions in phase 54 or as early as phase 50, for fuel trains with pilot ignition (Gp1, Gp2, LOgp, HOgp).	LowfireP50 LowfireP54	OEM	LowfireP54	LowfireP54	LowfireP54	●	●	●
				FuelTrainGas		Fuel train when firing on gas	DirectIgnG Pilot Gp1 Pilot Gp2	OEM	invalid	invalid	invalid	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
				FuelTrainOil		Fuel train when firing on oil	LightOilLO HeavyOilHO LO w Gasp HO w Gasp	OEM	invalid	invalid	invalid	●	●	●
				FuelTrainReset		Resetting of fuel train to invalid value								
					FuelTrainGas			OEM				●	●	●
					FuelTrainOil			OEM				●	●	●
				ContPilotGas		Continuous pilot gas For fuel trains using a pilot (Gp1, Gp2), the pilot valve can be activated in phases 52...62.	deactivated activated	OEM	deactivated	deactivated	deactivated	●		●
						 Caution! In order for plants to comply with EN 676, separate flame safeguards are required for the pilot flame and the main flame.								
				ContPilotOil		Continuous pilot oil For fuel trains using a pilot (LOGp, HOGp), the pilot valve can be activated in phases 52...62.	deactivated activated	OEM	deactivated	deactivated	deactivated	●		●
						 Caution! In order for plants to comply with EN 676, separate flame safeguards are required for the pilot flame and the main flame.								
				MainsFrequency		Selection of mains frequency 50 / 60 Hz	50 Hz 60 Hz	OEM	50 Hz	60 Hz	50 Hz	●	●	●
			ConfigIn/Output			Configuration of inputs and outputs								
				StartReleaseGas		Configuration of input (X7-03 pin 2) → deactivated → Start release gas → Valve closure contact for gas → Valve closure contact for gas and oil → Valve closure contact for oil	deactivated StartRelGas CPI Gas CPI Gas + Oil CPI Oil	OEM	StartRelGas	StartRelGas	StartRelGas	●	●	●
				StartReleaseOil		Configuration of input (X6-01 pin 1) → deactivated	deactivated activated	OEM	activated	activated	activated	●	●	●


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						→ activated, as start release oil → High temperature/flame safeguard redundancy contact	HT/FG-RedCo								
				AirPressureTest		Evaluation of air pressure switch input (X3-02 pin 1) → deactivated → activated → Air pressure switch is not evaluated in home run (phase 10) and standby (phase 12)	deactivated activated deactInStby	OEM	activated	activated	activated	●	●	●	
				Config_ PS-VP /CPI		Configuration of input (X9-03 pin 2) → Pressure switch for valve proving of gas valves → Valve closure contact for gas → Valve closure contact for gas and oil → Valve closure contact for oil	PS-VP CPI Gas CPI Gas+Oil CPI Oil	OEM	PS-VP	CPI Gas	PS-VP	●	●	●	
				FGR-PS/FCC		Configuration of input (X4-01 pin 3) → Fan contactor contact (FCC) → Flue gas recirculation pressure switch (FGR-PS) → deactivated → Do not evaluate pressure switch in home run (phase 10) and standby (phase 12) → Evaluate additional pressure switch (PS-VSD) beyond a defined VSD speed	FCC FGR-PS deactivated PSdeactStby PS VSD	OEM	FCC	FCC	FCC	●	●	●	
				RotSpeed PS on		Speed of VSD beyond which the additional air pressure switch (PS-VSD) must be on	RotSpeed PS off..100%	Service	80	80	80	●	●	●	
				RotSpeed PS off		Speed of VSD beyond which the additional air pressure switch (PS-VSD) must be off	10%..RotSpeed PS on	Service	50	50	50	●	●	●	
				InputController		Evaluation of controller input (X5-03 pin 1)	deactivated activated	OEM	activated	activated	activated	●	●	●	
				Config X5-03		Configuration of X5-03 pin 2 and X5-03 pin 3 inputs → LMV5x std Controller CLOSED/stage 3 and controller OPEN/stage 2 as previously for the LMV5 → LMV2/3 std Controller CLOSED/stage 3 and controller	LMV5x std LMV2/3 std LMV2/3 inv DeaO2/Stp36 CoolFctStby AutoDeactO2	Service	LMV5x std	LMV5x std	LMV5x std	●	●	●	


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
						OPEN/stage 2 as for Lmv2/Lmv3 → Lmv2/3 inv Controller CLOSED/stage 3 and controller OPEN/stage 2 as for Lmv2/Lmv3 inverted → DeaO2/Stp36 - Deactivation of O2 trim control by means of a signal at X5-03 pin 2 and - Stopping of startup in phase 36 by switching off the mains voltage at X5-03 pin 3 (not safety related) → CoolFctStby Activate cooling function in standby (switch on fan) by means of a signal at X5-03 pin 3 → AutoDeactO2 Switching the O2 trim controller operating mode from <i>conAutoDeac</i> to <i>auto deact</i> via a signal at X5-03 pin 2.								
				GasPressure Min		Evaluation of input (X9-03 pin 4) → Deactivate gas pressure-min → Activate gas pressure-min → Deactivate gas pressure-min for the oil fuel trains with gas pilot (LOgp and HOgp) (xOgp)	deactivated activated deact xOGP	OEM	activated	activated	activated	●	●	●
				GasPressure Max		Evaluation of input (X9-03 pin 3)	deactivated activated	OEM	activated	activated	activated	●	●	●
				OilPressureMin		Evaluation of input (X5-01 pin 2)	deactivated activated act from ts	OEM	activated	activated	activated	●	●	●
				OilPressureMax		Evaluation of input (X5-02 pin 2)	deactivated activated	OEM	activated	activated	activated	●	●	●
				HeavyOilDirStart		Configuration of input (X6-01 pin 3) → Deactivate input → Heavy oil direct start active in phase 38 for HO/resp. phase 44 for HOgp	deactivated activ 38/44 38/44..62 act 21..62	OEM	activ 38/44	activ 38/44	activ 38/44	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						→ Heavy oil direct start active in phase 38 for HO/resp. phase 44 for HOgp and in phase 62 → Heavy oil direct start active in phases 21...62 → External safety limit thermostat for high-temperature supervision (>750 °C) → External flame safeguard	HTempGuard ext.FlameGd								
				Start/PS-Valve		Configuration of output (X4-03 pin 3) → Start signal, e.g. for controlling an outside air damper in the boiler house → Air pressure switch release valve (test valve) for air pressure switch test, e.g. for <i>ContinuousPurge</i> → Reverse air pressure switch release valve (test valve) for air pressure switch test, e.g. for <i>ContinuousPurge</i>	StartSignal PS Relief PS Reli_Inv	Service	StartSignal	StartSignal	StartSignal	●	●	●	
			ConfigFlameDet			Configuration of flame detector									
				ReacExtranLight		Response in the event of extraneous light in standby (phase 12)	Lockout Startblock	OEM	Startblock	Startblock	Startblock	●	●	●	
				ExtranLightTest		Release of extraneous light test	deactivated activated	OEM	activated	activated	activated	●	●	●	
						 Caution! The extraneous light test may only be deactivated if this is permitted by the applicable standards for this application.									
				ReacTmeLossFlame		Time until reaction to flame OFF during <i>operation</i> (phases 44, 52, 54, 60, and 62) The safety time during operation is generated by adding 0.8 seconds for internal flame supervision, and 1 second + the reaction time of the external flame safeguard for external flame supervision. Examples of internal flame detectors at input X10: → Default setting for <i>ReacTmeLossFlame</i>	0.2..3.2 s	OEM	0,2 s	0,2 s	0,2 s	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
						<p>of 0.2 s: Safety time during operation <1 s (0.2 s + 0.8 s) → Maximum setting for <i>ReactTmeLossFlame</i> of 3.2 s: Safety time during operation <4 s (3.2 s + 0.8 s)</p> <p>Examples of external flame safeguards at input X6-01 pin 3 (and X6-01 pin 1 if applicable) with a reaction time of 1.4 seconds: → Default setting for <i>ReactTmeLossFlame</i> of 0.2 s: Safety time during operation <2.6 s (0.2 s + 1 s + 1.4 s) → Maximum setting for <i>ReactTmeLossFlame</i> of 3.2 s: Safety time during operation <5.6 s (3.2 s + 1 s + 1.4 s)</p>								
						 Caution! The reaction time for the loss of flame may only be extended if this is permitted by the applicable standards for this application!								
					FlameSignal	Configuration of flame signal								
					Standardize	Standardization of flame signal display		OEM				•	•	•
					StandardFactor	Reading of standardization factor		OEM				•	•	•
					FlameSig QRI_B	Flame signal QRI_B (raw information)	0...255	User				•		•
					FlameSig ION	Flame signal ION (raw information)	0...255	User				•	•	•
				SensExtranGas		QRA7 / QRI (QRB) OR Ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization	1 Sensor QRI_B ION QRI_B & / ION	OEM	1 sensor	1 sensor	1 sensor	•		•

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated	QRI_B ION & / QRI_B ION								
				SensPilotPhGas		QRA7 / QRI (QRB) OR Ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated QRA7 / QRI (QRB) AND ionization	1 Sensor QRI_B ION QRI_B & / ION QRI_B ION & / QRI_B ION QRI_B & ION	OEM	1 sensor	1 sensor	1 sensor	●		●	
				SensOperPhGas		QRA7 / QRI (QRB) OR Ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated QRA7 / QRI (QRB) AND ionization	1 Sensor QRI_B ION QRI_B & / ION QRI_B ION & / QRI_B ION QRI_B & ION	OEM	1 sensor	1 sensor	1 sensor	●		●	
				SensExtranOil		QRA7 / QRI (QRB) OR Ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated	1 Sensor QRI_B ION QRI_B & / ION QRI_B ION & / QRI_B ION	OEM	1 sensor	1 sensor	1 sensor	●		●	
				SensPilotPhOil		QRA7 / QRI (QRB) OR Ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated	1 Sensor QRI_B ION QRI_B & / ION QRI_B ION & / QRI_B ION	OEM	1 sensor	1 sensor	1 sensor	●		●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
						QRA7 / QRI (QRB) AND ionization	QRI_B & ION							
				SensOperPh Oil		QRA7 / QRI (QRB) OR ionization (including checking whether only one sensor is connected) QRA7 / QRI (QRB) OR ionization QRA7 / QRI (QRB) AND NOT ionization QRA7 / QRI (QRB) – ionization is not evaluated Ionization AND NOT QRA7 / QRI (QRB) Ionization – QRA7 / QRI (QRB) is not evaluated QRA7 / QRI (QRB) AND ionization	1 Sensor QRI_B ION QRI_B & / ION QRI_B ION & / QRI_B ION QRI_B & ION	OEM	1 sensor	1 sensor	1 sensor	●		●
			RepetitCounter			Setting the repetition counter								
						 Note! → Number of repetitions = set value -1 Examples (set value): 1 = no repetition 2 = one repetition 16 = Caution! Number of repetitions is unlimited! → Changes only become active after a reset (power ON/reset).								
				NoFlame_ts		Repetition counter value: No flame at end of safety time 1 (phase 42) 1 = no repetition 2 = one repetition 3 = two repetitions	1..3	OEM	1	1	1	●		
				LossOfFlame		Repetition counter value: Loss of flame during operation (phase 60 + 62) 1 = no repetition 2 = one repetition	1...2	Service	2	1	2	●	●	●
				HeavyOil		Repetition counter: Immediate start heavy oil 1 = no repetition 2 = one repetition	1...16	Service	3	1	3	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						3 = two repetitions 15 = 14 repetitions 16 = Caution! Number of repetitions is unlimited!									
				StartRelease		Repetition limit value: Start prevention 1 = no repetition 2 = one repetition 3 = two repetitions 15 = 14 repetitions 16 = Caution! Number of repetitions is unlimited!	1...16	Service	10	1	10	●	●	●	
				SafetyLoop		Repetition limit value: Safety loop 1 = no repetition 2 = one repetition 3 = two repetitions 15 = 14 repetitions 16 = Caution! Number of repetitions is unlimited!	1...16	Service	16	1	16	●	●	●	
		ValveProving				Settings for valve proving (DK) = leaking test (LT) of fuel valves									
			ValveProving Type			Type or time of valve proving	No VP VP startup VP shutdown VP stup/shd	OEM	VP shutdown	No VP	VP shutdown	●	●	●	
			Config_PM-VP/CPI			Configuration of input (X9-03 pin 2) to pressure switch for valve proving (DW-DK) or Valve closure contact (CPI = Closed Position Indicator or POC = Proof of closure) → Pressure switch for valve proving of gas valves → Valve closure contact for gas valves → Valve closure contact for gas and oil valves → Valve closure contact for oil valves	PS-VP CPI Gas CPI Gas + Oil CPI Oil	OEM	PS-VP	CPI Gas	PS-VP	●	●	●	
						 Note! The <i>Start release gas</i> (X7-03 pin 2)									

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						input can be configured as a second valve closure contact input.									
			VP_EvacTme			Leakage test evacuation time (phase 80)	0.2...MaxSafetyTme_Gas	OEM	3 s	3 s	3 s	●	●	●	
			VP_TmeAtmPress			Leakage test time atmospheric pressure (phase 81)	MinT_VP_AtmsPre 0.2..63 min	OEM	10 s	10 s	10 s	●	●	●	
			VP_FillTme			Leakage test filling time (phase 82)	0.2...MaxSafetyTme_Gas	OEM	3 s	3 s	3 s	●	●	●	
			VP_Tme_GasPress			Leakage test time gas pressure (phase 83)	MinT_VP_GasPre 0.2..63 min	OEM	10 s	10 s	10 s	●	●	●	
		ProductID				Identification of the individual device									
			ASN			Type code / order number	1...15 characters	User	LMV52.4 00B2	LMV52.4 40B1	LMV50.3 20B2	●	●	●	
			ProductionDate			Production date	01.01.00...31.12.99 01-01-00...12-31-99	User				●	●	●	
			SerialNumber			Identification number	0...65535	User				●	●	●	
			ParamSetCode			Preselected parameter set: Customer code	0...255	User	20	20	20	●	●	●	
			ParamSetVers			Preselected parameter set: Version	0...65535	User	600	600	600	●	●	●	
		SW Version				Software version of burner control	0...65535	User					●		
		SW Version				Software version of burner control	0...65535	User	---		x	●		●	
	RatioControl					Parameter settings for the electronic fuel-air ratio control									
		GasSettings				Parameter settings for firing on gas									
			Special Positions			Setting of special actuator positions for firing on gas									
				HomePos		Setting of no-load positions for firing on gas									
					HomePosGas	No-load position of fuel damper (gas)	0...90°	Service	0°	0°	0°	●	●	●	
					HomePosAir	No-load position of air damper (gas)	0...90°	Service	0°	0°	0°	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
								e							
					HomePosAux1	No-load position of auxiliary damper (gas)	0...90° 0...100%	Servic e	0°	0°	0°	●	●	●	
					HomePosAux2	No-load position of auxiliary damper 2	0...90°	Servic e	0°	0°	0°			●	
					HomePosAux3	No-load position of auxiliary damper 3	0...90°	Servic e	0°	0°	0°	●	●	●	
					HomePosVSD	No-load position of VSD	0...100%	Servic e	0%	0°	0°	●	●	●	
				PrepurgePos		Setting of prepurge positions for firing on gas									
					PrepurgePosAir	Prepurge position of air damper (gas)	0...90°	Servic e	90°	90°	90°	●	●	●	
					PrepurgePosAux1	Prepurge position of auxiliary damper (gas)	0...90° 0...100%	Servic e	90°	90°	90°	●	●	●	
					PrepurgePosAux2	Prepurge position of auxiliary damper 2	0...90°	Servic e	90°	90°	90°			●	
					PrepurgePosAux3	Prepurge position of auxiliary damper 3	0...90°	Servic e	90°	90°	90°	●	●	●	
					PrepurgePosVSD	Prepurge position of VSD	0...100%	Servic e	100%	100%	100%	●	●	●	
				IgnitionPos		Setting of ignition positions for firing on gas									
					IgnitionPosGas	Ignition position of fuel damper (gas)	0...90°	Servic e	invalid	invalid	invalid	●	●	●	
					IgnitionPosAir	Ignition position of air damper (gas)	0...90°	Servic e	invalid	invalid	invalid	●	●	●	
					IgnitionPosAux1	Ignition position of auxiliary damper (gas)	0...90° 0...100%	Servic e	invalid	invalid	invalid	●	●	●	
					IgnitionPosAux2	Ignition position of auxiliary damper 2	0...90°	Servic e	invalid	invalid	invalid			●	
					IgnitionPosAux3	Ignition position of auxiliary damper 3	0...90°	Servic e	invalid	invalid	invalid	●	●	●	
					IgnitionPosVSD	Ignition position of VSD	0...100%	Servic e	invalid	invalid	invalid	●	●	●	
				PostpurgePos		Setting of postpurge positions for firing on gas									
					PostpurgePos	Postpurge position of fuel damper (gas)	0...90°	Servic	15°	15°	15°	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
					Gas			e							
					PostpurgePos Air	Postpurge position of air damper (gas)	0...90°	Service	15°	15°	15°	•	•	•	
					PostpurgePos Aux1	Postpurge position of auxiliary damper (gas)	0...90° 0...100%	Service	25°	25°	25°	•	•	•	
					PostpurgePos Aux2	Postpurge position of auxiliary damper 2	0...90°	Service	25°	25°	25°			•	
					PostpurgePos Aux3	Postpurge position of auxiliary damper 3	0...90°	Service	25°	25°	25°	•	•	•	
					PostpurgePos VSD	Postpurge position of VSD	0...100%	Service	50%	50%	50%	•	•	•	
				ProgramStop		Program stop	deactivated 24 PrePurgP 32 PreP FGR 36 IgnitPos 44 Interv 1 52 Interv 2 72 PostPPos 76 PostPFGR	Service	deactivated	deactivated	deactivated	•	•	•	
				ResetIgnitPos		Resetting of ignition positions to invalid value									
					IgnitionPosGas			Service				•	•	•	
					IgnitionPosAir			Service				•	•	•	
					IgnitionPosAux1			Service				•	•	•	
					IgnitionPosAux2			Service						•	
					IgnitionPosAux3			Service				•	•	•	
					IgnitionPosVSD			Service				•	•	•	
			CurveParams			Curve parameter settings for the electronic ratio control during gas-fired operation		Service				•	•	•	
			LoadLimits			Setting of min. and max. load limits									

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
				MinLoadGas		Min. load <i>Low-fire</i> (gas)	0...MaxLoadGas	Service	0%	0%	0%	●	●	●
				MaxLoadGas		Max. load <i>High-fire</i> (gas)	MinLoadGas...100%	Service	100%	100%	100%	●	●	●
			Load mask out			Setting of a load range that can be masked out								
				LoadMaskLowLimit		Lower limit of load range to be masked out	0...LoadMaskHighLim	Service	0%	0%	0%	●	●	●
				LoadMaskHighLim		Upper limit of load range to be masked out	LoadMaskLowLim...100%	Service	0%	0%	0%	●	●	●
			AuxActuator			Configuration of the auxiliary actuator for gas-fired operation For LMV50, LMV51 and LMV51.3: → deactivated → AUX1 damper (mixing device) activated For LMV50 and LMV51.3: → VSD activated → AUX3 damper (FGR damper) activated → VSD and AUX3 (FGR) damper activated	deactivated damper act VSD active AUX3 VSD+Aux3	OEM	deactivated	deactivated	damper act	●	●	
			AirActuator			Configuration of air actuator for gas-fired operation → deactivated → activated → air influencing (for the LMV51.0 and LMV51.1, this setting corresponds to <i>activated</i>)	deactivated activated air influen	OEM	air influen	air influen	activated	●	●	●
			AuxActuator 1			Configuration of auxiliary actuator 1 for gas-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	air influen	air influen	activated			●
			AuxActuator 2			Configuration of auxiliary actuator 2 for gas-fired operation: → deactivated → activated	deactivated activated air influen	OEM	deactivated	deactivated	deactivated			●




Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
						→ air influencing								
			AuxActuator 3			Configuration of auxiliary actuator 3 for gas-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	deactivated	deactivated	deactivated			●
			VSD			Configuration of VSD for gas-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	air influen	air influen	deactivated			●
			GasActuator			Configuration of fuel actuator for gas-fired operation: → deactivated → activated	deactivated activated	OEM	activated	activated	activated	●	●	●
			StartPoint Operation			Curve point (start point operation) which is approached following ignition and flame formation.	1...15	Service	1	1	1	●	●	●
		OilSettings				Parameter settings for the electronic fuel-air ratio control for oil-fired operation								
			SpecialPositions			Setting of special actuator positions for firing on oil								
				HomePos		Setting of no-load positions for firing on oil								
					HomePosOil	No-load position of fuel damper (oil)	0...90°	Service	0°	0°	0°	●	●	●
					HomePosAir	No-load position of air damper (oil)	0...90°	Service	0°	0°	0°	●	●	●
					HomePosAux1	No-load position of auxiliary damper (oil)	0...90°	Service	0°	0°	0°	●	●	●
					HomePosAux2	No-load position of auxiliary damper 2	0...90°	Service	0°	0°	0°			●
					HomePosAux3	No-load position of auxiliary damper 3	0...90°	Service	0°	0°	0°	●	●	●
					HomePosVSD	No-load position of VSD	0...100%	Service	0%	0%	0%	●	●	●
				PrepurgePos		Setting of prepurge positions for firing on oil								
					PrepurgePos	Prepurge position of air damper (oil)	0...90°	Service	90°	90°	90°	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
					Air			e							
					PrepurgePosAux1	Prepurge position of auxiliary damper (oil)	0...90°	Service	90°	90°	90°	●	●	●	
					PrepurgePosAux2	Prepurge position of auxiliary damper 2	0...90°	Service	90°	90°	90°				●
					PrepurgePosAux3	Prepurge position of auxiliary damper 3	0...90°	Service	90°	90°	90°	●	●	●	
					PrepurgePosVSD	Prepurge position of VSD	0...100%	Service	100%	100%	100%	●	●	●	
				IgnitionPos		Setting of ignition positions for firing on oil									
					IgnitionPosOil	Ignition position of fuel damper (oil)	0...90°	Service	invalid	invalid	invalid	●	●	●	
					IgnitionPosAir	Ignition position of air damper (oil)	0...90°	Service	invalid	invalid	invalid	●	●	●	
					IgnitionPosAux1	Ignition position of auxiliary damper (oil)	0...90°	Service	invalid	invalid	invalid	●	●	●	
					IgnitionPosAux2	Ignition position of auxiliary damper 2	0...90°	Service	invalid	invalid	invalid				●
					IgnitionPosAux3	Ignition position of auxiliary damper 3	0...90°	Service	invalid	invalid	invalid	●	●	●	
					IgnitionPosVSD	Ignition position of VSD	0...100%	Service	invalid	invalid	invalid	●	●	●	
				PostpurgePos		Setting of postpurge positions for firing on oil									
					PostpurgePosOil	Postpurge position of fuel damper (oil)	0...90°	Service	0°	0°	0°	●	●	●	
					PostpurgePosAir	Postpurge position of air damper (oil)	0...90°	Service	15°	15°	15°	●	●	●	
					PostpurgePosAux1	Postpurge position of auxiliary damper (oil)	0...90°	Service	25°	25°	25°	●	●	●	
					PostpurgePosAux2	Postpurge position of auxiliary damper 2	0...90°	Service	25°	25°	25°				●
					PostpurgePosAux3	Postpurge position of auxiliary damper 3	0...90°	Service	25°	25°	25°	●	●	●	
					PostpurgePosVSD	Postpurge position of VSD	0...100%	Service	50%	50%	50%	●	●	●	


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
				ProgramStop		Program stop	deactivated 24 PrePurgP 32 PreP FGR 36 IgnitPos 44 Interv 1 52 Interv 2 72 PostPPos 76 PostPFGR	Service	deactivated	deactivated	deactivated	•	•	•
				ResetIgnitPos		Resetting of ignition positions to invalid value								
					IgnitionPosOil			Service				•	•	•
					IgnitionPosAir			Service				•	•	•
					IgnitionPosAux1			Service				•	•	•
					IgnitionPosAux2			Service						•
					IgnitionPosAux3			Service				•	•	•
					IgnitionPosVSD			Service				•	•	•
			CurveParameters			Setting of curve parameters of fuel-air ratio control for firing on oil								
				Curve Settings				Service				•	•	•
				Operation Mode		Selection of burner operating mode (multistage or modulating) for oil	Two-stage Three-stage Modulating	OEM	modulating	modulating	modulating	•	•	•
			LoadLimits			Setting of min. and max. load limits								
				MinLoadOil		Min. load <i>Low-fire</i> (oil)	0...MaxLoadOil	Service	0%	0%	0%	•	•	•
				MaxLoadOil		Max. load <i>High-fire</i> (oil)	MinLoadOil...100%	Service	100%	100%	100%	•	•	•
			Load mask out			Setting of a load range that can be masked out								

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
				LoadMaskLowLimit		Lower limit of load range to be masked out	0...LoadMaskHighLim	Service	0%	0%	0%	●	●	●
				LoadMaskHighLim		Upper limit of load range to be masked out	LoadMaskLowLimit...100%	Service	0%	0%	0%	●	●	●
			AuxActuator			Configuration of the auxiliary actuator for oil-fired operation For LMV50, LMV51 and LMV51.3: → deactivated → AUX1 damper (mixing device) activated For LMV50 and LMV51.3: → VSD activated → AUX3 damper (FGR damper) activated → VSD and AUX3 (FGR) damper activated	deactivated damper act VSD active AUX3 VSD+Aux3	OEM	deactivated	deactivated	damper act	●	●	●
			AirActuator			Configuration of air actuator for oil-fired operation → deactivated → activated → air influencing (for the LMV51.0 and LMV51.1, this setting corresponds to <i>activated</i>)	deactivated activated air influen	OEM	air influen	air influen	activated	●	●	●
			AuxActuator 1			Configuration of auxiliary actuator 1 for oil-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	air influen	air influen	activated			●
			AuxActuator 2			Configuration of auxiliary actuator 2 for oil-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	deactivated	deactivated	deactivated			●
			AuxActuator 3			Configuration of auxiliary actuator 3 for oil-fired operation: → deactivated → activated → air influencing	deactivated activated air influen	OEM	deactivated	deactivated	deactivated			●
			VSD			Configuration of VSD for oil-fired operation:	deactivated	Service	air	air	deactivated			●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
						→ deactivated → activated → air influencing	activated air influen	e	influen	influen	ed			
			OilActuator			Configuration of fuel actuator for oil-fired operation: → deactivated → activated	deactivated activated	OEM	activated	activated	activated	●	●	●
			StartPoint Operation			Curve point (start point operation) which is approached following ignition and flame formation.	1...15	Service	1	1	1	●	●	●
		Autom/Manual/Off				Selection of manual or automatic mode → Automatic The burner is switched on according to the heat request from the set load controller, provided that the controller release is on X5-03 pin 1 and the start release for the current fuel is on X6-01 or X7-03. → Manual The burner is switched on, provided that the controller release is on X5-03 pin 1 and the start release for the current fuel is on X6-01 or X7-03. → Burner off The LMV5 remains in standby or is put into standby mode, even if the set load controller requests heat. An error message is not displayed.	Automatic Manual Burner off	User	Automatic	Automatic	Automatic	●	●	●
		Times				Times								
			OperatRamp Mod			Operating ramp modulating is the maximum speed of the actuators during operation (phase 60 + 62). A setting of 30 seconds generates a maximum speed of 90° in 30 seconds (3°/s). The LMV5 calculates an individual speed for each actuator, so that all actuators reach their target positions at the same time.	30...120 s	Service	30 s	30 s	30 s	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						 Note! Operating ramp modulating must not be set higher than the speed of the slowest actuator in the fuel-air ratio control.									
			OperatRamp Stage			Operating ramp modulating is the maximum speed of the actuators during operation (phase 60 + 62). A setting of 10 seconds generates a maximum speed of 90° in 10 seconds (9°/s).	10...60 s	Service	10 s	10 s	10 s	●	●	●	
						 Note! Operating ramp modulating must not be set higher than the speed of the slowest actuator in the fuel-air ratio control.									
			TimeNoFlame			Drive ramp is the speed of the actuators when traveling to the home, prepurge, ignition, and postpurge positions. A setting of 10 seconds generates a maximum speed of 90° in 10 seconds (9°/s).	10...120 s	Service	10 s	10 s	10 s	●	●	●	
						 Note! Drive ramp must not be set higher than the speed of the slowest actuator in the fuel-air ratio control.									
		NumFuelActuators				Number of fuel actuators 1 = The gas damper and the oil pressure controller are operated with a single common actuator. It is, however, still possible to parameterize independent curves for both fuels. The common fuel actuator must then be addressed as a fuel actuator. 2 = The LMV5 system is operated with 2 fuel actuators; one for gas and one for oil.	1..2	OEM	2	2	2	●	●	●	
		ShutdownBehavior				Positions/behavior of the actuators in the lockout position (phase 00)	Unchanged PostpurgeP HomePos	Service	HomePos	HomePos	HomePos	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
		ProgramStop				Program stop	deactivated 24 PrePurgP 32 PreP FGR 36 IgnitPos 44 Interv 1 52 Interv 2 72 PostPPos 76 PostPFGR	Servic e	deactivat ed	deactivat ed	deactivat ed	●	●	●
		Pos. tolerance				Tolerance actuator position and variable speed drive	0.3...1.2° (0.5...1.2% for VSD)	OEM	0.3°/0.5 %	0.3°/0.5 %	0.3°/0.5 %	●	●	●
	O2Contr/Alar m					Parameter settings for O2 trim control and O2 alarm function								
		GasSettings				Parameter settings for firing on gas								
			OptgMode			Operating mode of O2 trim controller / alarm when firing on gas → auto deact Do not use, used by the LMV5 for automatic deactivation → man deact Manually deactivate O2 alarm and O2 controller → O2 alarm Activate O2 alarm, deactivate O2 controller → O2 Control Activate O2 alarm and O2 controller, lockout for O2 faults/O2 minimal value undershoot → conAutoDeac Activate O2 alarm and O2 controller, automatic deactivation of O2 controller and alarm for O2 faults, automatic deactivation of O2 controller for O2 minimum value undershoot	auto deact man deact O2 alarm O2 Control conAutoDeac	Servic e	man deact	man deact	man deact			●
			O2 Control			Parameter settings for O2 trim control								

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
			O2 Alarm			Parameter settings for O2 alarm									
				O2 Alarm		Special function for setting O2 minimum value parameters		Service							●
				Time O2 Alarm		This parameter defines the time period for which the O2 minimum value may be undershot or the O2 maximum value may be exceeded during O2 supervision before a reaction is triggered.	1..60s	OEM	3 s	3 s	3 s				●
				Type O2 MaxValue		Definition of the O2 maximum value during operation → O2 MaxValue The parameter <i>O2 MaxValue</i> is used → O2MaxCurve The O2 values that were measured on the ratio control curve when setting the O2 are used as the O2 maximum values.	O2 MaxValue O2MaxCurve	OEM	O2 MaxValue	O2 MaxValue	O2 MaxValue				●
				O2 MaxValue		O2 limit value of the O2 maximum value alarm during operation (only relevant in the <i>Type O2 MaxValue = O2 MaxValue</i> setting)	0..15%	Service	15 %	15 %	15 %				●
				NumMinUntil Deact		Number of repetitions of the O2 minimum value alarm once the O2 minimum value has been undershot before the following reaction occurs: - when the O2 controller is in the <i>conAutoDeac</i> operating mode: → automatic deactivation of the O2 controller - for all other O2 controller operating modes: → lockout	1..5	Service	1	1	1				●
						 Note! Set value: 1 = no repetition 5 = 4 repetitions									
			Control Param			O2 controller parameter									
				PI		PI controller parameter									


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
					P Low-Fire	P-part of the O2 controller determined by the LMV5 in low-fire operation (display only)	3...500%	Service	---	---	---			●
					I Low-Fire	I-part of the O2 controller determined by the LMV5 in low-fire operation (display only)	0...500 s	Service	---	---	---			●
					Tau Low-Fire OEM	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller in low-fire OEM operation, modifiable	1...60 s	OEM	---	---	---			●
					Tau Low-Fire	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller in low-fire operation (display only)	1...60 s	User	---	---	---			●
					P High-Fire	P-part of the O2 controller determined by the LMV5 with high-fire (display only)	3...500%	Service	---	---	---			●
					I High-Fire	I-part of the O2 controller determined by the LMV5 with high-fire (display only)	0...500 s	Service	---	---	---			●
					Tau High-Fire OEM	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller with OEM high-fire, modifiable	1...60 s	OEM	---	---	---			●
					Tau High-Fire	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller with high-fire (display only)	1...60 s	User	---	---	---			●
					Calc PI again	Recalculation of the PI parameters of the O2 controller based on the time constants <i>Tau Low-Fire OEM</i> and <i>Tau High-Fire OEM</i>	deactivated activated	OEM	---	---	---			●
				LowfireAdapt PtNo		Point number for low-fire adaption of O2 trim control	2	Service	2	2	2			●
				O2 CtrlThreshold		Min. load O2 trim control (gas)	0...100%	Service	0%	0%	0%			●
				LoadCtrlSuspend		If an internally calculated value exceeds the value set here, this means that there is a <i>fast</i> load change. As a result, the O2 trim control becomes inactive and the parameterized <i>O2ModOffset</i> becomes active for the O2 precontrol. Example: 0% means that each load change is classified	0..25%	Service	5%	5%	5%			

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
						as fast. 25% means that only very fast and large load changes are classified as fast.									
				O2ModOffset		O2 offset during <i>fast</i> load changes (gas) Remark: New name: O2ModOffset Old name: O2Offset	0..5%	Service	0 %	0 %	0 %				●
				O2TrimBehav		Characteristic of the O2 trim control → ForcdAirAdd Stronger reaction, when air must be added → ForcdAirRed Stronger reaction, when air must be reduced → symmetric Symmetrical behavior when adding or reducing air	ForcdAirAdd ForcdAirRed symmetric	OEM	ForcdAirAdd	ForcdAirAdd	ForcdAirAdd				●
				Type Air Change		The way in which changes in the air density affect the O2 value. → like P air The measured lambda factor is still taken into account when the air density changes. Recommended for gas → like theory The measured lambda factor is not taken into account when the air density changes. Recommended for oil → LambdaFact1 The system expects a fixed lambda factor of 1; the measured value is irrelevant.	like theory like P air LambdaFact1	Service	like theory	like theory	like theory				●
				O2MaxManVariable		Upper limit of the O2 controller manipulated variable. If this is exceeded, a low-fire load shutdown with	0..50	Service	35 %	35 %	35 %				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
						subsequent lockout is initiated.									
				O2MinManVariable		Lower limit of the O2 controller manipulated variable. If this is undershot, a low-fire load shutdown with subsequent lockout is initiated.	-50..0	Service	-35 %	-35 %	-35 %				●
			Startmode			Burner start mode of the O2 trim control (only LMV52.4, only in the operating modes <i>O2 control</i> and <i>conAutoDeac</i>)									
				Startmode		Selection of ignition type for O2 trim control: → standard Start via the ignition positions with locked O2 controller → Ign Load TC Direct start on the ratio control curves with initialized O2 controller (with supply air sensor) → IgnPtWithTC Start via the ignition positions with initialized O2 controller (with supply air sensor) → IgnPtWoutTC Start via the ignition positions with O2 controller initialized to 0 (without supply air sensor)	standard Ign Load TC IgnPtWithTC IgnPtWoutTC	OEM	standard	standard	standard				●
				Load of Ignition		Load at which a system with O2 trim control and startmode set to <i>Ign Load TC</i> is ignited.	0..100%	OEM	0 %	0 %	0 %				●
				O2InitOffset		O2 offset for ignition with <i>Load of Ignition</i> (rich or lean mixture). Irrespective of the start mode, this offset is added to the manipulated variable calculated during the controller initialization.	-2..2%	OEM	0 %	0 %	0 %				●
				NumberTauSuspend		Locking time of the O2 trim control when entering operating phase 60. Locking time = <i>NumberTauSuspend</i> * Tau Low-Fire.	5..140	Service	10	10	10				●
				Adjust. Temp		The temperature of the combustion air/supply air	-40..850	User	20 °C	20 °C	20 °C				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
				O2		when the O2 setpoints were set is saved automatically when the low-fire point is adapted and can be changed manually.										
			Type of Fuel			Selection of type of gas	user def naturalGasH naturalGasL propane butane	Servic e	naturalG asH	naturalG asH	naturalG asH					●
			Fuel user def			User-defined setting of fuel parameters										
				V_LNmin		Air volume under standard conditions and lambda = 1	0.00...40.00	Servic e	9.90	9.90	9.90					●
				V_afNmin		Flue gas volume wet under standard conditions and lambda = 1	0.00...40.00	Servic e	10.93	10.93	10.93					●
				V_atrNmin		Flue gas volume dry under standard conditions and lambda = 1	0.00...40.00	Servic e	8.89	8.89	8.89					●
				A2		Adjustable constant for calculating the combustion efficiency (gas)	0.40...0.80	Servic e	0.65	0.65	0.65					●
				B/1000		Adjustable constant for calculating the combustion efficiency (gas)	1...20	Servic e	9	9	9					●
			O2 Content Air			Oxygen content of air	0...30%	OEM	20.9%	20.9%	20.9%					●
		OilSettings				Parameter settings for the O2 trim control and the O2 alarm function for oil-fired operation										
			OptgMode			Operating mode of O2 trim controller / limiter when firing on oil → auto deact Do not use, used by the LMV5 for automatic deactivation → man deact Manually deactivate O2 alarm and O2 controller → O2 alarm Activate O2 alarm, deactivate O2 controller	auto deact man deact O2 alarm O2 Control conAutoDeac	Servic e	man deact	man deact	man deact					●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
						<p>→ O2 Control Activate O2 alarm and O2 controller, lockout for O2 faults/O2 minimal value undershoot</p> <p>→ conAutoDeac Activate O2 alarm and O2 controller, automatic deactivation of O2 controller and alarm for O2 faults, automatic deactivation of the O2 controller for O2 minimum value undershoot</p>								
			O2 Control			Parameter settings for O2 trim control and for O2 alarm								
			O2 Alarm			Parameter settings for O2 monitor								
				O2 Alarm		Special function for setting O2 minimum value parameters		Service						●
				Time O2 Alarm		This parameter defines the time period for which the O2 minimum value may be undershot or the O2 maximum value may be exceeded during O2 supervision before a reaction is triggered.	1..60s	OEM	3 s	3 s	3 s			●
				Type O2 MaxValue		<p>Definition of the O2 maximum value during operation</p> <p>→ O2 MaxValue The <i>O2 MaxValue</i> parameter is used</p> <p>→ O2MaxCurve The O2 values that were measured on the ratio control curve when setting the O2 are used as the O2 maximum values</p>	O2 MaxValue O2MaxCurve	OEM	O2 MaxValue	O2 MaxValue	O2 MaxValue			●
				O2 MaxValue		O2 limit value of the O2 maximum value alarm during operation (only relevant in the <i>Type O2 MaxValue = O2 MaxValue</i> setting)	0..15%	Service	15 %	15 %	15 %			●
				NumMinUntil Deact		<p>Number of repetitions of the O2 minimum value alarm once the O2 minimum value has been undershot before the following reaction occurs:</p> <p>- when the O2 controller is in the <i>conAutoDeac</i> operating mode:</p> <p>→ automatic deactivation of the O2 controller</p>	1..5	Service	1	1	1			●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						- for all other O2 controller operating modes: → lockout									
						 Note! Set value: 1 = no repetition 5 = 4 repetitions									
			Control Param			Control parameter									
				PI		PI controller parameter									
					P low-fire	P-part of the O2 controller determined by the LMV5 in low-fire operation (display only)	3...500%	Service	invalid	invalid	invalid				●
					I low-fire	I-part of the O2 controller determined by the LMV5 in low-fire operation (display only)	0...500 s	Service	invalid	invalid	invalid				●
					Tau Low-Fire OEM	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller in low-fire OEM operation, modifiable	1...60 s	OEM	invalid	invalid	invalid				●
					Tau low-fire	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller in low-fire operation (display only)	1...60 s	User	invalid	invalid	invalid				●
					P High-Fire	P-part of the O2 controller determined by the LMV5 with high-fire (display only)	3...500%	Service	invalid	invalid	invalid				●
					I High-Fire	I-part of the O2 controller determined by the LMV5 with high-fire (display only)	0...500 s	Service	invalid	invalid	invalid				●
					Tau High-Fire OEM	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller with OEM high-fire, modifiable	1...60 s	OEM	invalid	invalid	invalid				●
					Tau High-Fire	<i>Tau</i> time constant determined by the LMV5 for the control process of the O2 controller with high-fire (display only)	1...60 s	User	invalid	invalid	invalid				●
					Calc PI again	Recalculation of the PI parameters of the O2 controller based on the time constants <i>Tau Low-Fire OEM</i> and <i>Tau High-Fire OEM</i>	deactivated activated	OEM							●
				LowfireAdapt PtNo		Point number for low-fire adaption of O2 trim control	2	Service	2	2	2				●
				O2		Min. load O2 trim control (oil)	0...100%	Service	0%	0%	0%				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
				CtrlThreshold				e							
				LoadCtrlSuspend		<p>If an internally calculated value exceeds the value set here, this means that there is a <i>fast</i> load change.</p> <p>As a result, the O2 trim control becomes inactive and the parameterized <i>O2ModOffset</i> becomes active for the O2 precontrol.</p> <p>Example: 0% means that each load change is classified as <i>fast</i>. 25% means that only very fast and large load changes are classified as <i>fast</i>.</p>	0..25%								
				O2ModOffset		<p>O2 offset during <i>fast</i> load changes</p> <p>Remark: New name: O2ModOffset Old name: O2Offset</p>	0..5%	Service	0 %	0 %	0 %				●
				O2TrimBehav		<p>Characteristic of the O2 trim control</p> <p>→ ForcdAirAdd Stronger reaction, when air must be added</p> <p>→ ForcdAirRed Stronger reaction, when air must be removed</p> <p>→ symmetric Symmetrical behavior when adding or reducing air</p>	ForcdAirAdd ForcdAirRed symmetric	OEM	ForcdAirAdd	ForcdAirAdd	ForcdAirAdd				●
				Type Air Change		<p>The way in which changes in the air density affect the O2 value.</p> <p>→ like P air</p> <p>The measured lambda factor is still taken into account when the air density changes.</p> <p>Recommended for gas</p> <p>→ like theory</p>	like theory like P air LambdaFact1	Service	like theory	like theory	like theory				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
						The measured lambda factor is not taken into account when the air density changes. Recommended for oil → LambdaFact1 The system expects a fixed lambda factor of 1; the measured value is irrelevant.									
				O2MaxManVariable		Upper limit of the O2 controller manipulated variable. If this is exceeded, a low-fire load shutdown with subsequent lockout is initiated.	0..50	Service	35 %	35 %	35 %				●
				O2MinManVariable		Lower limit of the O2 controller manipulated variable. If this is undershot, a low-fire load shutdown with subsequent lockout is initiated.	-50..0	User	-35 %	-35 %	-35 %				●
			Startmode			Burner start mode of the O2 trim control for oil (only LMV52.4, only in operating modes <i>O2 Control</i> and <i>conAutoDeac</i>)									
				Startmode		Selection of ignition type for O2 trim control: → standard: Start via the ignition positions with locked O2 controller → Ign Load TC: Direct start on the ratio control curves with initialized O2 controller (with supply air sensor) → IgnPtWithTC Start via the ignition positions with initialized O2 controller (with supply air sensor) → IgnPtWoutTC Start via the ignition positions with O2 controller initialized to 0 (without supply air sensor)	standard Ign Load TC IgnPtWithTC IgnPtWoutTC	OEM	standard	standard	standard				●
				Load of Ignition		Load at which a system with O2 trim control and startmode set to <i>Ign Load TC</i> is ignited.	0..100%	OEM	0 %	0 %	0 %				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
				O2InitOffset		O2 offset for ignition with <i>Load of Ignition</i> (rich or lean mixture). Irrespective of the start mode, this offset is added to the manipulated variable calculated during the controller initialization.	-2..2%	OEM	0 %	0 %	0 %			●
				NumberTauSuspend		Locking time of the O2 trim control when entering operating phase 60. Locking time = <i>NumberTauSuspend</i> * Tau Low-Fire	5..140	Service	10	10	10			●
				Adjust. Temp O2		The temperature of the combustion air/supply air when the O2 setpoints were set is saved automatically when the low-fire point is adapted and can be changed manually.	-40..850	User	20 °C	20 °C	20 °C			●
			Type of Fuel			Selection of type of oil	user def oil EL oil H	Service	oil EL	oil EL	oil EL			●
			Fuel user def			User-defined settings for the fuel parameters		Service						
				V_LNmin		Air volume under standard conditions and lambda = 1	0.00...40.00	Service	11.2	11.2	11.2			●
				V_afNmin		Flue gas volume wet under standard conditions and lambda = 1	0.00...40.00	Service	12.02	12.02	12.02			●
				V_atrNmin		Flue gas volume dry under standard conditions and lambda = 1	0.00...40.00	Service	10.53	10.53	10.53			●
				A2		Adjustable constant for calculating the combustion efficiency (oil)	0.40...0.80	Service	0.65	0.65	0.65			●
				B/1000		Adjustable constant for calculating the combustion efficiency (oil)	1...20	Service	9	9	9			●
			O2 Content Air			Oxygen content of air	0...30%	OEM	20.9%	20.9%	20.9%			●
		COx				O2 controller process data / efficiency		Service						
			OptgMode COx Gas			Operating mode of COx controller/Cox alarm when firing on gas	deactivated COx Alarm COx Control	Service	deactivated	deactivated	deactivated			●
			OptgMode			Operating mode of COx controller/Cox alarm	deactivated	Service	deactivated	deactivated	deactivated			●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
			COx Oil			when firing on oil	COx Alarm COx Control	e	ed	ed	ed			
			Time COx Alarm			Tolerance time for active COx signal until a fault response takes place	0..600 s	Service	20s	20s	20s			●
		Process Data				O2 controller process data/combustion efficiency								
			CombEfficiency			Combustion efficiency	0...200%	User	---					●
			ManVar O2 Ctrl			Manipulated variable of O2 trim controller	-35...35%	User	---					●
			State O2 Ctrl			<p>Displaying the O2 trim controller status</p> <p>→ deactivated The O2 controller is not active; the system operates along the ratio control curves.</p> <p>→ locked The manipulated variable of the O2 controller is held at the last value.</p> <p>→ LockTStart The O2 controller is locked due to the locking time during startup.</p> <p>→ InitContr The O2 controller is being initialized and is still locked.</p> <p>→ LockTLoad The O2 controller is locked due to a load change.</p> <p>→ active The O2 controller is active and maintains the O2 setpoint.</p> <p>→ LockTCAct The O2 controller is locked due to direct</p>	deactivated locked LockTStart InitContr LockTLoad active LockTCAct	User	---					●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						influences from manipulated variables (switching functions).									
			Air-related Load			Air-related load	0...100%, S1, S2, S3	User							●
			Diag Reg State			Diagnostic code when controller is locked	0...255	User							●
	LoadController					Settings for internal load controller									
		ControllerParam				Settings of controller parameter for internal load controller									
			ContrlParamList			PID control parameters									
				StandardParam		<p>Selection of standard parameter sets for load controller → Adaption The PID values acquired by the adaption function are used</p> <p>→ very fast Standard PID triple value for very fast control paths (very small boilers)</p> <p>→ fast Standard PID triple value for fast control paths</p> <p>→ normal Standard PID triple value for normal control paths</p> <p>→ slow Standard PID triple value for slow control paths</p> <p>→ very slow Standard PID triple value for very slow control paths (very large boilers)</p>	Adaption very fast fast normal slow very slow	User				●	●	●	
				P-Part (Xp)		<p>Controller parameter proportional band = proportional band Xp</p> <p>Controller reaction: Xp = 2% → strong/fast</p>	2...500%	User	15%	15%	15%	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						Xp = 500% → weak/slow									
				I-Part (Tn)		Controller parameter integral part = integral time Tn Controller reaction: Tn = 0 → the I-part is switched off Tn = 1 → strong/fast Tn = 2000 → weak/slow	0...2000 s	User	320 s	320 s	320 s	•	•	•	
				D-Part (Tv)		Controller parameter derivative part = derivative time Tv Controller reaction: Tv = 1 → weak/slow Tv = 1000 → strong/fast	0...1000 s	User	40 s	40 s	40 s	•	•	•	
			MinActuatorStep			Min. actuator step possible	0.5...10%	User	1%	1%	1%	•	•	•	
			SW_FilterTimeCon			Filter time constant in a software-based filter	1...10 s	User	3 s	3 s	3 s	•	•	•	
			SetpointW1			Internal setpoint W1, in °C Internal setpoint W1, in bar	0...2000 °C 0...100 bar	User				•	•	•	
			SetpointW2			Internal setpoint W2, in °C Internal setpoint W2, in bar	0...2000 °C 0...100 bar	User				•	•	•	
			SD_ModOn			Switch-on differential of the integrated boiler 2-position controller for the modulating mode of the burner. The burner is switched on if the boiler actual value is equal to or less than the boiler setpoint plus <i>SD_ModOn</i> .	-50...+50%	User	1.0%	1.0%	1.0%	•	•	•	
			SD_ModOff			Switch-off differential of the integrated boiler 2-position controller for the modulating mode of the burner. The burner is switched off if the boiler actual value is higher than the boiler setpoint plus <i>SD_ModOff</i> .	0...+50%	User	10%	10%	10%	•	•	•	
			SD_Stage1On			Switch-on differential of the integrated boiler controller for the multistage operating mode of the burner. The burner (stage 1) is switched on if the boiler actual value is equal to or less than the boiler setpoint minus <i>SD_Stage1On</i> .	-50...+50%	User	-2%	-2%	-2%	•	•	•	
			SD_Stage1Off			Switch-off differential stage 1 of the integrated boiler controller for the multistage operating mode of the burner, if at least the reaction threshold Q2	0...+50%	User	10%	10%	10%	•	•	•	



Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						was exceeded and at least stage 2 was therefore switched on. The burner (stage 1) is switched off if the boiler actual value is higher than the boiler setpoint plus <i>SD_Stage1Off</i> .									
			SD_Stage2Off			Switch-off differential stage 2 of the integrated boiler controller for the multistage operating mode of the burner. The burner stage 2 is switched off if the boiler actual value is higher than the boiler setpoint plus <i>SD_Stage2Off</i> .	0...+50%	User	8%	8%	8%	●	●	●	
			SD_Stage3Off			Switch-off differential of the integrated boiler 2-position controller for the multistage operating mode of the burner. - The burner stage 3 is switched off as soon as the boiler actual value is equal to/less than the boiler setpoint minus <i>SD_Stage3Off</i> - If the reaction thresholds Q2 and Q3 were not exceeded and stage 2 and stage 3 were therefore not switched on, the burner is switched off if the boiler actual value is higher than the boiler setpoint plus <i>SD_Stage3Off</i> (low-fire operation)	0...+50%	User	6%	6%	6%	●	●	●	
			ThreshStage2On			Reaction threshold Q2 for switching on stage 2 (Integral of the control deviation over time)	0...1000	User	300	300	300	●	●	●	
			ThreshStage3On			Reaction threshold Q3 for switching on stage 3 (Integral of the control deviation over time)	0...1000	User	600	600	600	●	●	●	
		TempLimiter				Internal temperature limiter function									
			TL_ThreshOff			Temperature limiter OFF threshold, in °C	0...2000 °C	Service	95 °C	95 °C	95 °C	●	●	●	
			TL_SD_On			Temperature limiter switching differential ON	-50...0% TL_Thresh_Off	Service	-5%	-5%	-5%	●	●	●	
		ColdStart				Cold start thermal shock protection									
			ColdStartOn			Cold start thermal shock protection, activate / deactivate	deactivated activated	Service	deactivated	deactivated	deactivated	●	●	●	
			ThresholdOn			Cold start thermal shock protection activation level referred to the current setpoint	0...100%	Service	20%	20%	20%	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
			StageLoad			Cold start thermal shock protection load step (modulating)	0..100%	Service	15%	15%	15%	●	●	●
			StageSetp_Mod			Cold start thermal shock protection setpoint step (modulating) referred to the current setpoint	1...100%	Service	5%	5%	5%	●	●	●
			StageSetp_Stage			Cold start thermal shock protection setpoint step (multistage) referred to the current setpoint	1...100%	Service	5%	5%	5%	●	●	●
			MaxTmeMod			Cold start thermal shock protection, max. time per step (modulating)	1...63 min	Service	3 min	3 min	3 min	●	●	●
			MaxTmeStage			Cold start thermal shock protection, max. time per step (multistage)	1...63 min	Service	3 min	3 min	3 min	●	●	●
			ThresholdOff			Cold start thermal shock protection deactivation level referred to the current setpoint	0...100%	Service	80%	80%	80%	●	●	●
			AdditionalSens			In high-pressure plants, the thermal shock protection can be carried out with a temperature sensor (additional sensor) instead of the boiler controller pressure sensor.	deactivated Pt100 Pt1000 Ni1000	Service	deactivated	deactivated	deactivated	●	●	●
			TempColdStart			End of the temperature measuring range of the additional sensor for the cold start thermal shock protection function.	0...2000 °C	User				●	●	●
			SetpointAddSensor			The temperature setpoint for the additional sensor for the cold start thermal shock protection function starts to apply when an additional sensor is parameterized. The parameters <i>ThresholdOn</i> and <i>ThresholdOff</i> are percentage values of this temperature setpoint.	0...450 °C	Service	60 °C	60 °C	60 °C	●	●	●
			ReleaseStages			Cold start thermal shock protection load step stage mode (multistage operation)	no release release	Service	release	release	release	●	●	●
		Configuration				General configuration of load controller								
			LC_OptgMode			Operating mode with load controller → ExtLC X5-03 External load controller, load demand with switching contacts on the X5-03 inputs → Int LC LMV5 internal load controller, setpoint from the	ExtLC X5-03 Int LC Int LC Bus Int LC X62 Ext LC X62 Ext LC Bus	User	IntLC	IntLC	IntLC	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						AZL52 → Int LC Bus LMV5 internal load controller, setpoint from Modbus → Int LC X62 LMV5 internal load controller, setpoint from analog input X62 → Ext LC X62 External load controller, load demand from analog input X62 → Ext LC Bus External load controller, load demand from Modbus									
			Sensor Select			Sensor input definition including activation/deactivation of temperature limiter function (TL) → Pt100: Pt100 on X60, TL active → Pt1000: Pt1000 on X60, TL active → Ni1000: LG-Ni1000 on X60, TL active → Temp.-Sens.: temperature sensor on X61, TL deactivated → PressSensor.: pressure sensor on X61, TL deactivated → Pt100Pt1000: (Pt100 on X60 for controller and TL) + (Pt1000 on X60 also on for TL) → Pt100Ni1000: (Pt100 on X60 for controller and TL) + (LG-Ni1000 on X60 also on for TL) → no sensor: no input	Pt100 Pt1000 Ni1000 Temp sensor Press sensor Pt100Pt1000 Pt100Ni1000 NoSensor	Service	Pt100	Pt100	Pt100	•	•	•	
			MeasureRangePtNi			End of measurement range for temperature sensor at input X60	150 °C / 302 °F 400 °C / 752 °F 850 °C / 1562 °F	Service	150 °C / 302 °F	150 °C / 302 °F	150 °C / 302 °F	•	•	•	
			var. RangePtNi			End of measuring range for temperature sensor at input X60	0...850 °C	Service	850 °C	850 °C	850 °C	•	•	•	
			Ext Inp X61 U/I			Configuration of external input X61	4...20 mA 2...10 V 0...10 V 0...20 mA	Service	0...10 V	0...10 V	0...10 V	•	•	•	
			MRange TempSens			End of temperature measuring range for input X61	0...2000 °C	Service	90 °C	90 °C	90 °C	•	•	•	
			MRange PressSens			End of pressure measuring range for input X61	0...99.9 bar	Service	2 bar	2 bar	2 bar	•	•	•	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52
									EU	US	LMV50			
			Ext Inp X62 U/I			Configuration of external input X62	4...20 mA 2...10 V 0...10 V 0...20 mA	Service	4...20 mA	4...20 mA	4...20 mA	•	•	•
			Ext MinSetpoint			Accepted preselected min. external setpoint for X62 / Bus	0...100% ScaleHlcurrent	Service	0%	0%	0%	•	•	•
			Ext MaxSetpoint			Accepted preselected max. external setpoint for X62 / Bus	0...100% ScaleHlcurrent	Service	60%	60%	60%	•	•	•
			AnalogOutput			Selection of analog output X63								
				OutValueSelection		Selection of analog output at terminal X63	Load Load 0 O2 Pos Air Pos Fuel Pos Aux1 Pos Aux2 Pos Aux3 Speed VSD Flame Temp Pt1000 Temp Ni1000 Temp Pt100 Temp X61 Press X61	Service	Load	Load	Load	•	•	•
				CurrMode 0/4mA		Selection of min. output current 0 or 4 mA	0...20 mA 4...20 mA	Service	0...20 mA	0...20 mA	0...20 mA	•	•	•
				Scale20mA perc		Assignment of percentage to 20 mA for load 0 / O2 / speed VSD / flame	0...999.9%	Service	100%	100%	100%	•	•	•
				Scale20mA temp		Assignment of temperature to 20 mA for Temp Pt1000 / Temp Ni1000 / Temp Pt100 / Temp X61	0...2000 °C	Service	850 °C	850 °C	850 °C	•	•	•
				Scale20mA press		Assignment of pressure to 20 mA for pressure input X61	0...99.9 bar	Service	2	2	2	•	•	•
				Scale20mA		Assignment of angle to 20 mA for Pos Air / Pos	0...90°	Service	90 °	90 °	90 °	•	•	•

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
				angle		Fuel / Pos AUX1 / Pos AUX2 / Pos AUX3		e							
				Scale 0/4mA		Assignment of value to lower output value (percentage of relevant final value/20 mA value)	0...999.9%	Service	0%	0%	0%	●	●	●	
		Adaption				Adaption of controlled system									
			StartAdaption			Start adaption		User				●	●	●	
			AdaptionLoad			Adaption load	40...100%	User	100%	100%	100%	●	●	●	
		SW Version				Software version of internal load controller	0...65535	User				●	●	●	
	AZL					Settings for the display and operating unit AZL52									
		Times				Time settings									
			PasswordTime			Validity of password	10...480 min	OEM	120 min	120 min	120 min	●	●	●	
			Sum/WinterTime			Setting of summer- / wintertime	Manual Automatic	User	Automatic	Automatic	Automatic	●	●	●	
			Time EU/US			Setting of summer- / wintertime S / W time EU: Start: last Sunday in March End: last Sunday in October S / W time US: Start: first Sunday in April End: last Sunday in October	S / W time EU S / W time US	User	S / W time EU	S / W time US	S / W time EU	●	●	●	
		Language				Selection of language	English German Language 3 Language 4 Language 5 Language 6	User	German	English	English	●	●	●	
		DateFormat				Selection of date format (Day.Month.Year or Month-Day-Year)	DD.MM.YY MM-DD-YY	User	DD.MM.YY	DD.MM.YY	DD.MM.YY	●	●	●	
		PhysicalUnits				Selection of unit °C / bar or °F / psi	°C / bar °F / psi	User	°C / bar	°F / psi	°C / bar	●	●	●	
		eBUS				eBus									
			Address			eBus address of LMV5	1...8	User	1	1	1	●	●	●	


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
			SendCycleBU			Cycle time for sending the burner control's operating data of LMV5 (basic unit) to the building automation and control system (BACS)	10...60 s	User	30 s	30 s	30 s	●	●	●
		Modbus				Modbus								
			Address			Modbus address of LMV5	1...247	User	1	1	1	●	●	●
			Baudrate			Modbus rate of transmission	19200 bit/s 9600 bit/s	User	19200 bit/s	19200 bit/s	19200 bit/s	●	●	●
						 Note! Also affects the output of trending data on COM2.								
			Parity			Modbus parity for LMV5	no even odd	User	no	no	no	●	●	●
						 Note! Also affects the output of trending data on COM2.								
			Timeout			Max. time with no communication. When this time has elapsed, <i>Remote</i> changes to <i>Local</i>	0...7200 s	User	30 s	30 s	30 s	●	●	●
			Local / Remote			Change of operating mode local / remote	local remote	User				●	●	●
			Remote Mode			Remote mode: → Automatic The burner starts up automatically depending on the load controller. The controller release on X5-03 pin 1 and the start release on X6-01 pin 1 or X7-03 pin 2 must be present. The setpoint W3 from Modbus is used. → Manual Burner starts up if the controller release is on X5-03 pin 1 and the start release is on X6-01 pin 1 or X7-03 pin 2. The target load from the Modbus is used.	Automatic Manual Burner off	User				●	●	●


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
						→ Burner off Burner does not start up										
			W3			External setpoint W3, in °C External setpoint W3, in bar	0...2000 °C 0...100 bar	User				•	•	•		
		Display Contrast						User				•	•	•		
		ProductID				Product ID AZL52										
			ASN			Type code / order number	1...15 characters	User	AZL52.0 0B1	AZL52.4 B1	AZL52.0 0B1	•	•	•		
			ProductionDate			Production date	01.01.00...31.12.99 01-01-00...12-31-99	User				•	•	•		
			SerialNumber			Serial number	0...65535	User				•	•	•		
			ParamSet Code			Preselected parameter set: Customer code	0...255	User	20	20	20	•	•	•		
			ParamSet Vers			Preselected parameter set: Version	0...65535	User	600	600	600	•	•	•		
		SW Version				Software version of AZL5	0...65535	User	---	---	---	•	•	•		
	Actuators					Settings for the actuators										
		Addressing				Addressing										
			1 AirActuator			The actuator is addressed as the air actuator		Service				•	•	•		
			2 GasActuat(Oil)			The actuator is addressed as the gas actuator, or the fuel actuator for <i>dual fuel burners with one fuel actuator</i> .		Service				•	•	•		
			3 OilActuator			The actuator is addressed as the oil actuator		Service				•	•	•		
			4 AuxActuator			Actuator to be addressed becomes the auxiliary actuator 1		Service				•	•	•		
			5 AuxActuator2			Actuator to be addressed becomes the auxiliary actuator 2		Service							•	
			6 AuxActuator3			Actuator to be addressed becomes the auxiliary actuator 3		Service				•	•	•		
		DirectionRot				DirectionRot										

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting			LMV50	LMV51	LMV52	
									EU	US	LMV50				
						Standard = counterclockwise Reverse = clockwise Facing the end of the shaft (in unmounted state)									
			DeleteCurves					Service				•	•	•	
			1 AirActuator			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard	•	•	•	
			2 GasActuat(Oil)			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard	•	•	•	
			3 OilActuator			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard	•	•	•	
			4 AuxActuator			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard	•	•	•	
			5 AuxActuator2			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard				•
			6 AuxActuator3			Direction of rotation of the respective actuator	standard reversed	OEM	standard	standard	standard	•	•	•	
		ProductID				Product ID									
			1 AirActuator			Air auxiliary						•	•	•	
				ASN		Type code / order number	1...15 characters	User	SQM48.697A9	SQM48.697A9	SQM48.697A9	•	•	•	
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				•	•	•	
				SerialNumber		Serial number	0...65535	User				•	•	•	
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20	•	•	•	
				ParamSet Vers		Preselected parameter set: Version	0...65535	User	600	600	600	•	•	•	
			2 GasActuat(Oil)			Gas actuator (oil)									

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
				ASN		Type code / order number	1...15 characters	User	SQM48.697A9	SQM48.697A9	SQM48.697A9	●	●	●
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				●	●	●
				SerialNumber		Serial number	0...65535	User				●	●	●
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20	●	●	●
				ParamSet Vers		Preselected parameter set: Version	0...65535	User	600	600	600	●	●	●
			3 OilActuator			Oil actuator								
				ASN		Type code / order number	1...15 characters	User	SQM48.697A9	SQM48.697A9	SQM48.697A9	●	●	●
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				●	●	●
				SerialNumber		Serial number	0...65535	User				●	●	●
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20	●	●	●
				ParamSet Vers		Preselected parameter set: Version	0...65535	User	600	600	600	●	●	●
			4 AuxActuator			Auxiliary actuator 1								
				ASN		Type code / order number	1...15 characters	User	SQM48.697A9	SQM48.697A9	SQM48.697A9	●	●	●
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				●	●	●
				SerialNumber		Serial number	0...65535	User				●	●	●
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20	●	●	●
				ParamSet		Preselected parameter set: Version	0...65535	User	600	600	600	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
				Vers												
			5 AuxActuator 2			Auxiliary actuator 2										
				ASN		Type code / order number	1...15 characters	User	SQM48. 697A9	SQM48. 697A9	SQM48. 697A9				•	
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User								•
				SerialNumber		Serial number	0...65535	User								•
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20					•
				ParamSet Vers		Preselected parameter set: Version	0...65535	User	600	600	600					•
			6 AuxActuator 3			Auxiliary actuator 3										
				ASN		Product no.	1...15 characters	User	SQM48. 697A9	SQM48. 697A9	SQM48. 697A9	•	•	•	•	
				ProductionDate		Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				•	•	•	•	
				SerialNumber		Serial number	0...65535	User				•	•	•	•	
				ParamSet Code		Preselected parameter set: Customer code	0...255	User	20	20	20	•	•	•	•	
				ParamSet Vers		Preselected parameter set: Version	0...65535	User	600	600	600	•	•	•	•	
			SW Version			Display of actuators' software version										
			1 AirActuator			Software version of actuator	0...65535	User				•	•	•	•	
			2 GasActuat(Oil)			Software version of actuator	0...65535	User				•	•	•	•	
			3 OilActuator			Software version of actuator	0...65535	User				•	•	•	•	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
			4 AuxActuator			Software version of actuator	0...65535	User				•	•	•
			5 AuxActuator2			Software version of actuator	0...65535	User						•
			6 AuxActuator3			Software version of actuator	0...65535	User				•	•	•
	VSD Module					Settings for the VSD module								
		Configuration				Configuration								
			ReleaseCont t VSD			Behavior of VSD module's release contact when no-load position = 0% during home run	closed open	Service	closed	closed	closed	•	•	•
			ToIQuickShut down			Level of deviation at which a VSD quick shutdown is performed.	0...100%	OEM	10%	10%	10%	•	•	•
						 Caution! 100% means that the function is deactivated!								
			Speed			Speed								
				Num Puls per R		Number of pulses per revolution	3.6	Service	3	3	3	•	•	•
				Standardizati on		Standardization process for fan speed	deactivated activated	Service				•	•	•
				Standardized Sp		Standardized speed: Speed corresponding to 100%	1...6300	Service	1	1	1	•	•	•
				AbsoluteSpee d		Absolute speed	0...6553,5	User				•	•	•
				Setpoint Output		Configuration of analog interface	0...20 mA 4...20 mA	Service	4..20 mA	4..20 mA	4..20 mA	•	•	•
				Settling Time		Time between speed readjustment and speed acquisition for special positions and stage operation	8...200 ms	OEM	16	16	16	•	•	•
			Fuel Meter			Fuel meter								
				PulseValueG as		Number of pulses per volume unit gas	0...9999.9999 Imp/m³ 0...999.99999 Imp/ft³	Service	1	1	1	•	•	•
				PulseValueOil		Number of pulses per volume unit oil	0...9999.9999 Imp/l 0...9999.9999	Service	1	1	1	•	•	•

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
							Imp/gal								
		Process Data				Process data									
			Max Stat Dev			Max. speed deviation at the end of a drive command	0...100%	User				•	•	•	
			Max Dyn Dev			Max. speed deviation when accelerating	0...100%	User				•	•	•	
			Num Dev >0.3%			Number of speed deviations >0.3% at the end of a drive command	0...255	User				•	•	•	
			Num Dev >0.5%			Number of speed deviations >0.5% at the end of a drive command	0...255	User				•	•	•	
			Absolute Speed			Absolute speed	0...6553.5	User				•	•	•	
		ProductID				Product ID									
			ASN			Type code / order number	1...15 characters	User				•	•	•	
			ProductionDate			Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				•	•	•	
			SerialNumber			Identification number	0...65535	User				•	•	•	
			ParamSet Code			Preselected parameter set: Customer code	0...255	User	20	20	20	•	•	•	
			ParamSet Vers			Preselected parameter set: Version	0...65535	User	600	600	600	•	•	•	
		SW Version				Software version of VSD	0...65535	User				•	•	•	
	O2 Module					Settings for O2 module PLL52									
		Configuration				Configuration									
			O2 Sensor			Configuration of O2 sensor	no sensor QGO20 QGO21	Service	no sensor	no sensor	no sensor				•
			O2SensServTim			Service interval for the O2 sensor	0..65535	Service	0	0	0				•
						 Note! 0 = deactivated									
			O2SensServTimRes			Reset O2 sensor service timer activated = timer reset.	deactivated activated	Service							•
			SupAirTempSens			Configuration of supply air temperature input X87	no sensor Pt1000	Service	no sensor	no sensor	no sensor				•

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting							
									EU	US	LMV50	LMV50	LMV51	LMV52		
							Ni1000									
			AirTempX60PT1000			Activation of the load controller input X60 PT1000 as the input for the supply air temperature for calculating the combustion efficiency	deactivated activated	OEM	deactivated	deactivated	deactivated					●
			FlueGasTempSens			Configuration of flue gas temperature input X86	no sensor Pt1000 Ni1000	Service	no sensor	no sensor	no sensor	●	●	●		
			MaxTempFIGasGas			Switch-off limit of flue gas temperature	0...850 °C	Service	300 °C	300 °C	300 °C	●	●	●		
			MaxTempFIGasOil			Switch-off limit of flue gas temperature	0...850 °C	Service	300 °C	300 °C	300 °C	●	●	●		
		Process Data				Displayed values										
			Current O2 Value			Current O2 value	0...100%	User								●
			O2 Setpoint			O2 setpoint	0...25%	User								●
			SupplyAirTemp			Supply air temperature in °C	-100...923 °C	User								●
			FlueGasTemp			Flue gas temperature in °C	-100...923 °C	User				●	●	●		
			CombEfficiency			Combustion efficiency	0...200%	User								●
			QGO SensorTemp			Sensor temperature of QGO20 in °C	-100...923 °C	User								●
			QGO HeatingLoad			Control value of QGO20 heating in 0.1%	0...100%	User								●
			QGO Resistance			Internal resistance of QGO20 Nernst cell	0...1000 Ohm	User								●
		ProductID				Product ID										
			ASN			ASN	1...15 characters	User	PLL52.1 10A200	PLL52.1 10A100	PLL52.1 10A200	●	●	●		
			ProductionDate			Date of production	01.01.00...31.12.99 01-01-00...12-31-99	User				●	●	●		
			SerialNumber			Identification number	0...65535	User				●	●	●		
			ParamSet Code			Preselected parameter set: Customer code	0...255	User	20	20	20	●	●	●		
			ParamSet Vers			Preselected parameter set: Version	0...65535	User	600	600	600	●	●	●		
		SW Version				Software version of O2 module	0...65535	User				●	●	●		

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
	Flue Gas Recirc					Flue gas recirculation									
		FGR-Mode				<p>Operating mode of flue gas recirculation function → AUX3onCurve The flue gas recirculation function is deactivated. Auxiliary actuator 3 operates along its parameterized ratio control curve.</p> <p>→ time Auxiliary actuator 3 is held in the ignition position until an adjustable time is reached.</p> <p>→ temperature Auxiliary actuator 3 is held in the ignition position until an adjustable temperature is reached.</p> <p>→ temp.contr. The position of auxiliary actuator 3 is determined based on the flue gas temperature and the ratio control curve.</p> <p>→ TCautoDeact Functions in the same way as <i>temp.contr.</i>, except that if there is a fault in the flue gas sensor, the function is automatically deactivated.</p> <p>→ deactMinpos After the ignition position, auxiliary actuator 3 is always held in the minimum flue gas recirculation position.</p> <p>→ auto deact The temperature-compensated flue gas recirculation is automatically deactivated by the LMV5. Do not select this setting. It is used by the</p>	Aux3onCurve time temperature temp.contr. TCautoDeact deactMinpos auto deact	Servic e	Aux3on Curve	Aux3on Curve	Aux3on Curve	•	•	•	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						LMV5.									
		FGR-sensor				Selection of temperature sensor for the temperature-compensated flue gas recirculation function	X86PtNi1000 X60 Pt1000 X60 Ni1000	Service	X86PtNi 1000	X86PtNi 1000	X86PtNi 1000	•	•	•	
		actTmpFGR-sensor				Display of actual temperature value from the selected flue gas recirculation temperature sensor	1...850 °C	User				•	•	•	
		ThresholdFGR Gas				Temperature which must not be exceeded in order to keep auxiliary actuator 3 in the ignition position.	0...850 °C	Service	400 °C	400 °C	400 °C	•	•	•	
		DelaytimeFGR Gas				Time period for which auxiliary actuator 3 is held in the ignition position after entering into operation (phase 60).	0...63 min	Service	300 s	300 s	300 s	•	•	•	
		Factor FGR Gas				Flue gas recirculation adjustment factor for the calculated temperature-dependent positions of auxiliary actuator 3. A value <100% reduces the amount of recirculated flue gas (lowering of damper position toward closed position). A value of 100% means <i>no adjustment</i> .	10..100%	Service	100%	100%	100%				•
		OperationTempGas				Display of measured values for the flue gas recirculation temperature curve gas		Service							•
		ThresholdFGR Oil				Temperature which must not be exceeded in order to keep auxiliary actuator 3 in the ignition position.	0...850 °C	Service	400 °C	400 °C	400 °C	•	•	•	
		DelaytimeFGR Oil				Time period for which auxiliary actuator 3 is held in the ignition position after entering into operation (phase 60).	0...63 min	Service	300 s	300 s	300 s	•	•	•	
		Factor FGR Oil				Flue gas recirculation adjustment factor for the calculated temperature-dependent positions of auxiliary actuator 3. A value <100% reduces the amount of recirculated flue gas (lowering of damper position toward closed position). A value of 100% means <i>no adjustment</i> .	10..100%	Service	100%	100%	100%				•
		OperationTempOil				Display of measured values for the flue gas recirculation temperature curve oil		Service							•
		FGR MinPos				Minimum flue gas recirculation position Lower limit for the position of auxiliary actuator 3	0..90°	Service	0°	0°	0°				•

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						in the <i>temp.contr.</i> and <i>TCautoDeact</i> operating modes.									
		FGR MaxPos Fact				Maximum flue gas recirculation position factor Upper limit of the target position for auxiliary actuator 3, calculated from the actual temperature and the hot position. The setting is based on the relevant curve point.	0..100%	Service	10%	10%	10%				●
	SystemConfig					System configuration LMV5									
		LC_OptgMode				Load controller operating mode → ExtLC X5-03 External load controller, load demand with switching contacts on the X5-03 inputs → Int LC LMV5 internal load controller, setpoint from the AZL52 → Int LC Bus LMV5 internal load controller, setpoint from Modbus → Int LC X62 LMV5 internal load controller, setpoint from analog input X62 → Ext LC X62 External load controller, load demand from analog input X62 → Ext LC Bus External load controller, load demand from Modbus	ExtLC X5-03 Int LC Int LC Bus Int LC X62 Ext LC X62 Ext LC Bus	User	IntLC	IntLC	IntLC	●	●	●	
		Ext Inp X62 U/I				Configuration of load controller input X62	4...20 mA 2...10 V 0...10 V 0...20 mA	Service	4...20 mA	4...20 mA	4...20 mA	●	●	●	


Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
		TempLimiter				Temperature limiter (TL)									
			TL_Thresh_Off			Temperature limiter OFF threshold, in °C	0...2000 °C	Service	95 °C	95 °C	95 °C	●	●	●	
			TL_SD_On			Temperature limiter switching differential ON	-50...0% TL_Thresh_Off	Service	-5%	-5%	-5%	●	●	●	
			Sensor Select			Sensor input definition including activation/deactivation of temperature limiter function (TL) → Pt100: Pt100 on X60, TL active → Pt1000: Pt1000 on X60, TL active → Ni1000: LG-Ni1000 on X60, TL active → Temp.-Sens: temperature sensor on X61, TL deactivated → PressSensor.: pressure sensor on X61, TL deactivated → Pt100Pt1000: (Pt100 on X60 for controller and TL) + (Pt1000 on X60 also on for TL) → Pt100Ni1000: (Pt100 on X60 for controller and TL) + (LG-Ni1000 on X60 also on for TL) → no sensor: no input	Pt100 Pt1000 Ni1000 Temp sensor Press sensor Pt100Pt1000 Pt100Ni1000 NoSensor	Service	Pt100	Pt100	Pt100	●	●	●	
			MeasureRangePtNi			End of measuring range for sensor at load controller input X60	150 °C / 302 °F 400 °C / 752 °F 850 °C / 1562 °F	Service	150 °C / 302 °F	150 °C / 302 °F	150 °C / 302 °F	●	●	●	
		O2Ctrl/Limitr Gas				Operating mode of O2 trim controller / alarm when firing on gas → auto deact Do not use, used by the LMV5 for automatic deactivation. → man deact Manually deactivate O2 alarm and O2 controller → O2 alarm Activate O2 alarm, deactivate O2 controller → O2 Control Activate O2 alarm and O2 controller, lockout for	auto deact man deact O2 alarm O2 Control conAutoDeac	Service	man deact	man deact	man deact				●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
						O2 faults/O2 minimal value undershoot → conAutoDeac Activate O2 alarm and O2 controller, automatic deactivation of O2 controller and alarm for O2 faults, automatic deactivation of O2 controller for O2 minimum value undershoot									
		O2Ctrl/Limitr Oil				Operating mode of O2 trim controller / alarm when firing on oil → auto deact Do not use, used by the LMV5 for automatic deactivation. → man deact Manually deactivate O2 alarm and O2 controller → O2 alarm Activate O2 alarm, deactivate O2 controller → O2 Control Activate O2 alarm and O2 controller, lockout for O2 faults/O2 minimum value undershoot → conAutoDeac Activate O2 alarm and O2 controller, automatic deactivation of O2 controller and alarm for O2 faults, automatic deactivation of O2 controller for O2 minimum value undershoot	auto deact man deact O2 alarm O2 Control conAutoDeac	Servic e	man deact	man deact	man deact			●	
		LC Analog Output				Selection of output value on load controller analog output X63	Load Load 0 O2 Pos Air Pos Fuel Pos Aux1 Pos Aux2 Pos Aux3 Speed VSD	Servic e	Load	Load	Load	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
							Flame Temp Pt1000 Temp Ni1000 Temp Pt100 Temp X61 Press X61								
		allowed Pot.diff				Permitted tolerance between the 2 potentiometer values in the actuators	1...15	Service	1,5°	1,5°	1.5°	●	●	●	
		OptgMode COx Gas				Operating mode of COx controller/Cox alarm when firing on gas	deactivated COx Alarm COx Control	Service	deactivated	deactivated	deactivated	●			
		OptgMode COx Oil				Operating mode of COx controller/Cox alarm when firing on oil	deactivated COx Alarm COx Control	Service	deactivated	deactivated	deactivated	●			
		AirTempX60P T1000				Activation of the load controller input X60 PT1000 as the input for the supply air temperature sensor for calculating the combustion efficiency.	deactivated activated	OEM	deactivated	deactivated	deactivated				●
	HoursRun					Hours run									
		GasFiring				Operating hours gas (selectable)	0...999999 h	User	0	0	0	●	●	●	
		OilStage1/Mod				Operating hours oil stage 1 or modulating (selectable)	0...999999 h	User	0	0	0	●	●	●	
		OilStage2				Operating hours oil stage 2 (selectable)	0...999999 h	User	0	0	0	●	●	●	
		OilStage3				Operating hours oil stage 3 (selectable)	0...999999 h	User	0	0	0	●	●	●	
		TotalHoursReset				Operating hours total (can be reset)	0...999999 h	User	0	0	0	●	●	●	
		TotalHours				Operating hours total (read only)	0...999999 h	User	0	0	0	●	●	●	
		SystemOnPower				Operating hours unit live (read only)	0...999999 h	User	0	0	0	●	●	●	
		Reset				Resetting of hours run meters									
			GasFiring			Operating hours gas (selectable)	0...999999 h	User	0	0	0	●	●	●	
			OilStage1/Mod			Operating hours oil stage 1 or modulating (selectable)	0...999999 h	User	0	0	0	●	●	●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting					
									EU	US	LMV50	LMV50	LMV51	LMV52
			OilStage2			Operating hours oil stage 2 (selectable)	0...999999 h	User	0	0	0	●	●	●
			OilStage3			Operating hours oil stage 3 (selectable)	0...999999 h	User	0	0	0	●	●	●
			TotalHoursReset			Operating hours total (can be reset)	0...999999 h	User	0	0	0	●	●	●
	StartCounter					Start counter								
		GasStartCount				Number of startups gas, start counter (selectable)	0...999999	User	0	0	0	●	●	●
		OilStartCount				Number of startups oil, start counter (selectable)	0...999999	User	0	0	0	●	●	●
		TotalStartCountR				Total number of startups, start counter (can be reset)	0...999999	User	0	0	0	●	●	●
		TotalStartCount				Total number of startups, start counter (read only)	0...999999	User	0	0	0	●	●	●
		Reset				Resetting the start counters								
		GasStartCount				Number of startups gas, start counter (selectable)	0...999999	User	0	0	0	●	●	●
		OilStartCount				Number of startups oil, start counter (selectable)	0...999999	User	0	0	0	●	●	●
		TotalStartCountR				Total number of startups, start counter (can be reset)	0...999999	User	0	0	0	●	●	●
	Fuel Meter					Fuel meter								
		Curr Flow Rate				Current fuel throughput	0...6553.4	User				●	●	●
		Volume Gas				Fuel volume gas (read only)	0...199999999.9 m ³ 0...1999999999 ft ³	User	0	0	0	●	●	●
		Volume Oil				Fuel volume oil (read only)	0...199999999.9 l 0...199999999.9 gal	User	0	0	0	●	●	●
		Volume Gas R				Fuel volume gas (resettable)	0...199999999.9 m ³ 0...1999999999 ft ³	User	0	0	0	●	●	●
		Volume Oil R				Fuel volume oil (resettable)	0...199999999.9 l 0...199999999.9 gal	User	0	0	0	●	●	●
		Reset DateGas				Reset date fuel volume gas	01.01.00...31.12.99	User	0	0	0	●	●	●

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
							01-01-00...12-31-99								
		Reset DateOil				Reset date fuel volume oil	01.01.00...31.12.99 01-01-00...12-31-99	User	0	0	0	●	●	●	
Updating						Updating									
	Passwords					Change passwords									
		ServicePassword				Service password	3...8 characters	OEM				●	●	●	
		OEM Password				OEM password	4...8 characters	OEM				●	●	●	
	BurnerID					Identification of burner	4...15 characters	OEM	invalid	invalid	invalid	●	●	●	
	ParamBackup					Parameter backup									
		BackupInfo				Backup information									
			Date			Date of backup	01.01.00...31.12.99 01-01-00...12-31-99	User	0	0	0	●	●	●	
			TimeOfDay			Time of day of backup	00:00...23:59	User	0	0	0	●	●	●	
			BU included?			Information: LMV5 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			AZL included?			Information: AZL5 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			LC included?			Information: Load controller included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			ACT1 included?			Information: Actuator 1 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			ACT2 included?			Information: Actuator 2 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			ACT3 included?			Information: Actuator 3 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			ACT4 included?			Information: Actuator 4 included in last backup YES / NO	No Yes	User	No	No	No	●	●	●	
			ACT5 included?			Information: Actuator 5 included in last backup YES / NO	No	User	No	No	No			●	

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Menu level 5	Menu level 6	Description	Value range	Access rights	Parameter basic setting						
									EU	US	LMV50	LMV50	LMV51	LMV52	
							Yes								
			ACT6 included?			Information: Actuator 6 included in last backup YES / NO	No Yes	User	No	No	No	•	•	•	
			VSD included?			Information: VSD included in last backup YES / NO	No Yes	User	No	No	No	•	•	•	
			O2 included?			Information: O2 included in last backup YES / NO	No Yes	User	No	No	No			•	
		LMV5x → AZL				Saving the parameters of the system on the AZL5		Service				•	•	•	
		AZL → LMV5x				Transfer and save parameters stored in the AZL52 to the overall system		Service				•	•	•	
	Load_SW_from_PC					Updating of AZL5 software via the serial port with the PC tool ACS450		Service				•	•	•	
PW Login						Obtaining access right via the password (access times can be parameterized)									
PW Logout						Cancelation of last access right obtained via password									
SafetyCheck Funct						TÜV test									
	LossFlameTest					Loss-of-flame test activated: The flame signal is interrupted electronically.		Service				•	•	•	
	SLT Test					Safety limit thermostat test activated: The burner is switched on and the load is automatically set to the value defined by the <i>SLT-Testload Mod</i> and <i>SLT-Testload Stg</i> parameters.	deactivated activated	User				•	•	•	
						 Caution! Activating the safety limit thermostat test disables the internal controller and temperature limiter function.									
	SLT-Testload Mod					The load which is approached when the safety limit thermostat test is started, modulating operation	0...100%	User	100%	100%	100%	•	•	•	
	SLT-Testload Stg					The load which is approached when the safety limit thermostat test is started, multistage operation	S1 S2 S3	User	S3	S3	S3	•	•	•	

4 Error classes

The faults are subdivided into error classes (shutdown criteria of different priorities):

Class	Description
0	Lockout, restart only after manual reset
1	Software reset in the event of severe internal errors, automatic restart
2	Safety shutdown Safety phase: Restart - after error has disappeared or - after non-elapsed repetition meter or - after lockout after 30 seconds
3	Safety shutdown Home run, immediate restart, deletion of error
4	Safety shutdown Shutdown, immediate restart, deletion of error
5	Only display of error (note), no shutdown

AZL5...display using the example of *Loss of flame*

Error history:

```

1 Klasse: 00 Gas
Code: 26 Phase: 54
Diag: 00 Lst: 24.4
Anlauf-Nr: 326
    
```

7550z22/0906

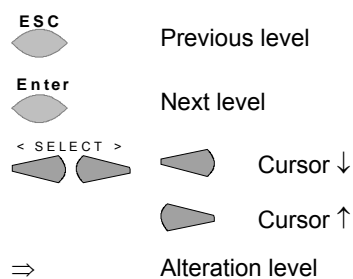
Lockout history:

```

1 28.08.06 15:15
C: 26 D: 00 P: 54
Anlauf-Nr: 326
Leistung: 24.4 Gas
    
```

7550z23/0906

Legend for operation AZL5



5 List of error messages of LMV5 system

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
		Ratio control	AZL not on Bus	No communication via CAN bus possible. AZL5 generates the error message itself. There is no error code or diagnostic code.	Improve EMC measures. System restart. Check the CAN bus cabling LMV5 → AZL52 → SQM4 → PLL5. Check the function of the CAN bus users.
01	01	LMV5	Internal Fault Basic Unit	ROM error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
02	#	LMV5	Internal Fault Basic Unit	RAM error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
02	01	LMV5	Internal Fault Basic Unit	RAM error in register bank 0 (LMV51)	
02	02	LMV5	Internal Fault Basic Unit	RAM error in IDATA area (LMV51)	
02	03	LMV5	Internal Fault Basic Unit	RAM error in XDATA area (LMV51)	
02	04	LMV5	Internal Fault Basic Unit	RAM error of variables used	
02	05	LMV5	Internal Fault Basic Unit	RAM error variable consistency	
02	06	LMV5	Internal Fault Basic Unit	RAM error reading back test pattern	
02	07	LMV5	Internal Fault Basic Unit	Error RAM test code run	
03	#	LMV5	Internal Fault Basic Unit	Error in connection with data comparison (internal communication) between μ C1 and μ C2	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
03	01	LMV5	Internal Fault Basic Unit	Timeout during program run synchronization prior to data transmission	
03	02	LMV5	Internal Fault Basic Unit	Timeout during data transmission	
03	03	LMV5	Internal Fault Basic Unit	CRC error during data transmission	
03	05	LMV5	Internal Fault Basic Unit	Timeout during program run synchronization with initialization	
03	10	LMV5	Internal Fault Basic Unit	Error counter Flame intensity outside tolerance has elapsed	
03	11	LMV5	Internal Fault Basic Unit	Error counter Target phase unequal has elapsed	
03	12	LMV5	Internal Fault Basic Unit	Error counter Reset-lockout input unequal has elapsed	
03	40	LMV5	Internal Fault Basic Unit	Fuel train unequal	
03	41	LMV5	Internal Fault Basic Unit	Relay control word unequal	
03	42	LMV5	Internal Fault Basic Unit	ROM-CRC signature unequal	


Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
03	43	LMV5	Internal Fault Basic Unit	Phase unequal	
03	44	LMV5	Internal Fault Basic Unit	(Key + main loop counter) unequal	
04	-	LMV5	Internal Fault Basic Unit	Unsuccessful synchronization of the 2 μ Cs	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
05	#	LMV5	Fault Flame Detector Test	Fault during test of the flame signal amplifier	If fault occurs sporadically: Improve EMC, e.g. by running the detector cable separately, by providing additional shielding, if necessary, and earthing the shield in the control panel. If fault occurs constantly: Replace the flame detector or the defective basic unit
05	01	LMV5	Fault Flame Detector Test	Fault during test of the flame signal amplifier	With QRI2: - Check to see if the detector cable has been laid separately With QRA7: - Check to see if live and neutral conductor are correctly connected to X3-04 - Check to see if, after 10 m at the latest, signal lines 3, 4 and 5 are laid separately from live conductor, neutral conductor and earth - Check UV cell for dark ignition <i>If fault occurs sporadically: Improve EMC measures. If fault occurs constantly: Replace the flame detector or the defective unit</i>
05	02	LMV5	Fault Flame Detector Test	Crosstalk fault between test pin and flame signal amplifier channel (with LMV52 FSV channel QRI / QRB)	
05	03	LMV5	Fault Flame Detector Test	(Only LMV52 and LMV50) crosstalk fault between test pin and FSV channel ION	
05	10	LMV5	Fault Flame Detector Test	Monitoring of redundancy contact on external high-temperature or flame safeguard	Check the wiring and the parameters of the external safety limit thermostat/external flame safeguard including the redundancy contact
06	#	LMV5	Internal Fault Basic Unit	Fault internal hardware tests	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
06	01	LMV5	Internal Fault Basic Unit	Fault during test of the ignition relay	
06	02	LMV5	Internal Fault Basic Unit	Fault during test of the safety relay	
06	03	LMV5	Internal Fault Basic Unit	Fault during voltage supervision test	
06	04	LMV5	Internal Fault Basic Unit	Relay voltage not switched off after reset	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
10	#	LMV5	Internal Fault Basic Unit	Basic unit has detected an inadmissible circuit at one of the outputs, a faulty diode, or a short-circuit in the power supply of the contact feedback network. The diagnostic code indicates the input affected	Neutral conductor may be missing. The fault may be caused by capacitive loads which, with the relay deenergized, are the reason voltage takes more than about 10 ms to drop to zero. Check wiring to the load If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
10	01	LMV5	Internal Fault Basic Unit	Load controller on / off	
10	02	LMV5	Internal Fault Basic Unit	Fan contact	
10	03	LMV5	Internal Fault Basic Unit	Selection of oil-firing	
10	04	LMV5	Internal Fault Basic Unit	Selection of gas-firing	
10	05	LMV5	Internal Fault Basic Unit	Reset	
10	06	LMV5	Internal Fault Basic Unit	Pressure switch oil maximum	
10	07	LMV5	Internal Fault Basic Unit	Pressure switch oil minimum	
10	08	LMV5	Internal Fault Basic Unit	Pressure switch valve proving	
10	09	LMV5	Internal Fault Basic Unit	Shutoff valve oil feedback	
10	0A	LMV5	Internal Fault Basic Unit	Fuel valve 1 oil feedback	
10	0B	LMV5	Internal Fault Basic Unit	Fuel valve 2 oil feedback	
10	0C	LMV5	Internal Fault Basic Unit	Fuel valve 3 oil feedback	
10	0D	LMV5	Internal Fault Basic Unit	Shutoff valve gas feedback	
10	0E	LMV5	Internal Fault Basic Unit	Fuel valve 1 gas feedback	
10	0F	LMV5	Internal Fault Basic Unit	Fuel valve 2 gas feedback	
10	10	LMV5	Internal Fault Basic Unit	Pilot valve 3 gas feedback	
10	11	LMV5	Internal Fault Basic Unit	Safety loop burner flange	
10	12	LMV5	Internal Fault Basic Unit	Safety relay feedback	
10	13	LMV5	Internal Fault Basic Unit	Pressure switch gas minimum	
10	14	LMV5	Internal Fault Basic Unit	Pressure switch gas maximum	
10	15	LMV5	Internal Fault Basic Unit	Ignition transformer feedback	
10	16	LMV5	Internal Fault Basic Unit	Fan pressure switch	
10	17	LMV5	Internal Fault Basic Unit	Start release oil	
10	18	LMV5	Internal Fault Basic Unit	Heavy oil direct start	
10	19	LMV5	Internal Fault Basic Unit	Load controller open	
10	1A	LMV5	Internal Fault Basic Unit	Load controller closed	
10	1B	LMV5	Internal Fault Basic Unit	Start release gas	
11	01	LMV5		Basic unit has detected a short-circuit in the contact feedback network	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
15	#	SQM VSD module	Fault Positioning Actuator or Fan Speed not reached	Basic unit has detected a positioning error on 1 / several actuators (incl. the VSD module)	Check if the actuator in question is mechanically overloaded. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the relevant actuators (refer to diagnostic code) - Check CAN bus fuse (F2/F3)
15	01...3F	SQM	<i>Fault Positioning Actuator</i>	<i>The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)</i>	
15	01	SQM	<i>Fault Positioning Actuator</i>	Positioning fault air actuator	
15	02	SQM	<i>Fault Positioning Actuator</i>	Positioning fault fuel actuator	
15	04	SQM	<i>Fault Positioning Actuator</i>	Positioning fault auxiliary actuator 1	
15	08	SQM	<i>Fault Positioning Actuator</i>	Positioning fault auxiliary actuator 2	
15	10	VSD module	<i>Fan Speed not reached</i>	The fan in combination with the VSD has not reached the required speed	Check the signal lines for the speed setpoint between LMV5 and VSD. Check to see if the motor can follow the ramp of the LMV5 <i>Check prepurge position of air actuator.</i>
15	20	SQM	<i>Fault Positioning Actuator</i>	Positioning fault auxiliary actuator 3	
15	40	VSD module	<i>Fan Speed not reached</i>	The difference of actual value and speed setpoint is greater than permitted by parameter <i>ToIQuick Shutdown</i>	Check signal lines for the speed setpoint between LMV5 and VSD. Check the signal lines between speed sensor and LMV5. Check to ensure that contacts are not loose. Check to see if motor can follow the ramp of the LMV5
16	#	LMV5		Basic unit has detected a plausibility fault in the fuel-air ratio control system. The diagnostic code describes the cause of the fault	
16	00	LMV5	<i>Internal Fault Basic Unit</i>	Ratio control curve of the air actuator is not fully defined	Check the curve to see if the correct values have been entered for the air actuator. Readjust the ratio control curve , if required
16	01	LMV5	<i>Internal Fault Basic Unit</i>	Ratio control curve of the fuel actuator is not fully defined	Check the curve to see if the correct values have been entered for the fuel actuator. Readjust the ratio control curve, if required

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
16	02	LMV5	<i>Internal Fault Basic Unit</i>	Ratio control curve of auxiliary actuator 1 is not fully defined	Check the curve to see if the correct values have been entered for the auxiliary actuator 1. Readjust the ratio control curve, if required
16	03	LMV5	<i>Internal Fault Basic Unit</i>	Ratio control curve of auxiliary actuator 2 is not fully defined	Check the curve to see if the correct values have been entered for the auxiliary actuator 2. Readjust the ratio control curve, if required
16	04	LMV5	<i>Internal Fault Basic Unit</i>	Ratio control curve of auxiliary actuator 3 is not fully defined	Check the curve to see if the correct values have been entered for the auxiliary actuator 3. Readjust the ratio control curve , if required
16	05	LMV5	<i>Internal Fault Basic Unit</i>	VSD curve is not fully defined	Check the curve to see if the correct values have been entered for the variable speed drive. Readjust the ratio control curve , if required
16	0A	LMV5	<i>Internal Fault Basic Unit</i>	Calculated P-part outside the permissible range	Check to see if correct values have been entered for the controller parameters. Readjust O2 trim control, if required, or repeat the settings
16	0B	LMV5	<i>Internal Fault Basic Unit</i>	Calculated I-part outside the permissible range	Check to see if correct values have been entered for the controller parameters. Readjust O2 trim control, if required, or repeat the settings
16	0C	LMV5	<i>Internal Fault Basic Unit</i>	Calculated system delay time outside the permissible range	Check to see if correct values have been entered for the controller parameters. Readjust O2 trim control, if required, or repeat the settings
16	0D	LMV5	<i>Internal Fault Basic Unit</i>	Calculated O2 setpoint outside the permissible range	Check to see if correct values have been entered for the O2 setpoints. Readjust O2 trim control, if required, or repeat the settings
16	0E	LMV5	<i>Internal Fault Basic Unit</i>	Calculated O2 min. value outside the permissible range	Check to see if correct values have been entered for the O2 min. values. Readjust O2 trim control, if required, or repeat the settings
16	0F	LMV5	<i>Internal Fault Basic Unit</i>	Calculated O2 ratio value outside the permissible range	Check to see if the correct values have been entered for the O2 ratio values. Readjust O2 trim control, if required, or repeat the settings
16	14	LMV5	<i>Internal Fault Basic Unit</i>	Calculated standardized value lies outside the permissible range	Check if the correct values have been entered for the standardized values. Readjust O2 trim control, if required, or repeat the settings
16	20	LMV5	<i>Internal Fault Basic Unit</i>	With hysteresis compensation: Permissible target positioning range exceeded	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
16	21	LMV5	Internal Fault Basic Unit	The load / point number predefined by the AZL5... lies outside the permissible range	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
16	22	LMV5	Internal Fault Basic Unit	Unplausible program branch	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
16	23	LMV5	Internal Fault Basic Unit	Unplausible fuel-air ratio phase	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
16	40	LMV5	Internal Fault Basic Unit	Unplausible target positions	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
17	---	LMV5	Internal Fault Basic Unit	(Internal) communication error of ELV	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
17	3F	LMV5	Internal Fault Basic Unit	Detection of different data when making the data comparison	
17	01	LMV5	Internal Fault Basic Unit	Timeout with program synchronization prior to data transmission	
17	02	LMV5	Internal Fault Basic Unit	Timeout with data transmission	
17	03	LMV5	Internal Fault Basic Unit	CRC fault during data transmission	
18	---	LMV5	Invalid Curve Data	Invalid curve data	Checking the curve data for invalid entries: Valid load range: 0.0...100.0% Valid positioning range: 0.0...90.0° Valid speed range: 0.0...100% In the case of a deviation from the valid range when commissioning the unit: Readjustment to the valid value range. If fault occurs after the unit has previously worked correctly: Replace the defective basic unit
19	#	SQM	Internal Fault Actuator	Basic unit (fuel-air ratio control system) has detected a fault when comparing potentiometer channels A and B. Diagnostic code shows on which actuator the fault occurred. See diagnostic code	Check CAN cabling. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the actuator (see diagnostic code) Check the max. permissible potentiometer difference (parameter <i>Max.Perm.PotiDiff</i>).

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					 <p>Note! Increase the value to 15 (corresponding to 1.5°) → Possible in the AZL5 upto software version V4.20</p>
19	01..2F	SQM	Internal Fault Actuator	The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)	
19	01	SQM.	Internal Fault Actuator	Fault occurred on the air actuator when comparing potentiometer channels A and B	
19	02	SQM	Internal Fault Actuator	Fault occurred on the active fuel actuator when comparing potentiometer channels A and B	
19	04	SQM	Internal Fault Actuator	Fault occurred on auxiliary actuator 1 when comparing potentiometer channels A and B	
19	08	SQM	Internal Fault Actuator	Fault occurred on auxiliary actuator 2 when comparing potentiometer channels A and B	
19	20	SQM	Internal Fault Actuator	Fault occurred on auxiliary actuator 3 when comparing potentiometer channels A and B	
1A	1	LMV5	Slope too steep	Slope of curve section is too steep	<p>Check curve data. If there is a slope greater than</p> <ul style="list-style-type: none"> - 3.6° per 0.1% (30-s ramp) - 1.8° per 0.1% (60-s ramp) - 0.9° per 0.1% (120-s ramp) <p>load change between 2 curvepoints -> change load assignment of the curvepoints such that above condition will be satisfied</p>
1B	#	LMV5	Operation in Parameter Setting Mode quit	Programming mode is still active in phase 62 and the target positions (normal operation) have not been reached	When parameterizing the curve, the plant should be operated in manual mode with Burner on. This prevents the load controller from triggering the change to shutdown. Response of the temperature limiter can trigger the same action, however, but the value (curvepoint) currently handled can still be stored in standby or lockout

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
1C	#	LMV5	Ignition Pos not defined	The relevant ignition positions have not been parameterized	Set the ignition positions
1C	01..3F	LMV5	<i>Ignition Pos not defined</i>	The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)	
1C	01	LMV5	<i>Ignition Pos not defined</i>	Ignition position of the air actuator	
1C	02	LMV5	<i>Ignition Pos not defined</i>	Ignition position of the active fuel actuator has not been parameterized	
1C	04	LMV5	<i>Ignition Pos not defined</i>	Ignition position of auxiliary actuator 1 has not been parameterized	
1C	08	LMV5	<i>Ignition Pos not defined</i>	Ignition position of auxiliary actuator 2 has not been parameterized	
1C	10	LMV5	<i>Ignition Pos not defined</i>	Ignition position of VSD has not been parameterized	
1C	20	LMV5	<i>Ignition Pos not defined</i>	Ignition position of auxiliary actuator 3 has not been parameterized	
1D	#	LMV5		Running time fault of actuators / VSD	Check the relevant actuators to see if they are mechanically overloaded. Check power supply to the actuators and their fuses. The actuator's ramp must be smaller to or equal to the ramp parameterized in the LMV5. The parameterized ramp of the VSD must be smaller than the ramp parameterized in the LMV5 (recommendation: 30%)
1D	01..3F	LMV5	<i>Fault Running Time</i>	The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)	
1D	01	LMV5	<i>Fault Running Time Air Actuator</i>	Running time fault of air actuator	
1D	04	LMV5	<i>Fault Running Time Aux Actuator</i>	Running time fault of auxiliary actuator 1	
1D	08	LMV5	<i>Fault Running Time Aux Actuator</i>	Running time fault of auxiliary actuator 2	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
1D	10	LMV5	<i>Fault Running Time VSD</i>	Running time fault of VSD	
1D	20	LMV5	<i>Fault Running Time Aux Actuator</i>	Running time fault of auxiliary actuator 3	
1E	#	SQM VSD module	Special Pos not reached	Basic unit has detected that 1 / several actuators (incl. VSD module) has / have not reached the special position pertaining to the phase	Check to see whether the respective actuators are subjected to mechanical overload, check actuators' supply voltages and fuses. Check actuators' power supply
1E	01..3F	SQM	<i>Special Pos not reached</i>	The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)	
1E	01	SQM	<i>Special Pos not reached</i>	Positioning fault of air actuator	
1E	02	SQM	<i>Special Pos not reached</i>	Positioning fault of fuel actuator	
1E	04	SQM	<i>Special Pos not reached</i>	Positioning fault of auxiliary actuator 1	
1E	08	SQM	<i>Special Pos not reached</i>	Positioning fault of auxiliary actuator 2	
1E	10	VSD module	<i>Special Pos not reached</i>	VSD has not reached the speed	
1E	20	SQM	<i>Special Pos not reached</i>	Positioning fault of auxiliary actuator 3	
1E	40	VSD	<i>Special Pos not reached</i>	<i>VSD quick shutdown, as the difference between the speed setpoint and the actual speed exceeds the value permitted in the TolQuick Shutdown parameter.</i>	<i>Check the signal lines for the speed setpoint between LMV5 and VSD. Check the signal lines between speed sensor and LMV5. Contacts must not be loose. Check to see if the motor can follow the ramp of the LMV5 (TmeNoFlame parameter). Observe and evaluate the behavior of the VSD and improve the settings/dimensioning of the VSD if necessary.</i>
1F	#	VSD module	Code for VSD Module Fault	Basic unit has detected a fault in connection with the VSD module	If fault occurs sporadically: Check CAN bus wiring. Improve EMC. If fault occurs constantly: Replace the defective basic unit
1F	01	VSD module	<i>Speed Acquisition faulty</i>	Internal VSD module test was not successful	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
1F	02	VSD module	<i>Wrong Direction of Rotation</i>	Fan rotates in the wrong direction	Check, if the motor direction of rotation is correct. Check if the sensor disk is mounted on the right side of the motor. Change live conductor on the fan motor or check parameterized direction of rotation on the VSD and correct, if necessary
1F	03	VSD module	<i>Speed Acquisition faulty</i>	Pulse sequence and length at the speed input were different from those anticipated	Check to see if sensor disk and speed sensor are correctly mounted. Check if the distance of the inductive sensor is correct. Check if the inductive sensor is correctly connected
1F	04	VSD module	<i>Standardization canceled because of VSD</i>	Fan was not able to keep the standardized speed at a constant level	Check if motor runs. Check if the inductive sensor is correctly connected. Check if distance of inductive sensor is correct
1F	05	VSD module	<i>Standardization canceled because of Air Actuator</i>	Air actuator has not reached the prepurge position. For this reason, speed standardization is not possible	Check to see if all air-influencing actuators travel to the prepurge position. Check to see if the relevant actuators are mechanically overloaded or replace defective actuator, if necessary. Check power supply to the actuators
1F	06	VSD module	<i>Speed Test was not successfully completed</i>	Internal VSD module speed test was not successful	
1F	07	VSD module	<i>Safety loop open</i>	<i>Standardization not possible when safety loop is open</i>	
21	---	LMV5		Safety loop open	
22	---	LMV5	Internal Temp Limiter has responded	Internal temperature limiter has switched off because parameterized value has been exceeded	
23	---	LMV5		Basic unit has detected extraneous light during startup	
23	00	LMV5		Basic unit has detected extraneous light during startup	If the LMV5 with QRI2 shows this fault constantly, check the neutral conductor connection of the QRI2
23	01/02/03	LMV5		(Only LMV50 / LMV52) Basic unit has detected extraneous light during startup. Coding: 01 = flame QRI / QRB present 02 = flame ION present 03 = flame QRA2 / QRA4 / QRA10 / QRB / QRI / ION present	If the LMV5 with QRI2 shows this fault constantly, check the neutral conductor connection of the QRI2
24	---	LMV5		Basic unit has detected extraneous light during shutdown	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
24	00	LMV5	<i>Extraneous Light on Shutdown</i>	Basic unit has detected extraneous light during shutdown	If the LMV5 with QRI2 shows this fault constantly, check the neutral conductor connection of the QRI2
24	01/02/03	LMV5	<i>Extraneous Light on Shutdown</i>	(Only LMV50 / LMV52) Basic unit has detected extraneous light during startup phase. Coding: 01 = flame QRI / QRB present 02 = flame ION present 03 = flame QRA2 / QRA4 / QRA10 / QRB / QRI / ION present	If the LMV5 with QRI2 shows this fault constantly, check the neutral conductor connection of the QRI2
25	---	LMV5	<i>No Flame at End of Safety Time</i>	No flame detected at the end of safety time TSA1 or TSA2	
25	00	LMV5	<i>No Flame at End of Safety Time</i>	No flame detected at the end of safety time TSA1 or TSA2	
25	01/02/03	LMV5	<i>No Flame at End of Safety Time</i>	(Only LMV50 / LMV52) No flame detected at the end of the safety time TSA1 or TSA2. Coding: 01 = flame QRI / QRB present 02 = flame ION present 03 = flame QRA2 / QRA4 / QRA10 / QRB / QRI / ION present	
26	---	LMV5	<i>Loss of Flame</i>	Detection of loss of flame during operation	
26	00	LMV5	<i>Loss of Flame</i>	Loss of flame during operation detected	
26	01/02/03	LMV5	<i>Loss of Flame</i>	(Only LMV50 / LMV52) Loss of flame during operation detected. Coding: 01 = flame QRI / QRB present 02 = flame ION present 03 = flame QRA2 / QRA4 / QRA10 / QRB / QRI / ION present	
27	---	LMV5	<i>Air Pressure on</i>	Air pressure = ON, but should have been OFF	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
28	---	LMV5	Air Pressure off	Air pressure = OFF, but should have been ON	
28	00	LMV5	Air Pressure off	Air pressure = OFF but should have been ON	
28	01	LMV5	Air Pressure off	Air pressure = OFF but should have been ON	Die The error message may be traced back to an open safety loop/burner flange
29	---	LMV5	Fan Contactor Contact is on	Fan contactor contact signal = ON, but should have been OFF	
2A	---	LMV5	Fan Contactor Contact is off	Fan contactor contact signal = OFF, but should have been ON	
2A	00	LMV5	Fan Contactor Contact is off	Fan contactor contact signal = OFF but should have been ON	
2A	01	LMV5	Fan Contactor Contact is off	Fan contactor contact signal = OFF but should have been ON	The error message may be traced back to an open safety loop/burner flange
2B	---	LMV5	Flue Gas Recirculation Pressure Switch on	Flue gas recirculation pressure switch = ON, but should have been OFF	
2C	---	LMV5	Flue Gas Recirculation Pressure Switch on	Flue gas recirculation pressure switch = OFF, but should have been ON	
2C	00	LMV5	Flue Gas Recirculation Pressure Switch off	Flue gas recirculation pressure switch = ON but should have been OFF	
2C	01	LMV5	Flue Gas Recirculation Pressure Switch off	Flue gas recirculation pressure switch = ON but should have been OFF	The error message may be traced back to an open safety loop/burner flange
2D	---	LMV5	Valve not open	Closed Position Indicator (CPI) = ON, but should have been OFF	
2D	00	LMV5	Valve not open	Closed Position Indicator (CPI) = ON, but should have been OFF	
2D	01	LMV5	Valve not open	CPI via terminal StartRelease_Gas Closed Position Indicator (CPI) = ON, but should have been OFF	Check the parameters or the signals: Pressure switch valve proving / CPI and StartRelease_Gas
2E	---	LMV5	Valve or Closed Position Indicator (CPI) open	Closed Position Indicator (CPI) = OFF, but should have been ON	
2E	00	LMV5	Valve or Closed Position Indicator (CPI) open	Closed Position Indicator (CPI) = OFF, but should have been ON	
2E	01	LMV5	Valve or Closed Position Indicator (CPI) open	CPI via terminal StartRelease_Gas Closed Position Indicator (CPI) = OFF,	Check the parameters or the signals: Pressure switch valve proving / CPI and StartRelease_Gas

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
				but should have been ON	
2F	---	LMV5	Gas Pressure has dropped below minimum Limit	Gas pressure < Min	
30	---	LMV5	Gas Pressure has exceeded maximum Limit	Gas pressure > Max	
31	---	LMV5	Gas Pressure at Valve proving: Valve on Gas Side leaking	Gas pressure valve proving = high	
32	---	LMV5	No Gas Pressure Valve Proving: Valve on Burner Side leaking	Gas pressure valve proving = low	
33	---	LMV5	Oil Pressure on although Oil Pump off	Oil pressure > Min	
34	---	LMV5	Oil Pressure below Minimum	Oil pressure < Min	
35	---	LMV5	Oil Pressure above Maximum	Oil pressure > Max	
36	---	LMV5	No Start Release for Oil	Start release oil = off	
37	---	LMV5	No direct Heavy Oil direct start	Heavy oil direct start	
38	---	LMV5	Lack of Gas Program	Shortage-of-gas program in progress	
39	#	LMV5		Parameter of max. safety time faulty	
39	01	LMV5	Internal Fault Basic Unit	Fault with timer 1	
39	02	LMV5	Internal Fault Basic Unit	Fault with timer 2	
39	03	LMV5	Internal Fault Basic Unit	Fault with timer 3	
3A	---	LMV5		No burner identification defined	Parameterize burner identification
3B	---	LMV5	No Service Password defined	No service password defined	Enter service password
3F	---	LMV5	Error-free	The system is error-free	
40	---	LMV5		Wrong contact position of safety relay	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit. Check to see whether the safety loop and the burner flange contact are correctly connected
41	---	LMV5	Internal Fault Basic Unit	Wrong contact position of ignition	Check output wiring. Check correct connection of the neutral conductor (N)
42	#	LMV5	Internal Fault Basic Unit	Wrong contact position of fuel valve relay	Check output wiring.


Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					Check correct connection of the neutral conductor (N)
42	01..FF	LMV5	Internal Fault Basic Unit	<p>The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format).</p> <p>Note that all outputs are powered by the safety loop, which means that the monitoring microprocessor identifies these contact reset errors, triggering lockout</p>	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	01	LMV5	Internal Fault Basic Unit	Contact position fault shut off valve-oil	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	02	LMV5	Internal Fault Basic Unit	Contact position fault fuel valve 1-oil	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	04	LMV5	Internal Fault Basic Unit	Contact position fault fuel valve 2-oil	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	08	LMV5	Internal Fault Basic Unit	Contact position fault fuel valve 3-oil	Check whether voltage is fed back to the voltage input via an




Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					<p>external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	10	LMV5	<i>Internal Fault Basic Unit</i>	Contact position fault shut off valve-gas	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	20	LMV5	<i>Internal Fault Basic Unit</i>	Contact position fault fuel valve 1-gas	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p>
42	40	LMV5	<i>Internal Fault Basic Unit</i>	Contact position fault fuel valve 2-gas	<p>Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source</p> <p>Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating in the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault</p> <p>Check wiring of the gas valve (connect neutral conductor to the LMV5, check wiring)</p>





Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
42	80	LMV5	<i>Internal Fault Basic Unit</i>	Contact position error fuel valve 3-gas	Check whether voltage is fed back to the voltage input via an external power source. If yes, remove that power source Check to see whether there are switches contained in the safety loop opening very briefly and closing again. This could be a fluttering pressure switch or water shortage switch operating the very same moment. All outputs are powered by the safety loop, which means that the microprocessor monitoring these outputs detects the fault
43	#	LMV5		Fault in connection with plausibility check. For cause of fault, refer to diagnostic code	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
43	01	LMV5	<i>Internal Fault Basic Unit</i>	No fuel selection	
43	02	LMV5	<i>No Fuel Train defined</i>	No defined fuel train parameterized	
43	03	LMV5	<i>Internal Fault Basic Unit</i>	Variable Train not defined	
43	04	LMV5	<i>Internal Fault Basic Unit</i>	Variable Fuel not defined	
43	05	LMV5	<i>Internal Fault Basic Unit</i>	Operating mode with load controller not defined	
43	06	LMV5	<i>Internal Fault Basic Unit</i>	Prepurge time gas too short	
43	07	LMV5	<i>Internal Fault Basic Unit</i>	Prepurge time oil too short	
43	08	LMV5	<i>Internal Fault Basic Unit</i>	Safety time 1 gas too long	
43	09	LMV5	<i>Internal Fault Basic Unit</i>	Safety time 1 oil too long	
43	0A	LMV5	<i>Internal Fault Basic Unit</i>	Ignition off time > TSA1 gas	
43	0B	LMV5	<i>Internal Fault Basic Unit</i>	Ignition off time > TSA1 oil	
43	0C	LMV5	<i>Internal Fault Basic Unit</i>	Safety time 2 gas too long	
43	0D	LMV5	<i>Internal Fault Basic Unit</i>	Safety time 2 gas too long	
44	#	LMV5		Fault at deactivated inputs	Deactivate input or do not connect
44	01	LMV5	<i>Controller input connected but deactivated</i>	Controller input connected but deactivated	
44	02	LMV5	<i>Air Press Switch connected but deactivated</i>	Air pressure switch connected but deactivated	
44	03	LMV5	<i>FCC / FGR – APS connected but deactivated</i>	Fan contactor contact / Flue gas recirculation – air pressure switch connected but deactivated	
44	04	LMV5	<i>Gas Pressure-MIN connected but deactivated</i>	Gas pressure-Min connected but deactivated	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
44	05	LMV5	Gas Pressure-MAX connected but deactivated	Gas pressure-Max connected but deactivated	
44	06	LMV5	Oil Pressure min connected but deactivated	Oil pressure-Min connected but deactivated	
44	07	LMV5	Oil Pressure max connected but deactivated	Oil pressure-Max connected but deactivated	
44	08	LMV5	Start Signal Oil connected but deactivated	Start signal oil connected but deactivated	
44	09	LMV5	HO Start connected but deactivated	Heavy oil start connected but deactivated	
44	0A	LMV5	Start Signal Gas connected but deactivated	Start signal gas connected but deactivated	
44	0B	LMV5	HO Start connected but deactivated	High-temperature flame safeguard connected but deactivated	
45	---	LMV5	Locked by SLT	Shutdown via safety limit thermostat test	Safety limit thermostat was activated and safety shutdown was triggered (usually via the safety limit thermostat)
46	#	LMV5	Programstop active	Program stop was activated. System has stopped at the parameterized position	Deactivate the program stop if no longer required
46	01	LMV5	Programstop active	Program stop STOP_DR_PREP in phase 24 active	
46	02	LMV5	Programstop active	Program stop STOP_PREP2 in phase 32 active	
46	03	LMV5	Programstop active	Program stop STOP_DR_IGN in phase 36 active	
46	04	LMV5	Programstop active	Program stop STOP_INTERV1 in phase 44 active	
46	05	LMV5	Programstop active	Program stop STOP_INTERV2 in phase 52 active	
46	06	LMV5	Programstop active	Program stop STOP_DR_POSTP in phase 72 active	
46	07	LMV5	Programstop active	Program stop STOP_PREP2 in phase 76 active	
47	---	LMV5	No Start Release for Gas	Start release gas = off	
48	---	LMV5	2 Flame Signals with 1 Detector Operation	System parameterized for 1-detector operation but 2 flame signals present	
48	00	LMV5	2 Flame Signals with 1 Detector Operation	Parallel operation with 2 flame detectors	Set correct parameters for flame evaluation of the fuel concerned/check the cabling with regard to the connection of a

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					<i>second flame detector</i>
49	---	LMV5	2 flame signals	2 flame signals present on external safeguard	
49	01	LMV5	2 flame signals	Parallel operation of external flame safeguard via contact and internal flame detector evaluation	When using an external flame safeguard via X6-01 pin 1 (parameter HeavyOilDirStart = ext.FlameGd), there must not be a flame detector connected to X10-02/X10-03
49	02	LMV5	2 flame signals	Parallel operation of external high-temperature safeguard via contact and internal flame detector evaluation	When using a high-temperature safeguard via X6-01 pin 1 (parameter HeavyOilDirStart = HTempGuard), only one flame detector may be connected to X10-02/X10-03 for low-temperature operation
50	#	LMV5		Fault during key value check	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
50	00..07	LMV5	Internal Fault Basic Unit	Number of time block in which the fault was detected	
51	#	LMV5	Internal Fault Basic Unit	Time block overflow	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
51	00..07	LMV5	Internal Fault Basic Unit	Number of time block in which the fault was detected	
52	#	LMV5	Internal Fault Basic Unit	Stack error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
52	01	LMV5	Internal Fault Basic Unit	Stack overflow	
52	02	LMV5	Internal Fault Basic Unit	Value dropped below preset min. limit	
52	03	LMV5	Internal Fault Basic Unit	Test values in stack range exceeded	
53	01	LMV5	Internal Fault Basic Unit	Faulty reset state has occurred	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
57	---	LMV5	Invalid parameterization		
57	00	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the gas extraneous light phases	Correct the setting for the SensExtranlGas parameter
57	01	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the oil extraneous light phases	Correct the setting for the SensExtranlOil parameter
57	02	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the gas pilot phases	Correct the setting for the SensPilotPhGas parameter

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
57	03	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the oil pilot phases	Correct the setting for the SensPilotPhOil parameter
57	04	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the gas operating phases	Correct the setting for the SensOperPhGas parameter
57	05	LMV5	Invalid parameterization	The setting ... AND NOT ... is not permitted in the oil operating phases	Correct the setting for the SensOperPhOil parameter
57	06	LMV5	Invalid parameterization	The temperature-compensated flue gas recirculation function is not permitted	The function is only enabled for the LMV52.4 model. Setting the FGR-Mode parameter to temp.contr., TCautoDeact, deactMinpos, and auto deact. is not permitted.
57	07	LMV5	Invalid parameterization	The high-temperature flame safeguard function is not permitted	The function is only enabled for the LMV50 model. Setting the HeavyOilDirStart parameter to HTempGuard is not permitted.
57	08	LMV5	Invalid parameterization	The external flame safeguard function is not permitted	The function is only enabled for the LMV50 /LMV52 models. Setting the HeavyOilDirStart parameter to ext.FlameGd is not permitted.
57	09	LMV5	Invalid parameterization	The flue gas recirculation function is not permitted	The function is only enabled for the LMV50 / LMV51.3 / LMV52 models. Changing the parameter FGR-Mode from deactivated is not permitted.
57	0A	LMV5	Invalid parameterization	The VSD/auxiliary actuator 3 function is not permitted.	The function is only enabled for the LMV50 / LMV51.3 /LMV52 models. Setting the auxiliary actuator parameter to VSD and/or AUX3 is not permitted.
57	0B	LMV5	Invalid parameterization	The cooling in standby function is not permitted.	The function is only enabled for the LMV50 model. Setting the Config X5-03 parameter to CoolfctStby is not permitted.
57	0C	LMV5	Invalid parameterization	X5-03 double assignment: External load controller via contact (operating mode 1) or deactivation O2 and startup stop phase 36	Adjust the LC_OptgMode or Config X5-03 parameter to prevent the double assignment.
57	0D	LMV5	Invalid parameterization	The redundancy contact monitoring function is not permitted	The function is only enabled for the LMV50 / LMV52 models. Setting the StartReleaseOil parameter to HT/FG-RedCo is not permitted
57	0E	LMV5	Invalid parameterization	The COx function is not permitted	The function is only enabled for the LMV52.4 model. Changing the OptgMode COx Gas/OptgMode COx Oil parameter from deactivated is not permitted
58	---	LMV5	Internal Fault Basic Unit	Internal communication ($\mu C1 \leftrightarrow \mu C2$)	Reset the unit
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
59	#	LMV5	Internal Fault Basic Unit	After initialization, EEPROM page is on ABORT (last parameterization was possibly interrupted due to a power failure)	Reset the unit
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
59	#	LMV5	<i>Internal Fault Basic Unit</i>	Page number	
5A	#	LMV5	Internal Fault Basic Unit	CRC error of a parameter page	Reset the unit
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
5A	#	LMV5	<i>Internal Fault Basic Unit</i>	Page number	
5B	#	LMV5	Internal Fault Basic Unit	Page is on ABORT	Reset the unit
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
5B	#	LMV5	<i>Internal Fault Basic Unit</i>	Page number	
5C	#	LMV5	Parameter Backup Restore	Page is on WR_RESTO A backup restore was made	Reset the unit
5C	#	LMV5	<i>Parameter Backup Restore</i>	Page number	
5D	#	LMV5		Page too long open	Reset the unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
5D	#	LMV5	<i>Internal Fault Basic Unit</i>		
5E	#	LMV5	Internal Fault Basic Unit	Page has an undefined status	Reset the unit.  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
5E	#	LMV5	<i>Internal Fault Basic Unit</i>	Page number	
5F	---	LMV5	Internal Fault Basic Unit	Last backup restore invalid (was interrupted)	Repeat backup restore
60	#	LMV5	Internal Fault Basic Unit	Fault when copying a parameter page	Reset the unit.  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
60	#	LMV5	<i>Internal Fault Basic Unit</i>	Number of parameter page	
61	#	LMV5		Fault in connection with EEPROM initialization	Reset the unit.  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
61	01	LMV5	<i>Internal Fault Basic Unit</i>	Fault during initialization of EEPROM	
61	02	LMV5	<i>Internal Fault Basic Unit</i>	Number of write attempts exceeded	
61	10	LMV5	<i>Internal Fault Basic Unit</i>	EEPROM was busy when accessed	


Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
61	11	LMV5	Internal Fault Basic Unit	Comparison of EEPROM and RAM area revealed dissimilarity	
61	12	LMV5	Internal Fault Basic Unit	Page area of EEPROM exceeded during write process	
61	13	LMV5	Internal Fault Basic Unit	Access conflict μ C1 <> μ C2 (arbitration)	
61	20	LMV5	Internal Fault Basic Unit	Fault when calling the ParAccess() function	
61	21	LMV5	Internal Fault Basic Unit	Written EEPROM block unequal RAM block	
61	22	LMV5	Internal Fault Basic Unit	CRC of page is faulty	
61	23	LMV5	Internal Fault Basic Unit	Matching fault μ C1, μ C2 when saving the error page	
63	#	LMV5	No display (no fault). Can only be read out via bus.	Unit is error-free	
70	#	LMV5	Internal Fault Basic Unit	Fault during restoring of lockout information	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
70	01	LMV5	Internal Fault Basic Unit	When reading from EEPROM (initialization)	
70	02	LMV5	Internal Fault Basic Unit	When test writing in the initialization	
70	03	LMV5	Internal Fault Basic Unit	No write access to ERROR page in init.	
70	04	LMV5	Internal Fault Basic Unit	Repetition counter Internal fault has elapsed	
71	---	LMV5	Manual Lockout	Lockout was made manually via contact	Lockout contact is negated by new actuation
72	#	LMV5	Internal Fault Basic Unit	Plausibility fault in connection with fault entry	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
72	01	LMV5	Internal Fault Basic Unit	Fault in seterr()	
72	02	LMV5	Internal Fault Basic Unit	Fault in seterr()	
72	03	LMV5	Internal Fault Basic Unit	Fault in error_manager()	
72	04	LMV5	Internal Fault Basic Unit	Fault in storeerr()	
80	#	SQM	Fault Feedback Aux Actuator 3	Basic unit has detected wrong state of the auxiliary actuator 3	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
80	01	SQM	Fault Feedback Aux Actuator 3	CRC error	




Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
80	02	SQM	<i>Fault Feedback Aux Actuator 3</i>	<i>Error in the key value of the main loop meter</i>	
80	03	SQM	<i>Fault Feedback Aux Actuator 3</i>	No feedback for max. number	
81	#	SQM	Fault Feedback Air Actuator	Basic unit has detected wrong state of the air actuator	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
81	01	SQM	<i>Fault Feedback Air Actuator</i>	CRC error	
81	02	SQM	<i>Fault Feedback Air Actuator</i>	<i>Error in the key value of the main loop meter</i>	
81	03	SQM	<i>Fault Feedback Air Actuator</i>	No feedback for max. number	
82	#	SQM	Fault Feedback Gas (Oil) Actuator	Basic unit has detected wrong state of the gas actuator	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
82	01	SQM	<i>Fault Feedback Gas (Oil) Actuator</i>	CRC error	
82	02	SQM	<i>Fault Feedback Gas (Oil) Actuator</i>	<i>Error in the key value of the main loop meter</i>	
82	03	SQM	<i>Fault Feedback Gas (Oil) Actuator</i>	No feedback for max. number	
83	#	SQM	Fault Feedback Oil Actuator	Basic unit has detected wrong state of the oil actuator	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. Replace the defective actuator
83	01	SQM	<i>Fault Feedback Oil Actuator</i>	CRC error	
83	02	SQM	<i>Fault Feedback Oil Actuator</i>	<i>Error in the key value of the main loop meter</i>	
83	03	SQM	<i>Fault Feedback Oil Actuator</i>	No feedback for max. number	
84	#	SQM	Fault Feedback Aux Actuator 1	Basic unit has detected wrong state of the auxiliary actuator	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
84	01	SQM	<i>Fault Feedback Aux Actuator 1</i>	CRC error	
84	02	SQM	<i>Fault Feedback Aux Actuator 1</i>	<i>Error in the key value of the main loop meter</i>	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
84	03	SQM	<i>Fault Feedback Aux Actuator 1</i>	No feedback for max. number	
85	#	SQM	<i>Fault Feedback Aux Actuator 2</i>	Basic unit has detected wrong state of the auxiliary actuator	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
85	01	SQM	<i>Fault Feedback Aux Actuator 2</i>	CRC error	
85	02	SQM	<i>Fault Feedback Aux Actuator 2</i>	<i>Error in the key value of the main loop meter</i>	
85	03	SQM	<i>Fault Feedback Aux Actuator 2</i>	No feedback for max. number	
86	#	LC	<i>Fault Feedback Load Controller</i>	Basic unit has detected wrong state of the internal load controller	Improve EMC. Replace the defective unit
86	01	LC	<i>Fault Feedback Load Controller</i>	CRC error	
86	02	LC	<i>Fault Feedback Load Controller</i>	<i>Error in the key value of the main loop meter</i>	
86	03	LC	<i>Fault Feedback Load Controller</i>	No feedback for max. number	
87	#	AZL5	<i>Fault Feedback AZL5</i>	Basic unit has detected wrong state of the AZL52	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the faulty AZL52.
87	01	AZL5	<i>Fault Feedback AZL5</i>	CRC error	
87	02	AZL5	<i>Fault Feedback AZL5</i>	<i>Error in the key value of the main loop meter</i>	
87	03	AZL5	<i>Fault Feedback AZL5</i>	No feedback for max. number	
88	#	All		Plausibility fault NMT	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit (see diagnostic code) or the basic unit
88	01	SQM	<i>Fault Feedback Actuator</i>	Undefined fault class of SQM4	
88	02	LC	<i>Fault Feedback Load Controller</i>	Undefined fault class of load controller	


Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
88	03	AZL5	Fault Feedback AZL5	Undefined fault class of AZL5	
88	04	VSD module	Fault Feedback VSD Module	Undefined fault class of VSD module	
88	05	O2M	Fault Feedback O2 Module	Undefined fault class of O2 module	
90	---	SQM	Fault Feedback Aux Actuator 3	Basic unit has detected a ROM-CRC error on the auxiliary actuator 3 when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
91	---	SQM	Fault Feedback Air Actuator	Basic unit has detected a ROM-CRC error on the air actuator when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
92	---	SQM	Fault Feedback Gas (Oil) Actuator	Basic unit has detected a ROM-CRC error on the gas actuator when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
93	---	SQM	Fault Feedback Oil Actuator	Basic unit has detected a ROM-CRC error on the oil actuator when checking its feedback signal	Check CAN cabling and terminators as specified. Improve EMC. Replace the defective actuator
94	---	SQM	Fault Feedback Aux Actuator 1	Basic unit has detected a ROM-CRC error on the auxiliary actuator when checking its feedback signal	Check CAN cabling and terminators as specified If fault occurs sporadically: Improve EMC If fault occurs constantly: Replace the defective actuator
95	---	SQM	Fault Feedback Aux Actuator 2	Basic unit has detected a ROM-CRC error on the auxiliary actuator when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
96	---	LC	Fault Feedback Load Controller	Basic unit has detected a ROM-CRC error on the load controller when checking its feedback signal	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective basic unit




Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
97	---	AZL5	Fault Feedback AZL5	Basic unit has detected a ROM-CRC error on the AZL52 when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective AZL52.
98	---	All	Fault two equal Addresses	There are several components with the same address on the CAN bus (CAN overflow)	Check to see if several users (e.g. actuators) with the same address are connected to the CAN bus and rectify (e.g. readdressing the actuators)
99	---	All		CAN bus OFF A CAN bus user (SQM, PLL52) switches the CAN bus to OFF mode	Check CAN cabling. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit Disconnect the actuators and the PLL52 bus plug, reset the LMV5 → if other faults are displayed, reconnect the CAN users one by one until the fault occurs again. Check power supply on the CAN user causing the fault. If power supply 2 x AC 12 V is ok, replace the unit. If the fault occurs only with AZL5 and LMV5, make the test with another AZL5 first
9A	---	All	Internal Fault Basic Unit	CAN warning level. Fault probably occurred when connecting or disconnecting a CAN bus user	Check CAN cabling. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
9B	#	All	Internal Fault Basic Unit	Overflow of CAN queue	Check CAN cabling. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
9B	01	All	Internal Fault Basic Unit	Overflow of RX queue	
9B	02	All	Internal Fault Basic Unit	Overflow of TX queue	
A0	#	SQM		Auxiliary actuator 3 has detected a fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
A0	See A1	See A1	Internal Fault Auxiliary Actuator 3	See A1	See A1
A1	#	SQM		Air actuator has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A1	01	SQM	Internal Fault Air Actuator	CRC fault during ROM test	
A1	02	SQM	Internal Fault Air Actuator	CRC fault during RAM test	
A1	04	SQM	Internal Fault Air Actuator	Fault during key value check	
A1	05	SQM	Internal Fault Air Actuator	Error code for time block overflow	
A1	07	SQM	Internal Fault Air Actuator	Sync fault or CRC fault	
A1	08	SQM	Internal Fault Air Actuator	Error code for main loop counter	
A1	09	SQM	Internal Fault Air Actuator	Fault during stack test	
A1	0C	SQM	Overtemperature Air Actuator	Temperature warning and shutdown	Check housing temperature (max. 60 °C)
A1	0D	SQM	Internal Fault Air Actuator	Actuator turns in the wrong direction	This fault can be caused by mechanical blocking of the drive shaft. Check to ensure that mechanical parts operate smoothly also under extreme temperature conditions
A1	0E	SQM	Ramp time too short Air Actuator	Actuator operates with too short a ramp time, or with a rotation angle that is too large for the ramp time	Recommendation: 1. Match ramp time to the slowest actuator in the system (SQM48.4/SQM48.6), OR 2. Reduce the actuator's rotation angle between special positions (load stages with multistage operation) based on rotation angle = $90^\circ * \text{ramp time} / (90^\circ \text{ running time of the actuator})$
A1	10	SQM	Internal Fault Air Actuator	Timeout during A/D conversion	
A1	11	SQM	Internal Fault Air Actuator	Fault during ADC test	
A1	12	SQM	Internal Fault Air Actuator	Fault during A/D conversion	
A1	13	SQM	Position Fault Air Actuator	Actuator is outside the valid angular rotation (0-90°) or linearization data are faulty	Check to see if actuator is within the valid positioning range (0...90°)
A1	15	SQM	Internal Fault Air Actuator	CAN fault	Check CAN wiring
A1	16	SQM	Internal Fault Air Actuator	CRC fault of a parameter page	
A1	17	SQM	Internal Fault Air Actuator	Page too long open	Reset the unit.
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A1	18	SQM	Internal Fault Air Actuator	Page disrupted	Reset the unit.
					 Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit
A1	19	SQM	Internal Fault Air Actuator	Invalid parameter access	Reset the unit.
					 Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters Otherwise, replace the defective basic unit
A1	1B	SQM	Internal Fault Air Actuator	Fault during copying of parameter page	Reset the unit.
					 Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit
A1	1E	SQM	Internal Fault Air Actuator	External plausibility fault. This type of fault covers possible faults occurring due to invalid presettings in the drive commands. In response, the presettings will be ignored	Check the special positions to see if value range is valid (0...90°)
A1	1F	SQM	Internal Fault Air Actuator	Internal plausibility fault. This type of fault covers possible faults that can occur due to strong EMC impact	
A2	#	SQM		Gas actuator has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A2	See A1	See A1	Internal Fault Gas Actuator	See A1	See A1
A3	#	SQM		Oil actuator has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
A3	See A1	See A1	Internal Fault Oil Actuator	See A1	See A1
A4	#	SQM		Auxiliary actuator 1 has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
A4	See A1	See A1	Internal Fault Auxiliary Actuator 1	See A1	See A1
A5	#	SQM		Auxiliary actuator 2 has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective actuator
A5	See A1	See A1	Internal Fault Auxiliary Actuator 2	See A1	See A1
A6	#	LC		Internal load controller has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	
A6	10	LC	<i>No actual Value Slope at End of Identification</i>		If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	12	LC	<i>Adaption invalid</i>	Invalid XP identified	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	13	LC	<i>Adaption invalid</i>	Invalid TN identified	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	14	LC	<i>Adaption invalid</i>	TU longer than identification time	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	15	LC	<i>Adaption invalid</i>	Invalid TV identified	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	16	LC	<i>Timeout with Adaption</i>	Timeout during observation time	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	17	LC	<i>Cold Start thermal Shock Protection active</i>		If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	18	LC	<i>Timeout with Adaption</i>	Timeout during delivery of adaption rate and while process is being watched	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	22	LC	<i>Setpoint Temp Controller above maximum Limit</i>		If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	30	LC	<i>Internal Fault Load Controller</i>	EEPROM does not respond within the expected period of time	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	31	LC		Max. number of EEPROM attempts exceeded	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	32	LC	<i>Internal Fault Load Controller</i>	Fault during opening of page	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	33	LC	<i>Internal Fault Load Controller</i>	Invalid CRC when reading a page	Reset the unit, repeat backup restore if necessary
A6	34	LC	<i>Internal Fault Load Controller</i>	Page cannot be set to FINISH	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	35	LC	<i>Internal Fault Load Controller</i>	No access to PID after identification	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	36	LC	<i>Internal Fault Load Controller</i>	No access to PID Standard after identification	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	37	LC	<i>Internal Fault Load Controller</i>	No reading of EEPROM at identification fault	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	38	LC	<i>Internal Fault Load Controller</i>	No EEPROM write access for PID possible	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	39	LC	<i>Internal Fault Load Controller</i>	No EEPROM write access for PID Standard possible	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	3A	LC	<i>Internal Fault Load Controller</i>	No access if reception via COM	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	3B	LC	<i>Internal Fault Load Controller</i>	Invalid page access	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
					Reset the unit
A6	40	LC	<i>Internal Fault Load Controller</i>	Page too long open	 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	41	LC	<i>Internal Fault Load Controller</i>	Invalid phase during parameterization of the safety-related page P_TW	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	42	LC	<i>Internal Fault Load Controller</i>	Invalid phase during parameterization of the safety-related page P_STATUS	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	43	LC	<i>Internal Fault Load Controller</i>	Invalid phase during parameterization of the safety-related page P_SYSTEM	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	44	LC	<i>Internal Fault Load Controller</i>	Page has been set to ABORT	Reset the unit
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
A6	45	LC	<i>Parameter Backup Restore</i>	Page has been set to RESTO	Reset the unit.
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters Otherwise, replace the defective basic unit</p>
A6	46	LC	<i>Internal Fault Load Controller</i>	Page has an invalid status	Reset the unit.
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
A6	4A	LC	<i>Internal Fault Load Controller</i>	CAN error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	4B	LC	<i>Internal Fault Load Controller</i>	CAN error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	4C	LC	<i>Internal Fault Load Controller</i>	CAN error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	4D	LC	Internal Fault Load Controller	CAN error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	4E	LC	Internal Fault Load Controller	CAN error	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	50	LC	Short-circuit Pt100 Sensor	Short-circuit sensor PT100 (X60 pin 1 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	51	LC	Open-circuit Pt100 Sensor	Open-circuit sensor PT100 (X60 pin 1 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	52	LC	Open-circuit Pt 100 Sensor (Line Compens)	Open-circuit compensation line of sensor PT100 (X60 pin 2 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	53	LC	Short-circuit Pt1000 Sensor	Short-circuit sensor PT1000 (X60 pin 3 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	54	LC	Open-circuit PT1000 Sensor	Open-circuit sensor PT1000 (X60 pin 3 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	55	LC	Short-circuit Ni1000 Sensor	Short-circuit sensor Ni1000 (X60 pin 3 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	56	LC	Open-circuit Ni1000 Sensor	Open-circuit sensor Ni1000 (X60 pin 3 X60 pin 4)	Check wiring and sensor <i>or increase parameter MeasureRangePtNi</i>
A6	57	LC	Overvoltage at Input 2	Overvoltage at input 2 (X61)	Check wiring and sensor
A6	58	LC	Open-circuit / Short-circuit at Input 2	Open-circuit / short-circuit input 2 (X61)	Check wiring and sensor
A6	59	LC	Overvoltage at Input 3	Overvoltage at input 3 (X62)	Check wiring and sensor
A6	5A	LC	Open-circuit / Short-circuit at Input 3	Open-circuit / short-circuit input 3 (X62)	Check wiring and sensor
A6	5B	LC	Output Value for Analog Output not available	Selected output value for analog output is not available in the current configuration	Check setting Sensor selection and Output value selection Also refer to Basic Documentation P7550
A6	5C	LC	Sensor for FGR not available	The selected sensor for flue gas recirculation is not available in the current configuration	Check setting FGR sensor selection. Also refer to Basic Documentation P7550
A6	60	LC	Internal Fault Load Controller	Timeout during calibrate_ADC	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	61	LC	Internal Fault Load Controller	Timeout during read_conversion	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	62	LC	Internal Fault Load Controller	Timeout during calibrate_ADC	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	63	LC	Internal Fault Load Controller	Fault during RedInv reading from A/D converter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	64	LC	Internal Fault Load Controller	Fault internal A/D converter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	65	LC	Internal Fault Load Controller	Gain register has been changed	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	66	LC	Internal Fault Load Controller	Offset register has been changed	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	67	LC	Internal Fault Load Controller	Too great / small gain for self-calibration of A/D converter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	68	LC	Internal Fault Load Controller	Too great / small offset for self-calibration of A/D converter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	69	LC	Internal Fault Load Controller	Fault internal A/D converter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6A	LC	Internal Fault Load Controller	Fault during PWM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6B	LC	Internal Fault Load Controller	Faulty reference voltage	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6C	LC	Internal Fault Load Controller	Fault transmitter power supply	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6D	LC	Internal Fault Load Controller	Fault analog output, voltage deviation too great	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6E	LC	Internal Fault Load Controller	Fault during resistance test PT100 input (X60)	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	6F	LC	Internal Fault Load Controller	Fault during diode test PT100 input	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	70	LC	Internal Fault Load Controller	Measured value varies too much: Concerns: PT100 sensor (X60)	Check wiring of input
A6	71	LC	Internal Fault Load Controller	Measured value varies too much: Concerns: PT100 line (X60)	Check wiring of input
A6	72	LC	Internal Fault Load Controller	Measured value varies too much: Concerns: PT1000 (X60)	Check wiring of input
A6	73	LC	Internal Fault Load Controller	Measured value varies too much: Concerns: PWM	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	74	LC	Internal Fault Load Controller	Measured value varies too much: Concerns: Voltage measurement input 2 (X61)	Check wiring of input. Check input voltage value for humming voltages

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	75	LC	<i>Internal Fault Load Controller</i>	Measured value varies too much: Concerns: Current measurement input 2 (X61)	Check wiring of input. Check input voltage value for humming voltages
A6	76	LC	<i>Internal Fault Load Controller</i>	Measured value varies too much: Concerns: Voltage measurement input 3 (X62)	Check wiring of input. Check input voltage value for humming voltages
A6	77	LC	<i>Internal Fault Load Controller</i>	Measured value varies too much: Concerns: Current measurement input 3 (X62)	Check wiring of input. Check input voltage value for humming voltages
A6	78	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity PT100 sensor (X60)	Check wiring of input
A6	79	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity PT100 line (X60)	Check wiring of input
A6	7A	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity PT1000 (X60)	Check wiring of input
A6	7B	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity PWM	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	7C	LC		Excessive voltage value or wrong polarity voltage measurement input 2 (X61)	Check wiring of input. Check input voltage value
A6	7D	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity current measurement input 2 (X61)	Check wiring of input. Check input actual value
A6	7E	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity voltage measurement input 3 (X62)	Check wiring of input. Check input voltage value
A6	7F	LC	<i>Internal Fault Load Controller</i>	Excessive voltage value or wrong polarity current measurement input 3 (X62)	Check wiring of input. Check input actual value
A6	80	LC	<i>Internal Fault Load Controller</i>	Fault during internal multiplexer test PT100 sensor	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	81	LC	<i>Internal Fault Load Controller</i>	Fault during internal multiplexer test PT100 line	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	82	LC	<i>Internal Fault Load Controller</i>	Fault during internal multiplexer test PT100	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	90	LC	<i>Internal Fault Load Controller</i>	Max. number of synchronization failures exceeded	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit



Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	91	LC	<i>Internal Fault Load Controller</i>	Wrong CRC with synchronizations object	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	92	LC	<i>Internal Fault Load Controller</i>	Wrong CRC with <i>synchronizations</i> object	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	93	LC	<i>Internal Fault Load Controller</i>	Main loop counter does not agree with LMV5	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	96	LC	<i>Internal Fault Load Controller</i>	Fault during multiplexer test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	97	LC	<i>Internal Fault Load Controller</i>	Paraccess with FINISH unsuccessful	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	9B	LC	<i>Internal Fault Load Controller</i>	Fault PageAccess, invalid access status	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	9C	LC	<i>Internal Fault Load Controller</i>	Fault voltage monitor test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	9E	LC	<i>Internal Fault Load Controller</i>	Fault during readout of PDO message	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A0	LC	<i>Internal Fault Load Controller</i>	XP smaller than min. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A1	LC	<i>Internal Fault Load Controller</i>	XP larger than max. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A2	LC	<i>Internal Fault Load Controller</i>	TN smaller than min. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A3	LC	<i>Internal Fault Load Controller</i>	TN larger than max. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A4	LC	<i>Internal Fault Load Controller</i>	TV smaller than min. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A5	LC	<i>Internal Fault Load Controller</i>	TV larger than max. value	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A6	LC	<i>Internal Fault Load Controller</i>	Parameter outside the permissible range	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	A7	LC	<i>Inadmissible Selection aux Sensor Cold Start</i>	Inadmissible selection of the auxiliary sensor	When using the auxiliary sensor for the cold start, a temperature or pressure sensor must be selected at input 2. Parameter: Sensor Selection (TempSensor, PressSensor)
A6	B0	LC	<i>Internal Fault Load Controller</i>	Red/Inv fault with float variables	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit





Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A6	B1	LC	Internal Fault Load Controller	Red/Inv fault of a Red/Inv variable	If fault occurs sporadically: Improve EMC. Check to see if only ONE function has been assigned to the connected temperature sensors (boiler temperature, extra temperature for cold start shock protection, or flue gas temperature for flue gas recirculation). If fault occurs constantly: Replace the defective unit
A6	B2	LC	Internal Fault Load Controller	Fault during key value check	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B4	LC	Internal Fault Load Controller	Fault in fault routine	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B5	LC	Internal Fault Load Controller	Unplausible software interrupt	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B6	LC	Internal Fault Load Controller	Time block too long: Time block 0	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B7	LC	Internal Fault Load Controller	Time block too long: Time block 1	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B8	LC	Internal Fault Load Controller	Time block too long: Time block 2	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	B9	LC	Internal Fault Load Controller	Time block too long: Time block 3	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	BA	LC	Internal Fault Load Controller	Time block too long: Time block 4	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	BB	LC	Internal Fault Load Controller	Time block too long: Time block 5	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	BC	LC	Internal Fault Load Controller	Time block too long: Time block 6	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	BD	LC	Internal Fault Load Controller	Time block too long: Time block 7	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace defective unit
A6	C0	LC	Internal Fault Load Controller	CRC fault in page	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	E0	LC	Internal Fault Load Controller	Identpower	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	E1	LC	Internal Fault Load Controller	Controller parameter KP	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	E2	LC	Internal Fault Load Controller	Scanning time	If fault occurs sporadically: Improve EMC.

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					If fault occurs constantly: Replace the defective unit
A6	EA	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	EB	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	EC	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	ED	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	EE	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	EF	LC	<i>Internal Fault Load Controller</i>	Invalid branch in EEPROM module()	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F0	LC	<i>Internal Fault Load Controller</i>	Fault during ROM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F1	LC	<i>Internal Fault Load Controller</i>	Fault during RAM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F2	LC	<i>Internal Fault Load Controller</i>	Fault during RAM test, register bank 0	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F3	LC	<i>Internal Fault Load Controller</i>	Fault during RAM test, IDATA range	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F4	LC	<i>Internal Fault Load Controller</i>	Fault during RAM test, XDATA range	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F5	LC	<i>Internal Fault Load Controller</i>	Stack pointer does not point at stack	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	F6	LC	<i>Internal Fault Load Controller</i>	Stack overflow	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	FE	LC	<i>Internal Fault Load Controller</i>	Fault messages in fault management	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A6	FF	LC	<i>Internal Fault Load Controller</i>	Fault messages in fault management	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A7	#	AZL5		AZL52 has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	Check CAN cabling and terminators as specified. Observe instructions given below, and: If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective AZL52.

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A7	01	AZL5	Internal Fault AZL	CRC fault during ROM test	
A7	02	AZL5	Internal Fault AZL	CRC fault during RAM test	
A7	03	AZL5	Internal Fault AZL	Fault during stack test	
A7	04	AZL5	Internal Fault AZL	Fault during key value check	
A7	05	AZL5	Internal Fault AZL	Time block overflow	
A7	07	AZL5	Internal Fault AZL	Sync fault or CRC fault	
A7	08	AZL5	Internal Fault AZL	Fault main loop counter	
A7	09	AZL5	Manual Lockout AZL	Fault message for emergency off function via AZL52	
A7	0A	AZL5	Internal Fault AZL	Invalid AZL52 page	
A7	0B	AZL5	>250,000 startups, service required		
A7	0C	AZL5	Internal Fault AZL	Save fault parameter	
A7	0D	AZL5	Menu for firing on oil. Current Fuel is Gas	Fuel changeover from oil to gas	Change to GasSettings menu
A7	0E	AZL5	Menu for firing on gas. Current Fuel is Oil	Fuel changeover from gas to oil	Change to OilSettings menu
A7	15	AZL5	Internal Fault AZL	CAN queue fault	
A7	16	AZL5	Internal Fault AZL	CAN overflow fault	
A7	17	AZL5	Internal Fault AZL	CAN bus off A CAN bus user (SQM, PLL52) switches the CAN bus to OFF mode	Check power supply, fuses and wiring. Disconnect the actuators and the PLL52 bus plug, reset the LMV5 → if other faults are displayed, reconnect the CAN users one by one until the fault occurs again. Check power supply on the CAN user causing the fault. If power supply 2 x AC 12 V is ok, replace the unit. If the fault occurs only with AZL5 and LMV5, make the test with another AZL5 first
A7	18	AZL5	Internal Fault AZL	CAN warning level	
A7	1A	AZL5	Internal Fault AZL	EEPROM fault	If the error occurs in phase 22 together with a VSD, check / change wiring of the VSD
A7	1B	AZL5	No valid Parameter Backup	Fault during copying of a parameter page	Reset the unit, repeat backup restore if necessary
A7	1C	AZL5	Internal Fault AZL	Page in EEPROM was disrupted, has been restored	
A7	20	AZL5	Internal Fault AZL	Display fault	
A7	22	AZL5	Internal Fault AZL	RTC is locked, permanently busy	
A7	24	AZL5	Internal Fault AZL	Buffer for page copies too small	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A7	28	AZL5	Internal Fault AZL	Time stamp could not be sent	
A7	30	AZL5	Fault Communication eBUS	Fault in connection with eBUS communication	
A7	38	AZL5	Internal Fault AZL	Interface mode could not be terminated	
A7	40	AZL5	Communication AZL with PC tool	Parameterization fault PC tool. Disclosed by key value check in AZL5	
A7	88	AZL5	Internal Fault AZL	RAM fault with redundant inverse variables	
A7	89	AZL5	Internal Fault AZL	Program run fault, execution of program code that will probably never be executed	
A7	8A	AZL5	Internal Fault AZL	Unintentional watchdog reset	
A9	#	VSD module	Fault VSD Module	VSD module has detected own fault and reported it to the basic unit. Type of fault: See diagnostic code	
A9	01	VSD module	Internal Fault VSD Module	CRC fault during ROM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	02	VSD module	Internal Fault VSD Module	CRC fault during RAM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	04	VSD module	Internal Fault VSD Module	Fault during key value check	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	05	VSD module	Internal Fault VSD Module	Error code for time block overflow	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	07	VSD module	Internal Fault VSD Module	Sync fault or CRC fault	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	08	VSD module	Internal Fault VSD Module	Error code for main loop counter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	09	VSD module	Internal Fault VSD Module	Fault during stack test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	0A	VSD module	Internal Fault VSD Module	Max IRQ speed reached	Possibly electromagnetic interference on the line to the speed sensor, check cable routing, use shielding If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace defective unit


Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A9	0C	VSD module	Alarm from VSD	VSD reports a fault to the VSD module	Fault has been triggered by the VSD. Read VSDs error code. Check VSD settings (ramps, motor settings), increase ramp time on VSD and LMV5, if necessary. Check combination VSD / motor size
A9	0D	VSD module	Control Range Limitation VSD Module	VSD module could not offset speed differential within its control limits	Check to see if the current interfaces of VSD and VSD module use the same setting (0/4...20 mA). Standardize the speed.  Note! After standardizing the speed □-> check setting of combustion mixture!
A9	0E	VSD module	Internal Fault VSD Module	Fault during the speed calculation test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
A9	15	VSD module	Internal Fault VSD Module	CAN bus fault, disturbed CAN bus transmissions	If fault occurs sporadically: Check CAN bus wiring. Improve EMC. Check terminating resistors and correct, if necessary
A9	16	VSD module	Internal Fault VSD Module	CRC fault of a parameter page	Reset the unit.  Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit
A9	17	VSD module	Internal Fault VSD Module	Page too long open	Reset the unit.

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					 <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
A9	18	VSD module	Internal Fault VSD Module	Page disrupted	<p>Reset the unit.</p>  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit.</p>
A9	19	VSD module	Internal Fault VSD Module	Invalid access to parameters	<p>Reset the unit.</p>  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
A9	1B	VSD module	Internal Fault VSD Module	Fault when copying a parameter page	<p>Reset the unit.</p>  <p>Warning! If fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5... parameters. Otherwise, replace the defective basic unit</p>
A9	1E	VSD module	Internal Fault VSD Module	External plausibility fault. This type of fault covers possible faults occurring due to invalid presettings in the drive commands. In response, the presettings will be ignored	<p>Check the special positions for valid value range (0...100%)</p>

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
A9	1F	VSD module	Internal Fault VSD Module	Internal plausibility fault. This type of fault detects faults that cannot practically occur	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
AB	#	O2M	Fault O2 Module	The O2 module has detected own fault and reported it to the basic unit	
AB	01	O2M	Internal Fault O2 Module	CRC fault during ROM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	02	O2M	Internal Fault O2 Module	CRC fault during RAM test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	04	O2M	Internal Fault O2 Module	Fault during key value check	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	05	O2M	Internal Fault O2 Module	Error code for time block overflow	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	07	O2M	Internal Fault O2 Module	Sync fault or CRC fault	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	08	O2M	Internal Fault O2 Module	Error code for main loop counter	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	09	O2M	Internal Fault O2 Module	Fault during stack test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	0A	O2M	Internal Fault O2 Module	Feedback values invalid	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	10	O2M	Unplaus Value Nernst Voltage O2 Module	Nernst voltage outside the valid range	Check the connection (correct polarity, short-circuit)
AB	12	O2M	Unplaus Value Thermocouple O2 Module	Thermocouple voltage outside the valid range	Check connections (polarity, short-circuit, open-circuit). Check power supply to the O2 module. Check fuse F2 on the O2 module. Check heating control on the QGO.
AB	13	O2M	Unplaus Value Compensation Element	Compensation element voltage outside the valid range	Check connections (polarity, short-circuit, open-circuit). Check housing temperature of the QGO (temperature inside - 25...120 °C)
AB	15	O2M	Unplaus Value Flue Gas Temp O2 Module	Temperature of combustion air sensor outside the valid range (-20...800 °C)	Check connections (short-circuit, open-circuit). Check ambient temperature

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
AB	16	O2M	<i>Unplaus Value Flue Gas Temp O2 Module</i>	Temperature of flue gas sensor outside the valid range (-20...800 °C)	Check connections (short-circuit, open-circuit).
AB	17	O2M	<i>Internal Fault O2 Module</i>	Fault during combustion air temperature sensor test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	18	O2M	<i>Internal Fault O2 Module</i>	Fault during thermocouple test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	19	O2M	<i>Internal Fault O2 Module</i>	Fault during compensation element test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	1A	O2M	<i>Internal Fault O2 Module</i>	Fault during channel comparison of O2 signal	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	1B	O2M	<i>Internal Fault O2 Module</i>	Fault ADC test voltages	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	20	O2M	<i>O2 Sensor Temp too low</i>	Temperature of QGO measuring cell too low	Check mains power supply on O2 module. Check fuse F2 on O2 module. Check connection between O2 module and QGO heating
AB	21	O2M	<i>O2 Sensor Temp too high</i>	Temperature of QGO measuring cell too high	Check QGO temperature
AB	22	O2M	<i>Internal Fault O2 Module</i>	Fault during calculation test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	23	O2M	<i>Unplaus Value Ri O2 Measuring Cell</i>	Measured internal resistance of the QGO measuring cell is smaller than 5 Ohm or greater than 150 Ohm	Check electrical connection (polarity, short-circuit). If fault occurs after more than 1 year, QGO may have reached the end of its service life -> replace
AB	24	O2M	<i>Response Time O2 Measuring Cell too long</i>	Measured response time of the QGO measuring cell exceeds 5 s	Check mounting position of QGO. Check to see if QGO is dirty. If error occurs after more than 1 year, QGO may have reached end of its service life -> replace
AB	25	O2M	<i>O2 Sensor Test aborted by O2 Module</i>	Fault occurred during O2 sensor test	Check fluctuations of the O2 value
AB	30	O2M	<i>Internal Fault O2 Module</i>	CAN fault	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
AB	31	O2M	<i>Internal Fault O2 Module</i>	CRC fault of a parameter page	Reset the unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					<p>Warning!</p> <p>If fault occurred during parameterization: Check the parameters changed last.</p> <p>If fault cannot be rectified by the reset: Restore AZL5 parameters.</p> <p>Otherwise, replace the defective O2 module</p>
AB	32	O2M	Internal Fault O2 Module	Page too long open	<p>Reset the unit.</p> <p>Warning!</p> <p>If fault occurred during parameterization: Check the parameters changed last.</p> <p>If fault cannot be rectified by the reset: Restore AZL5 parameters.</p> <p>Otherwise, replace the defective O2 module</p>
AB	33	O2M	Internal Fault O2 Module	Page disrupted	<p>Reset the unit.</p> <p>Warning!</p> <p>If fault occurred during parameterization: Check the parameters changed last.</p> <p>If fault cannot be rectified by the reset: Restore AZL5 parameters.</p> <p>Otherwise, replace the defective O2 module</p>
AB	34	O2M	Internal Fault O2 Module	Invalid access to parameters	<p>Reset the unit.</p> <p>Warning!</p> <p>If fault occurred during parameterization: Check the parameters changed last.</p> <p>If fault cannot be rectified by the reset: Restore AZL5 parameters.</p> <p>Otherwise, replace the defective O2 module</p>
AB	38	O2M	Internal Fault O2 Module	Fault during copying of a parameter page	<p>Reset the unit.</p> <p>Warning!</p> <p>If fault occurred during parameterization: Check the parameters changed last.</p> <p>If fault cannot be rectified by the reset: Restore AZL5 parameters.</p> <p>Otherwise, replace the defective O2 module</p>

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
AB	3E	O2M	Internal Fault O2 Module	External plausibility fault. This type of fault covers possible faults occurring due to invalid presettings in the drive commands. In response, the presettings will be ignored	Reset the unit.
					 Warning! If this fault occurred during parameterization: Check the parameters changed last. If fault cannot be rectified by the reset: Restore AZL5 parameters. Otherwise, replace the defective O2 module
AB	3F	O2M	Internal Fault O2 Module	Internal plausibility fault. This type of fault covers possible errors that cannot practically occur	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
B0	#	LMV5		Fault during test of port outputs	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
B0	01	LMV5	Internal Fault Basic Unit	Fault when resetting the set outputs	
B0	02	LMV5	Internal Fault Basic Unit	Fault during ZR test	
B1	01	LMV5		Fault during short-circuit test between inputs and outputs	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
B5	#	LMV5		O2 monitor	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
B5	01	LMV5	Below O2 Min Value	O2 value has dropped below O2 min. value	Check setting of the ratio control curve. Increase interval between O2 setpoint and O2 min. value
B5	02	LMV5	O2 Min Values undefined	Invalid O2 min. value	Define all O2 min. values
B5	03	LMV5	O2 Setpoints undefined	Invalid O2 setpoint	Define all O2 setpoints
B5	04	LMV5	O2 Delay Time undefined	Invalid O2 delay time	Adaption at curvepoint 2 or at the highest curvepoint has not been made. Set these curvepoints
B5	05	LMV5	Actual O2 Value invalid	No valid actual O2 value in operation for ≥ 3 s	O2 module and O2 sensor must be correctly connected. Mains power supply to the QGO must be connected
B5	06	LMV5	O2 Value Prepurging not reached	During prepurging, the parameterized air oxygen content of $\pm 2\%$ was not reached	At the end of prepurging, the parameterized O2 content air must be reached. <i>Prepurging must not be sufficiently long for the air to reach the O2 content in the flueways.</i> The value must have been parameterized at an air oxygen content of 20.9%. If fault occurs after more than 1 year, QGO may have reached the end of its service life -> replace
B5	07	LMV5	O2 Value in Operation too high	During operation, an O2 value of 15% or the O2 maximum curve was exceeded	Check mechanical and electrical mounting of the QGO sensor

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
				(depending on the setting for the O2 maximum value monitoring)	
B5	08	LMV5	O2 parameter/O2 curve points not defined	The curves for minimum/maximum O2 values are incomplete or no adaption has yet been carried out to determine the Tau values	Check the specified curves/controller parameters and complete if necessary
B5	09	LMV5	Testing period for minimum O2 values not defined	No value has been specified for the testing period (parameter Time O2 Alarm)	Enter a valid value for the testing period
B5	0A	LMV5	Internal Fault Basic Unit		
BA	01	LMV5	O2 Sensor Test aborted	O2 sensor test was not successful. E.g. reset of O2 module during probe test	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective O2 module
BB	00	LMV5	Service interval reached for O2 sensor test	The O2 trim control is removed and the system moves along the set ratio control curves	Replace O2 sensor or carry out maintenance
BE	#	LMV5		Invalid parameterization of O2 operating mode/flue gas recirculation sensor/COx monitoring	
BE	00	LMV5	O2 operating mode not possible with flue gas recirculation and selected temperatures	An error occurred in connection with the O2 trim control/the O2 alarm and flue gas recirculation functionality	Parameterize O2 operating mode <i>conAutoDeac</i> to O2 controller/ O2 alarm or set flue gas recirculation temperature to X60
BF	---		O2 Control and Limiter automate deactivated	Fault occurred in connection with O2 trim control or with the O2 monitor. It led to automatic deactivation of O2 trim control or the O2 monitor	In the error history, the reason for switching off is entered just before the BF error
C5	#	#	Version Conflict	When comparing the versions of the individual units, the AZL52 has detected old versions	Before replacing any units, start the system and wait about 1 minute (until, after entering the parameter level, the display Parameters will be updated disappears). Then, make a reset. Replace the unit only if the fault message does not disappear. Replace the relevant units by new versions
C5	01...2F	#	Version Conflict	The diagnostic value is made up of the following faults or their combinations (the individual diagnostic codes are added up in hexadecimal format)	

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
C5	01	LMV5	Version Conflict	Software of the basic unit too old	Replace the basic unit
C5	02	LC	Version Conflict	Software of the load controller too old	Replace the basic unit
C5	04	AZL5	Version Conflict	Software of the AZL52 too old	Replace the AZL52 or update its software
C5	08	SQM	Version Conflict	Software of 1 or several actuators too old	Replace the actuator
C5	10	VSD module	Version Conflict	Software of VSD module too old	Replace the basic unit
C5	20	O2	Version Conflict	Software of O2 module too old	Replace the O2 module
D1	#	VSD module	Fault Feedback VSD Module	Basic unit has detected a wrong state of the VSD module. Corresponds to the 8x-faults with the other CAN users	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective module
D1	01	VSD module	Fault Feedback VSD Module	CRC error	
D1	02	VSD module	Fault Feedback VSD Module	Error in the key value of the main loop meter	
D1	03	VSD module	Fault Feedback VSD Module	No feedback for max. number	
D3	#	O2	Fault Feedback O2 Module	Basic unit has detected a wrong stage of the O2 module	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. Replace the defective module
D3	01	O2	Fault Feedback O2 Module	CRC error	
D3	02	O2	Fault Feedback O2 Module	Error in the key value of the main loop meter	
D3	03	O2	Fault Feedback O2 Module	No feedback for max. number	
E1	---	VSD module	Fault Feedback VSD Module	Basic unit has detected a ROM-CRC fault in the VSD module when checking its feedback signal	If fault occurs sporadically: Improve EMC If fault occurs constantly: Replace the defective module
E3	---	O2	Fault Feedback O2 Module	Basic unit has detected a ROM-CRC fault in the O2 module when checking its feedback signal	Check CAN cabling and terminators as specified. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective module
F0	---	LMV5	Internal Fault Basic Unit	Plausibility fault during calculation of interpolation values	If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
F1	#	LMV5	Internal Fault Basic Unit	Internal fault during calculation of precontrol	Check curve setting, check fuel parameters depending on the selected type of fuel
F1	01	LMV5	Internal Fault Basic Unit		
F1	02	LMV5	Internal Fault Basic Unit		
F1	03	LMV5	Internal Fault Basic Unit		
F1	04	LMV5	Internal Fault Basic Unit		
F1	05	LMV5	Internal Fault Basic Unit		
F1	06	LMV5	Internal Fault Basic Unit	Internal fault calculation of precontrol. Undefined value in the curves used for the calculation	
F1	07	LMV5	Internal Fault Basic Unit	Internal fault calculation of precontrol. Undefined value for a type of fuel parameter	
F2	#	LMV5		Code for faulty temperature values from O2 module when calculating the air rate change	
F2	07	LMV5	Internal Fault Basic Unit	O2 module has delivered invalid value	
F2	08	LMV5	Flue Gas Temp too high	Flue gas temperature outside the permissible value range	Set permissible flue gas temperature to a higher level
F2	0A	LMV5	QGO in Heating-up Phase	QGO probe not yet sufficiently heated up	Wait until probe has reached its operating temperature
F3	#	LMV5		O2 trim control fault	
F3	01	LMV5	Missing or faulty Control Parameters	PID parameter for controller algorithm missing	Check the controller parameters
F3	02	LMV5	Missing or faulty O2 controller manipulated variable limitation	The parameters for limiting the O2 controller manipulated variable have not yet been set	Check the parameters for limiting the O2 controller manipulated variable and reset if necessary. Must be observed in particular when copying the parameters from LMV51 / LMV52.2 software version 05.10 and LMV50 / LMV52.4 software version 10.20.
F3	03	LMV5	O2 controller manipulated variable limitation	The O2 controller manipulated variable is limited	Check that the O2 sensor is installed correctly, e.g. leaking exhaust system. Check the settings of the O2 trim control, check that the O2MaxManVariable and O2MinManVariable parameters are set

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
					<i>correctly (Must be observed in particular when copying the parameters from LMV51 / LMV52.2 software version 05.10 and LMV50 / LMV52.4 software version 10.20.)</i>
F3	04	LMV5	O2 curves incomplete	Missing value in the O2 trim control curves	Check for missing values in the curves for the O2 setpoints, O2 ratio control values, O2 standardization values, and O2 minimum values
F3	05	LMV5	Internal Fault Basic Unit		
F3	06	LMV5	Faulty set temperature or supply air temperature	There is no valid supply air temperature for initialization; there was no valid set temperature when the O2 trim control curves were set	Check supply air temperature sensor, check O2 set temperature parameter, reset the O2 curves if the value is invalid
F3	07	LMV5	O2 controller operation locking time for QGO21 too short	The QGO21 requires a longer waiting time than the QGO20 when entering into operation.	Adjust the NumberTauSuspend parameter to 40
F3	08	LMV5	O2 value too high during O2 controller initialization	The O2 controller could not be initialized correctly after entering into operation. Cause: O2 value is too high (greater than approx. 13%)	Check the O2 sensor (malfunction, false air, etc.), startup locking time (NumberTauSuspend parameter) too short
F4	#	O2		A fault occurred in the O2 module in connection with the flue gas recirculation function	
F4	01	O2	Fault with Feedback from O2 Module	The flue gas temperature sensor PLL52...input X86 is selected, but no response is registered on the CAN	Check CAN wiring / power supply PLL52...
F4	15	O2	Implausible supply air temperature value	Temperature of supply air sensor on PLL52 input X87 is outside of the valid range (-20 °C...+800 °C)	Check connection (short circuit, interruption), check ambient temperature
F4	16	O2	Implausible flue gas temperature value	Value of flue gas temperature sensor on PLL52 input X87 is outside of the valid range (-20 °C...+800 °C)	Check connection (short circuit, interruption), check ambient temperature
F5	01	LC	Fault with Feedback from Load Controller	The Pt1000/Ni1000 on the load controller input X60 is selected, but no response is registered on the CAN	Check CAN wiring. If fault occurs sporadically: Improve EMC. If fault occurs constantly: Replace the defective unit
F6	#	LMV5		A fault occurred in connection with the flue gas recirculation function	
F6	01	LC	Flue gas recirculation automatically deactivated	The flue gas recirculation function was automatically deactivated	The cause is entered in the error history directly before fault F6

Error code	Diagnostic code	Device	Display	Meaning for the LMV5x system	Troubleshooting
F6	02	LMV5	<i>Invalid parameterization of flue gas recirculation operating mode/flue gas recirculation sensor</i>	<i>Invalid parameterization of flue gas recirculation operating mode/flue gas recirculation sensor in connection with O2 controller/ O2 alarm</i>	<i>Parameterize flue gas recirculation operating mode TCautoDeact to temp.contr. or set flue gas recirculation temperature to X60</i>

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