SIEMENS



LMV50… / LMV51... / LMV52…

Burner management system for forced draft burners

with the main features:

- Burner control

- Fuel-air-ratio control

- Boiler controller / load controller

LMV50…

with specific functions for industrial applications

LMV52...

with additional O2 Trim Control

Installation Guide

The LMV5 and this Installation Guide are intended for OEMs which integrate the burner controls in their products!

Caution!
Observe the safety notes given in the Basic Documentation of the LMV5 (P7550)!

CC1J7550.1en
22.05.2018

Building Technologies

Supplementary documentation

Product type	Type of documentation	Document number
AZL5	User Documentation AZL5 Modbus	A7550
LMV5	User Documentation Basic diagram for use of LMV5 with 2 types of gases	A7550.1
LMV5	User Documentation Basic diagram for use of LMV5 with 2 types of liquid fuels	A7550.3
LMV5	User Documentation Assembly of VKF41.xxxC gas damper with ASK33.4 mounting kit to the SQM45.295A9 actuator	A7550.4
LMV52	User Documentation COx supervision and control	A7550.5
LMV5	Setting lists	I7550
ACS450	Operating instructions ACS450 PC software for LMV5	J7550
LMV5	Data Sheet LMV5	N7550
LMV5	Basic Documentation LMV5	P7550
LMV5	Product Range Overview In this document, a complete overview is included	Q7550
AZL52 / LMV51	Operating Instruction	U7550
AZL52 / LMV51	Operating Instruction	U7550.1
AZL52 / LMV52	Operating Instruction	U7550.2
AZL52 / LMV52	Operating Instruction	U7550.3
AZL52 / LMV50	Operating Instruction	U7550.4
AZL52 / LMV50	Operating Instruction	U7550.5
SQM45 / SQM48	Data Sheet	N7814
SQM9	Data Sheet	N7818
QGO20	Data Sheet	N7842
QGO20	Basic Documentation	P7842
VGD	Data Sheet	N7631

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1 Connection terminals / coding of connectors

1.1 Connection terminals LMV51.040x1

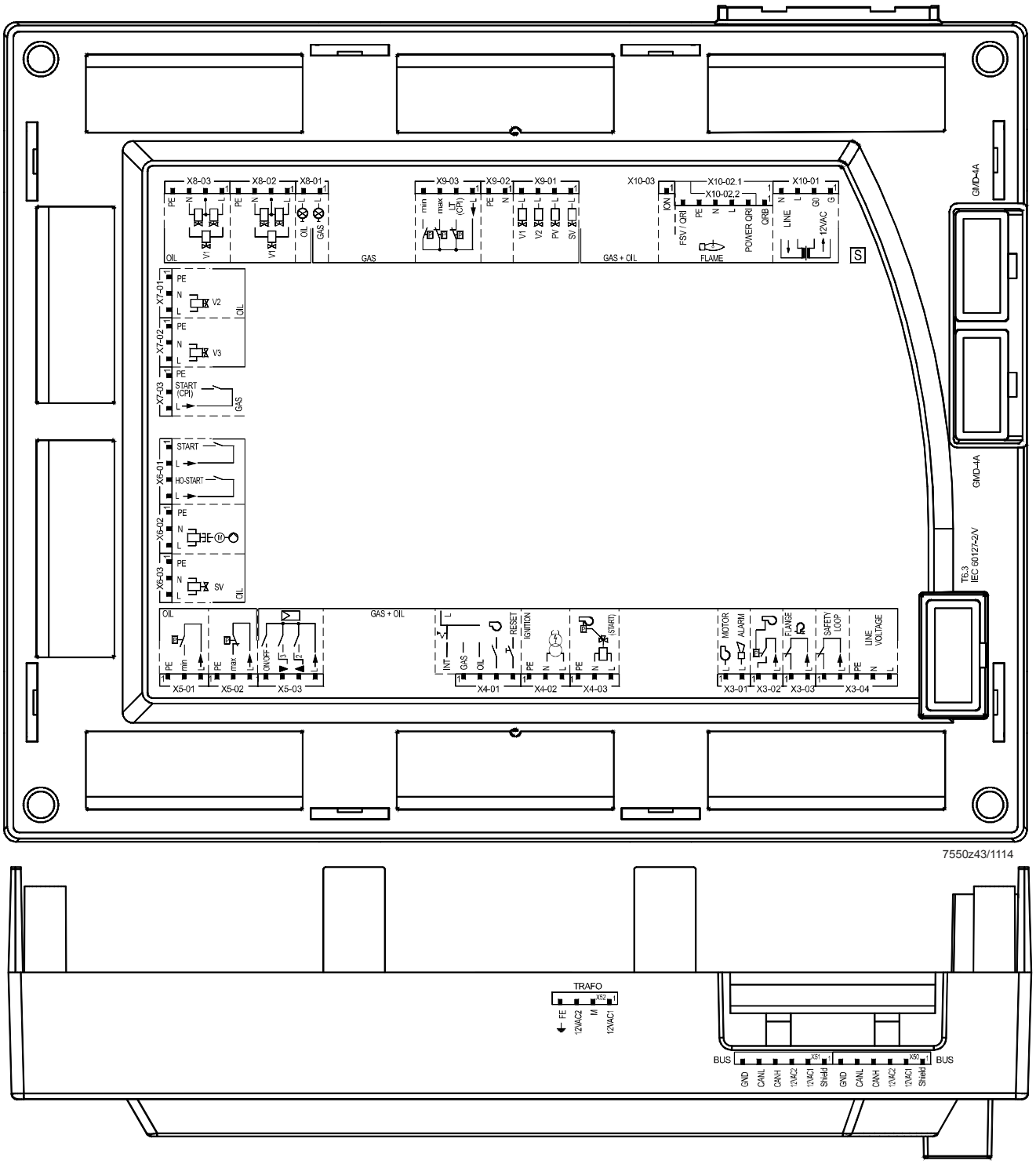


Figure 1: Connection terminals LMV51.040x1

1.2 Connection terminals LMV51.000x1 / LMV51.000x2 / LMV51.040x2

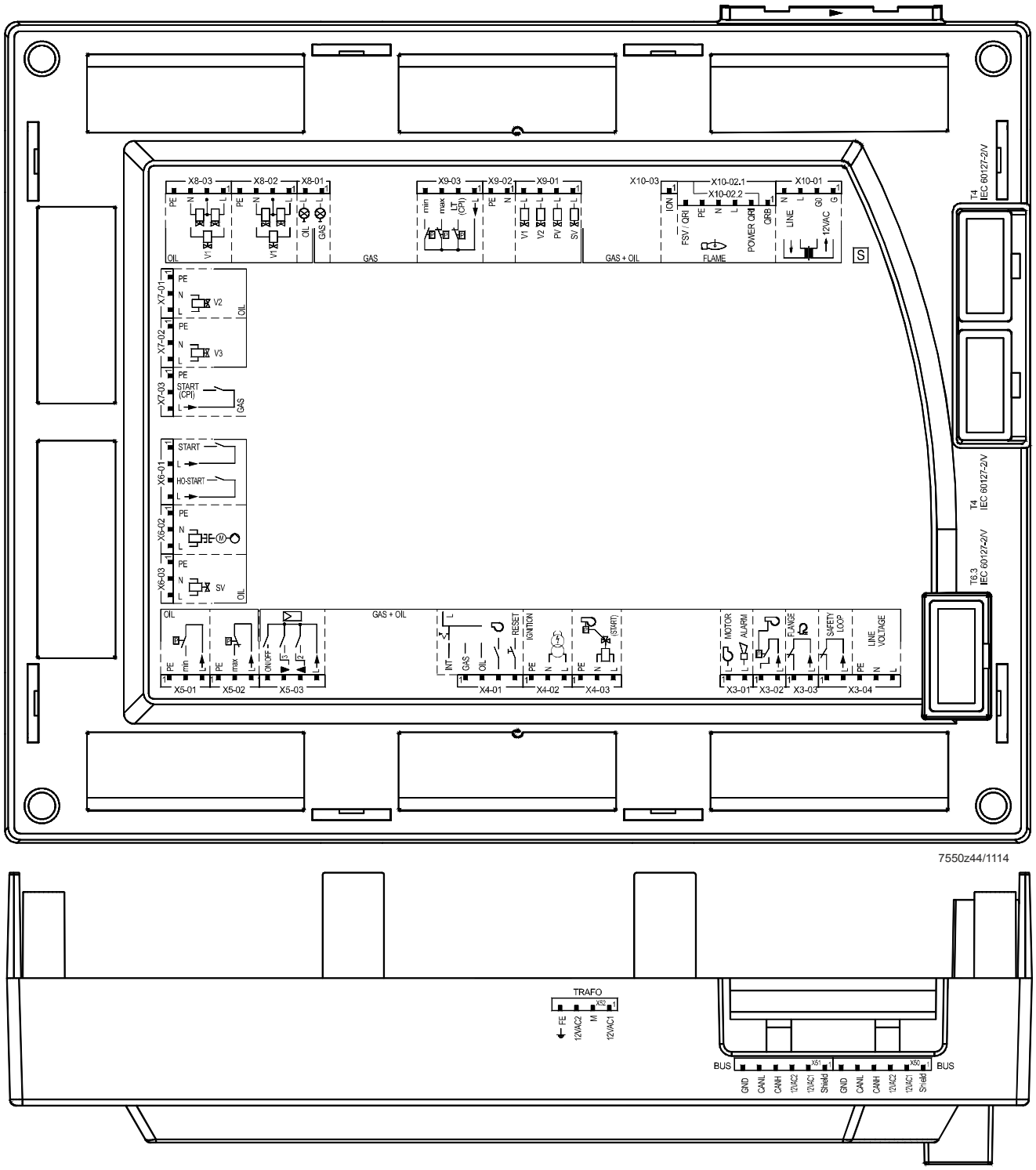


Figure 2: Connection terminals LMV51.000x1 / LMV51.000x2 / LMV51.040x2

1.3 Connection terminals LMV51.140x1

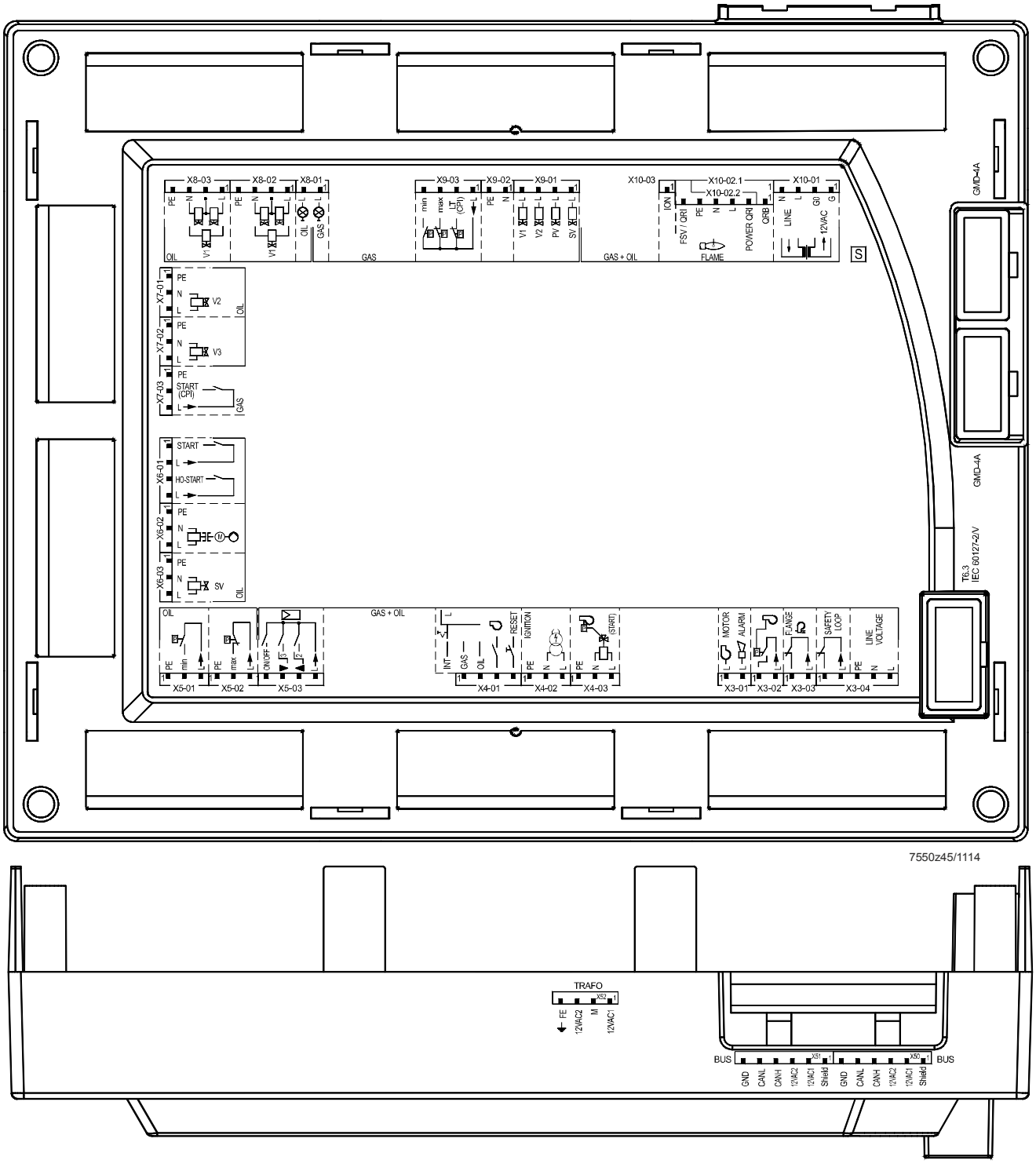


Figure 3: Connection terminals LMV51.140x1

1.4 Connection terminals LMV51.100x1 / LMV51.100x2 / LMV51.140x2

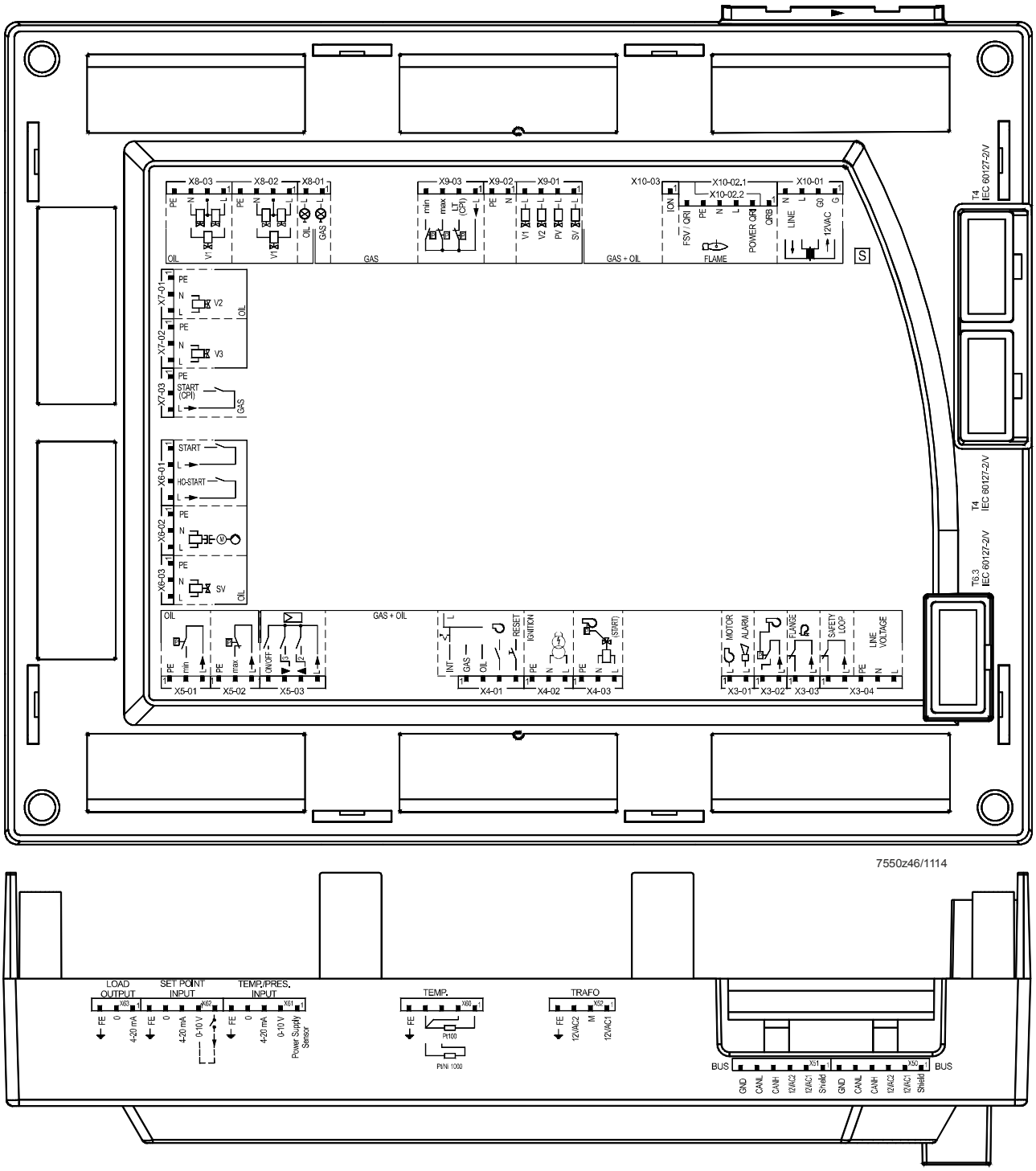


Figure 4: Connection terminals LMV51.100x1 / LMV51.100x2 / LMV51.140x2

1.5 Connection terminals LMV51.300x1 / LMV51.300x2 / LMV52.200x1 / LMV52.200x2 / LMV52.240x2 / LMV52.400x1 / LMV52.400x2

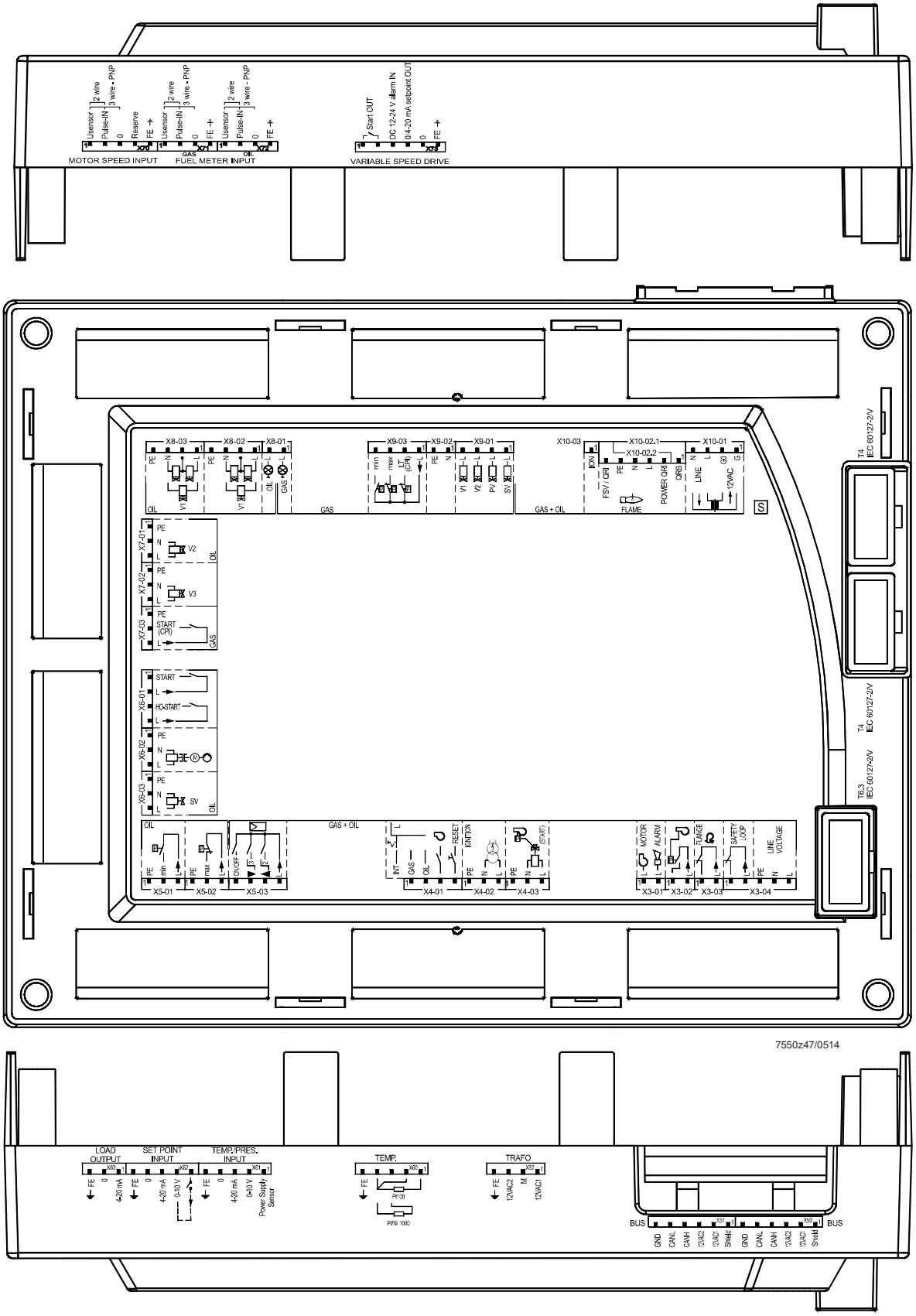


Figure 5: Connection terminals LMV51.300x1 / LMV51.300x2 / LMV52.200x1 / LMV52.200x2 / LMV52.240x2 / LMV52.400x1 / LMV52.400X2

1.6 Connection terminals LMV51.340x1 / LMV52.240x1 / LMV52.440x1 / LMV52.440x2

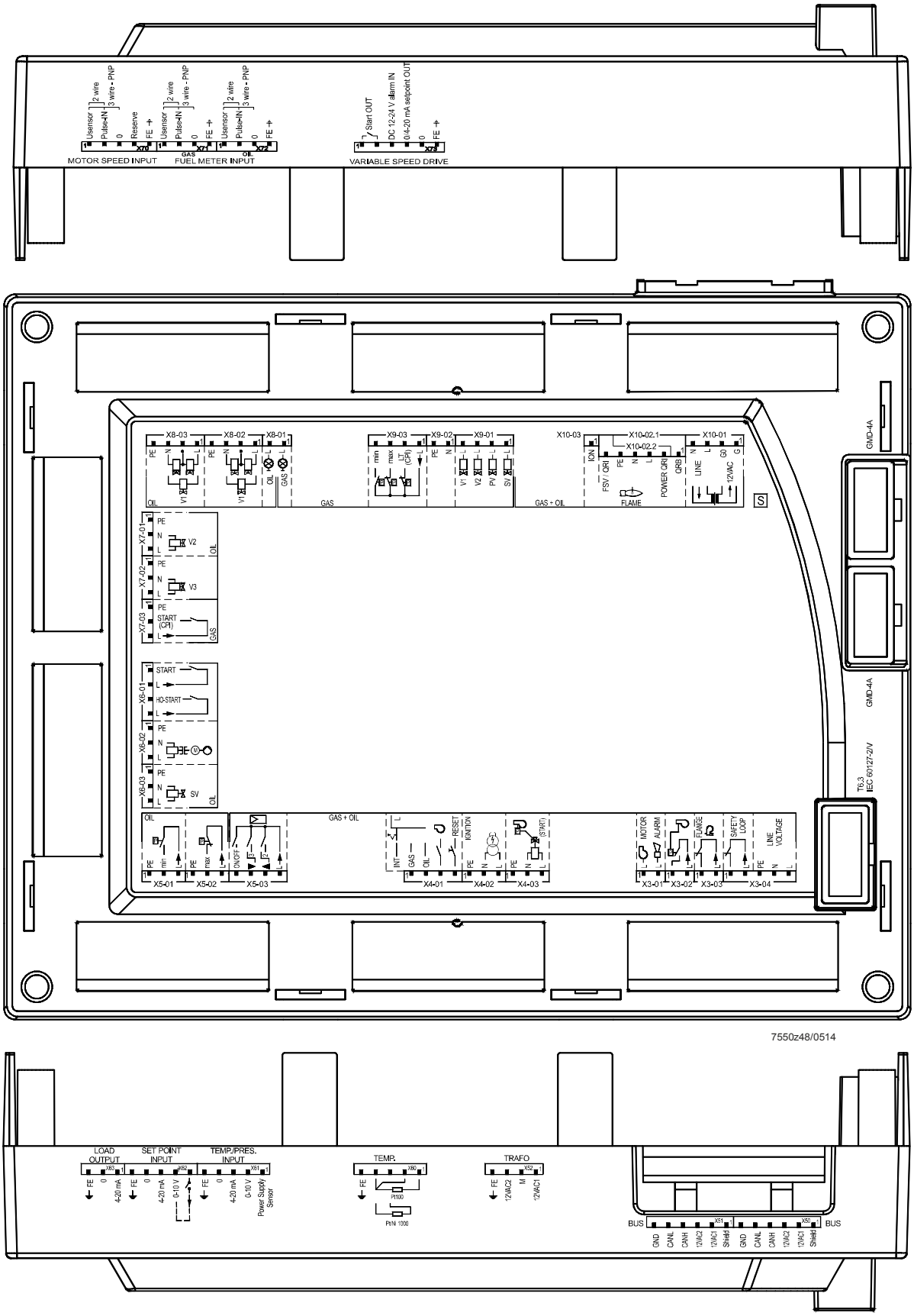


Figure 6: Connection terminals LMV51.340x1 / LMV52.240x1 / LMV52.440x1 / LMV52.440X2

1.7 Coding of connectors

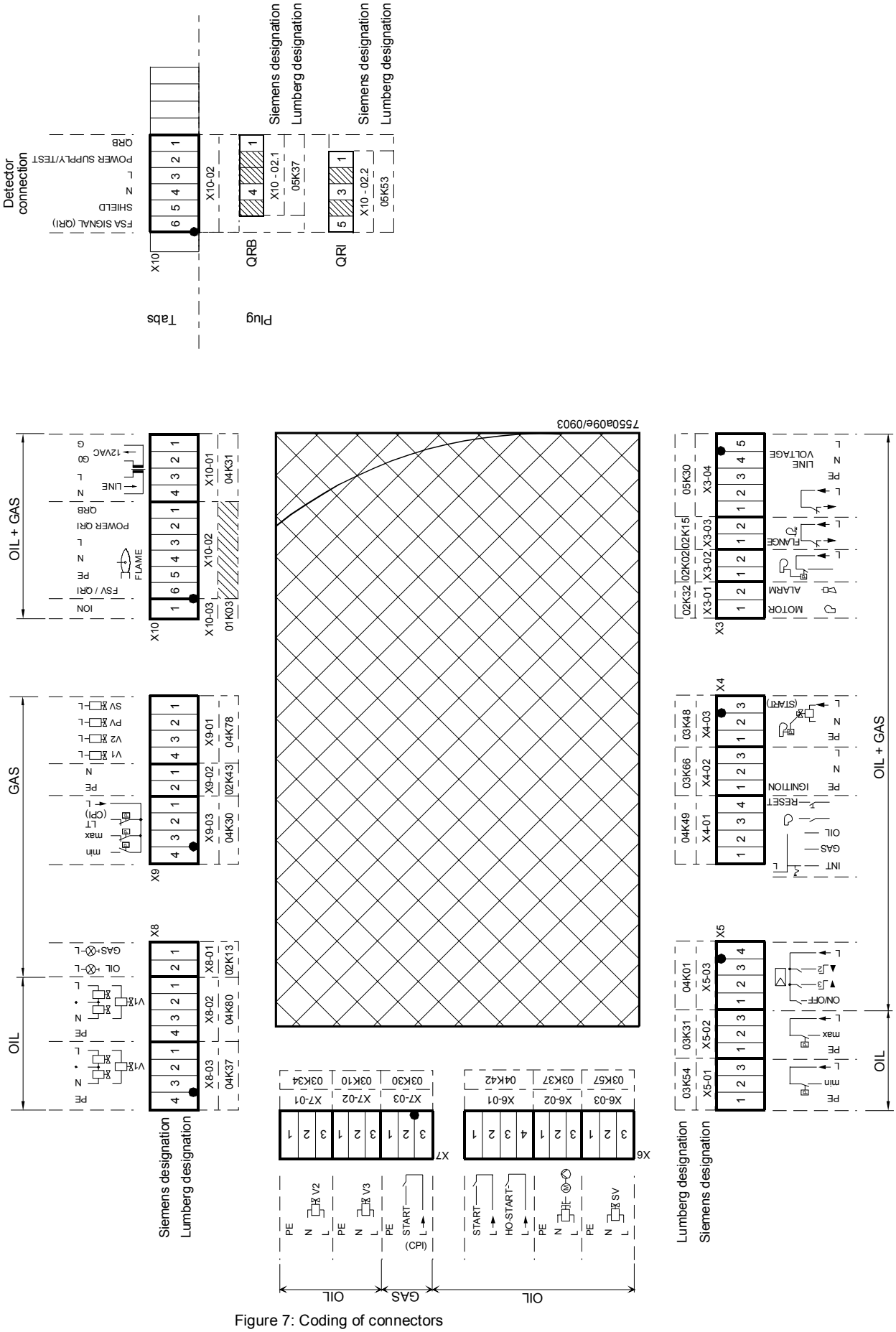
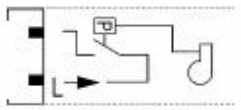
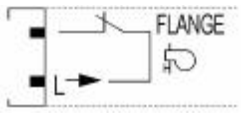
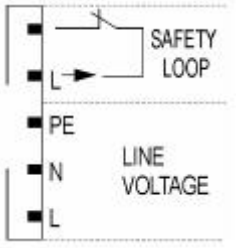
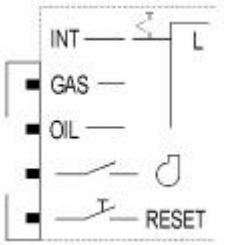
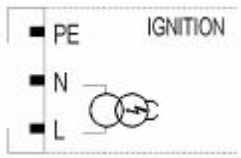
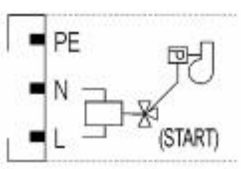
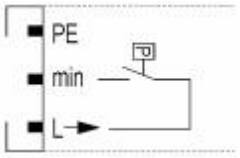
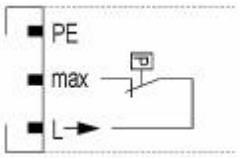
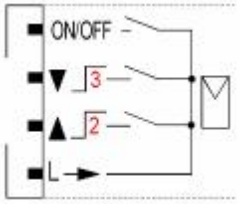
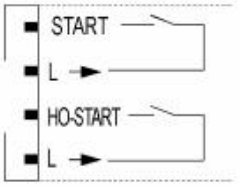
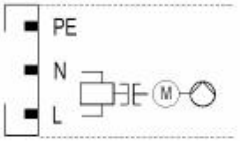
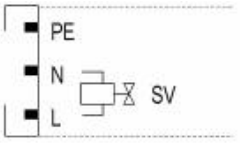


Figure 7: Coding of connectors

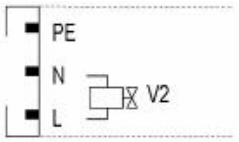
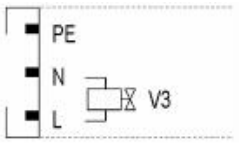
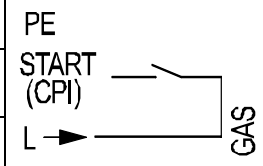
2 Description of connection (AC 120 V)

Terminal marking		Connection symbol	Safety class	Input	Output	Description of connections	Electrical rating
X3-01	PIN 1		I		●	Fan motor contactor	AC 120 V +10 % / -15 %, 50...60 Hz, 1 A, (pilot duty), cosφ 0.4
	PIN 2				●	Alarm	AC 120 V +10 % / -15 %, 50...60 Hz, 1 A, (pilot duty), cosφ 0.4
X3-02	PIN 1		I	●		Air pressure switch (APS)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2				●	Power signal for air pressure switch (APS)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X3-03	PIN 1		I	●		End switch burner flange	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 2				●	Power signal for end switch burner flange	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 5 A
X3-04	PIN 1		I	●		Safety loop	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 2				●	Power signal for safety loop	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 3			●		Protective earth (PE)	
	PIN 4			●		Power supply neutral conductor (N)	
	PIN 5			●		Power supply live conductor (L)	AC 120 V +10 % / -15 %, 50...60 Hz, fuse 6,3 AT (DIN EN 60 127 2 / 5)
X4-01			I			Fuel selection „internal“ if pin 1-2 is not used	
	PIN 1			●		Fuel selection gas	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2			●		Fuel selection oil	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3			●		Fan contactor contact (FCC) or flue gas recirculation power switch (FGR-PS)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4			●		Reset / manual lockout	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
X4-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Ignition	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.2
X4-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Start signal or pressure switch-relief valve	AC 120 V +10 % / -15 %, 50...60 Hz, 75 VA, (pilot duty), cosφ 0.4

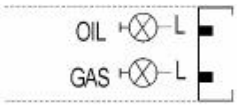
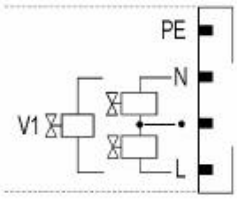
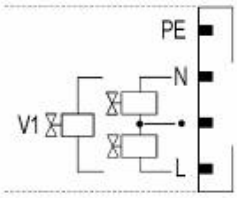
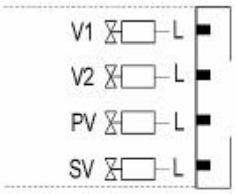
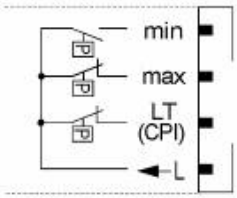
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X5-01	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Pressure switch min-oil (Pmin-oil)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal for pressure switch-min-oil (Pmin-oil)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X5-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Pressure switch-max-oil (Pmax-oil)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal for pressure switch-max-oil (Pmax-oil)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X5-03	PIN 1		I	●		Controller (ON / OFF)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2			●		Controller closes / stage 3	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3			●		Controller opens / stage 2	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4				●	Power signal for control of controller	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X6-01	PIN 1		I	●		Start release oil	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2				●	Power signal start release oil	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
	PIN 3			●		Direct heavy oil start	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4				●	Power signal direct heavy oil start	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X6-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Oil pump / magnetic coupling	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X6-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve (shut-off valve-oil)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4

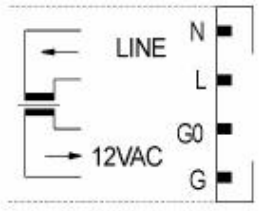
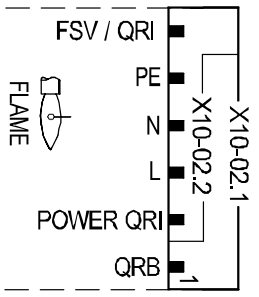
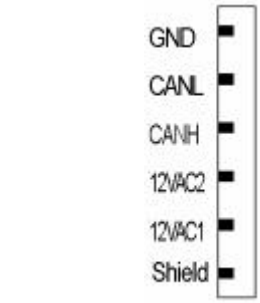
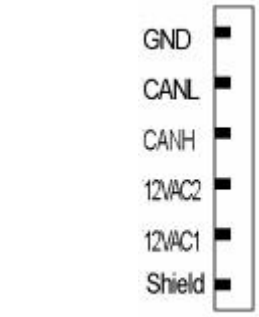
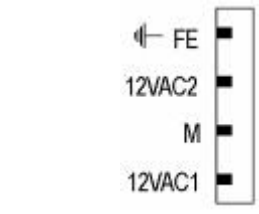
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X7-01	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve 2 (oil)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X7-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve 3 (oil)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X7-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Start release signal gas / oil CPI	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal (reserve)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA

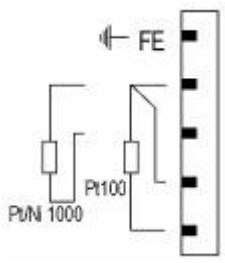
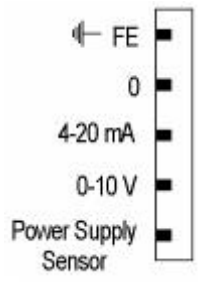
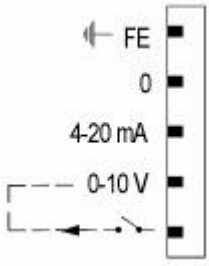
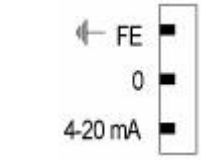
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X8-01		PIN 2	I		●	Firing on oil	AC 120 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
		PIN 1			●	Firing on gas	AC 120 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X8-02		PIN 4	I		●	Protective earth (PE)	
		PIN 3			●	Neutral conductor (N)	
		PIN 2			●	Wiring point for in series switched valves	
		PIN 1			●	Fuel valve 1 (oil)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X8-03		PIN 4	I		●	Protective earth (PE)	
		PIN 3			●	Neutral conductor (N)	
		PIN 2			●	Wiring point for in series switched valves	
		PIN 1			●	Fuel valve 1 (oil)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X9-01		PIN 4	I		●	Fuel valve 1 (gas)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
		PIN 3			●	Fuel valve 2 (gas)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
		PIN 2			●	Pilot valve (gas)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
		PIN 1			●	Fuel valve (shut-off valve-gas)	AC 120 V +10 % / -15 %, 50...60 Hz, 1.6 A, (pilot duty), cosφ 0.4
X9-02		PIN 2	I		●	Protective earth (PE)	
		PIN 1			●	Neutral conductor (N)	
X9-03		PIN 4	I	●		Pressure switch-min-gas (Pmin-gas, start release gas)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 3		●		Pressure switch-max-gas (Pmax-gas)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 2		●		Gas pressure switch valve proving / valve proving or valve closing contact (CPI)	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 1			●	Power signal for pressure switch	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA

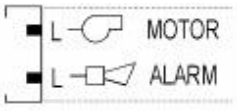
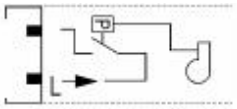
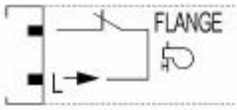
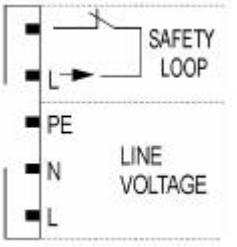
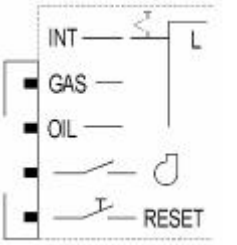
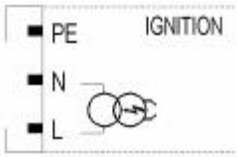
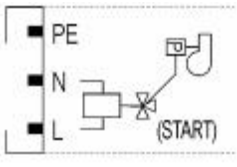
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X10-01		PIN 4	I		●	Neutral conductor (N)	AC 120 V +10 % / -15 %, 50...60 Hz, Max. 1 mA
		PIN 3			●	Power signal transformer	
		PIN 2		●		AC power signal G0	AC 12 V +10 % / -15 %, 50...60 Hz, Max. 1.2 mA
		PIN 1		●		AC power signal fan (G)	
X10-02		PIN 6	I	●		QRI (IR detector) / QRA7 signal voltage	Umax DC 5 V
		PIN 5			●	Protective earth (PE)	
		PIN 4			●	Neutral conductor (N)	
		PIN 3			●	Power signal	AC 120 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
		PIN 2			●	QRI (IR detector) / QRA7 power supply	DC 14 / 21 VC Imax 100 mA
		PIN 1		●		QRB signal voltage	Max. DC 8 V
X10-03		PIN 1	I		●	Ionization probe (ION) (alternatively QRA2 / QRA4 / QRA10)	Umax (X3-04-PINS) Imax. 0.5 mA
X50		PIN 6	III		●	Reference ground (PELV)	
		PIN 5			●	Communication signal (CANL)	DC U ← 5 V, Rw = 120 Ω, level to ISO-DIS 11898
		PIN 4			●	Communication signal (CANH)	
		PIN 3			●	AC power supply for actuators / AZL5	AC 12 V +10 % / -15 %, 50...60 Hz, Fuse max. 4 A
		PIN 2			●		
		PIN 1			●	Shield connection (functional earth)	
X51		PIN 6	III		●	Reference ground (PELV)	
		PIN 5			●	Communication signal (CANL)	DC U ← 5 V, Rw = 120 Ω, level to ISO-DIS 11898
		PIN 4			●	Communication signal (CANH)	
		PIN 3			●	AC power supply for actuators / AZL5	AC 12 V +10 % / -15 %, 50...60 Hz, Fuse max. 4 A
		PIN 2			●		
		PIN 1			●	Shield connection (functional earth)	
X52		PIN 4	III	●		Functional earth	
		PIN 3		●		AC power supply from transformer to LMV5	AC 12 V +10 % / -15 %, 50...60 Hz
		PIN 2		●		Reference ground (PELV)	
		PIN 1		●		AC power supply from transformer to LMV5	AC 12 V +10 % / -15 %, 50...60 Hz

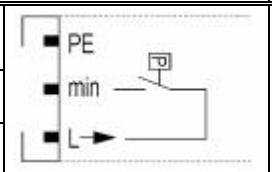
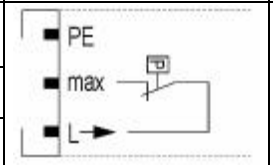
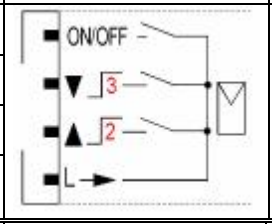
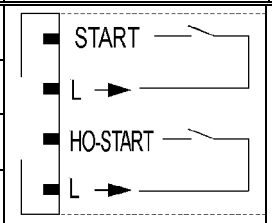
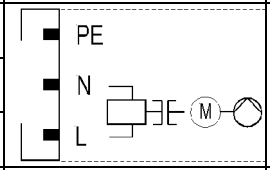
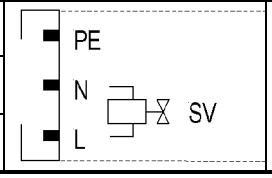
Description of connection terminals (cont'd)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
Temperature / pressure controller							
X60		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Temperature sensor input Pt / LG-Ni 1000 (Input 4, TEMP.)	
		PIN 2		●		Line compensation temperature sensor Pt100	
		PIN 1		●		Temperature sensor input Pt100 (input 1, TEMP.)	
X61		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Current input for temperature / pressure signal (input 2, TEMP / PRESS INPUT 4...20 mA)	DC 0...20 mA
		PIN 2		●		Voltage input for temperature / pressure signal (input 2, TEMP / PRESS INPUT DC 0...10 V)	DC 0...10 V
		PIN 1			●	Power supply for temperature / pressure transmitter	Approx. DC 20 V, Max. 25 mA
X62		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Current input for setpoint or load (input 3, SETPOINT INPUT)	DC 0...20 mA
		PIN 2		●		Voltage input for setpoint or load (input 3, SETPOINT INPUT)	DC 0...10 V (up to DC 24 V on setpoint change of X62 / pin 1)
		PIN 1			●	Power supply for setpoint changeover	Approx. DC 24 V, Max. 2 mA
X63		PIN 3	III	●		Functional earth for shield connection	
		PIN 2			●	Reference ground	
		PIN 1			●	Current output for burner load (LOAD OUTPUT)	DC 4...20 mA, RLmax = 500 Ω

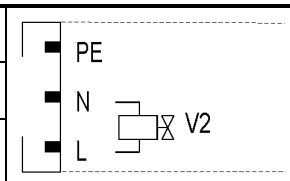
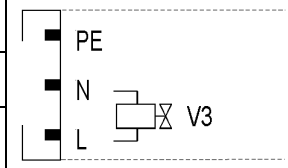
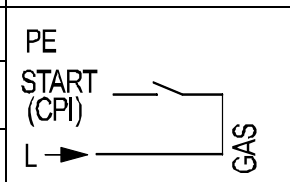
2.1 Description of connection (AC 230 V)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X3-01	PIN 1		I		●	Fan motor contactor	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
	PIN 2				●	Alarm	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X3-02	PIN 1		I	●		Air pressure switch (APS)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2				●	Power signal for air pressure switch (APS)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X3-03	PIN 1		I	●		End switch burner flange	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 2				●	Power signal for end switch burner flange	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 5 A
X3-04	PIN 1		I	●		Safety loop	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 2				●	Power signal for safety loop	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 5 A
	PIN 3			●		Protective earth (PE)	
	PIN 4			●		Power supply neutral conductor (N)	
	PIN 5			●		Power supply live conductor (L)	AC 230 V +10 % / -15 %, 50...60 Hz, fuse 6.3 AT (DIN EN 60 127 2 / 5)
X4-01			I			Fuel selection “internal” if pin 1-2 is not used	
	PIN 1			●		Fuel selection gas	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2			●		Fuel selection oil	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3			●		Fan contactor contact (FCC) or flue gas recirculation (FGR-PS)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4			●		Reset / manual lockout	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
X4-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Ignition	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.2
X4-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Start signal or pressure switch relief valve	AC 230 V +10 % / -15 %, 50...60 Hz, 0.5 A, cosφ 0.4

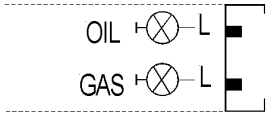
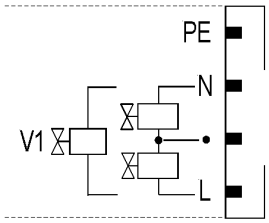
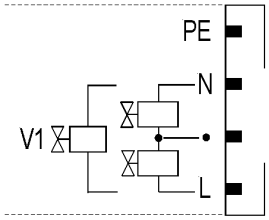
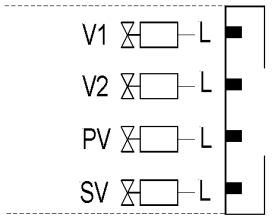
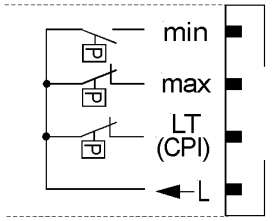
Description of connection terminals (cont'd)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X5-01	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Pressure switch min-oil (Pmin-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal for pressure switch-min-oil (Pmin-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X5-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Pressure switch-max-oil (Pmax-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal for pressure switch-max-oil (Pmax-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X5-03	PIN 1		I	●		Controller (ON / OFF)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2			●		Controller closes / stage 3	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3			●		Controller opens / stage 2	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4				●	Power signal for control of controller	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X6-01	PIN 1		I	●		Start release oil (START)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 2				●	Power signal start release oil (START)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
	PIN 3			●		Direct heavy oil start	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 4				●	Power signal direct heavy oil start	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
X6-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3				●	Oil pump / magnetic coupling	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4
X6-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve (shut-off valve-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4

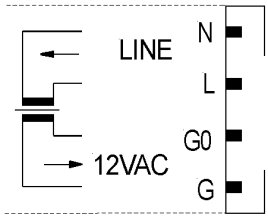
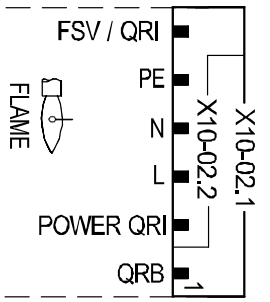
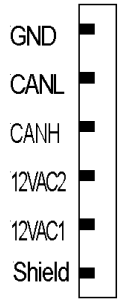
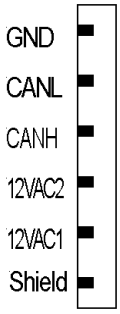
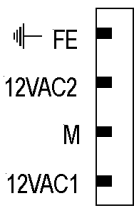
Description of connection terminals (cont'd)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X7-01	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve 2 (oil)	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X7-02	PIN 1		I		●	Protective earth (PE)	
	PIN 2				●	Neutral conductor (N)	
	PIN 3					Fuel valve 3 (oil)	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X7-03	PIN 1		I		●	Protective earth (PE)	
	PIN 2			●		Start release gas / oil or valve closure contact (CPI)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
	PIN 3				●	Power signal (reserve)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA

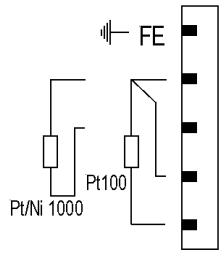
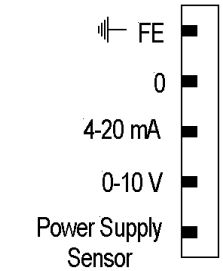
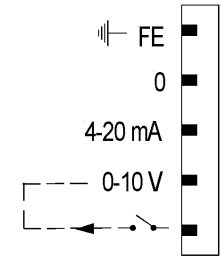
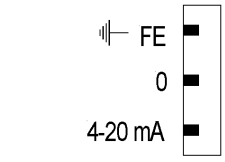
Description of connection terminals (cont'd)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X8-01		PIN 2	I		●	Firing on oil	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
		PIN 1			●	Firing on gas	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X8-02		PIN 4	I		●	Protective earth (PE)	
		PIN 3			●	Neutral conductor (N)	
		PIN 2			●	Wiring point for in series switched valves	
		PIN 1			●	Fuel valve 1 (oil)	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X8-03		PIN 4	I		●	Protective earth (PE)	
		PIN 3			●	Neutral conductor (N)	
		PIN 2			●	Wiring point for in series switched valves	
		PIN 1			●	Fuel valve 1 (oil)	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4
X9-01		PIN 4	I		●	Fuel valve 1 (gas)	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4
		PIN 3			●	Fuel valve 2 (gas)	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4
		PIN 2			●	Pilot valve (gas)	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4
		PIN 1			●	Fuel valve (shut-off valve-gas)	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4
X9-02		PIN 2	I		●	Protective earth (PE)	
		PIN 1			●	Neutral conductor (N)	
X9-03		PIN 4	I	●		Pressure switch-min-gas (Pmin-gas, start release gas)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 3		●		Pressure switch-max-gas (Pmax-gas)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 2		●		Pressure switch valve proofed-gas / leakage test or valve closing contact (CPI)	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 1.5 mA
		PIN 1			●	Power signal for pressure switch	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA

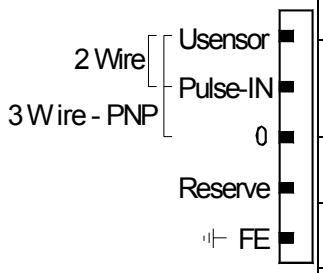
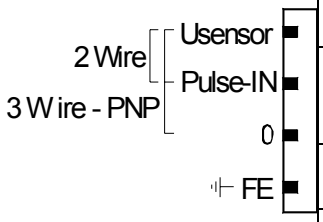
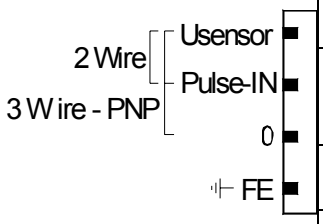
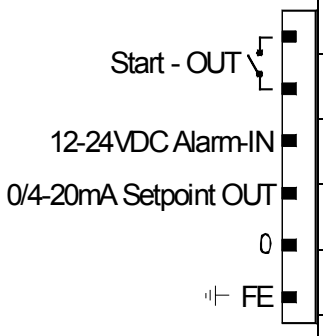
Description of connection terminals (cont'd)

Terminal markings	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
X10-01		PIN 4	I		●	Neutral conductor (N)	AC 230 V +10 % / -15 %, 50...60 Hz, Max. 1 mA
		PIN 3			●	Power signal transformer	
		PIN 2		●		AC power signal G0	AC 12 V +10 % / -15 %, 50...60 Hz, Max. 1.2 mA
		PIN 1		●		AC power signal fan (G)	
X10-02		PIN 6	I	●		QRI (IR detector) / QRA7 signal voltage	Umax DC 5 V
		PIN 5			●	Protective earth (PE)	
		PIN 4			●	Neutral conductor (N)	
		PIN 3			●	Power signal	AC 230 V +10 % / -15 %, 50...60 Hz, Imax 500 mA
		PIN 2			●	QRI (IR detector) / QRA7 power supply	DC 14 / 21 VC Imax 100 mA
		PIN 1		●		QRB signal voltage	Max. DC 8 V
X10-03		PIN 1	I		●	Ionization probe (ION) (alternatively QRA2 / QRA4 / QRA10)	Umax (X3-04-PINS), Imax. 0.5 mA
X50		PIN 6	III		●	Reference ground (PELV)	
		PIN 5			●	Communication signal (CANL)	DC U ← 5 V, Rw = 120 Ω, level to ISO-DIS 11898
		PIN 4			●	Communication signal (CANH)	
		PIN 3			●	AC power supply for actuators / AZL5	AC 12 V +10 % / -15 %, 50...60 Hz, Fuse max. 4 A
		PIN 2			●		
		PIN 1			●	Shield connection (functional earth)	
X51		PIN 6	III		●	Reference ground (PELV)	
		PIN 5			●	Communication signal (CANL)	DC U ← 5 V, Rw = 120 Ω, level to ISO-DIS 11898
		PIN 4			●	Communication signal (CANH)	
		PIN 3			●	AC power supply for actuators / AZL5	AC 12 V +10 % / -15 %, 50...60 Hz, Fuse max. 4 A
		PIN 2			●		
		PIN 1			●	Shield connection (functional earth)	
X52		PIN 4	III	●		Functional earth	
		PIN 3		●		AC power supply from transformer to LMV5	AC 12 V +10 % / -15 %, 50...60 Hz
		PIN 2		●		Reference ground (PELV)	
		PIN 1		●		AC power supply from transformer to LMV5	AC 12 V +10 % / -15 %, 50...60 Hz

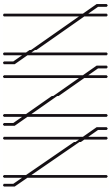
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connections	Electrical rating
Temperature / pressure controller							
X60		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Temperature sensor input Pt / LG-Ni 1000 (Input 4, TEMP)	
		PIN 2		●		Line compensation temperature sensor Pt100	
		PIN 1		●		Temperature sensor input Pt100 (input 1, TEMP)	
X61		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Current input for temperature / pressure signal (input 2, TEMP / PRESS INPUT 4...20 mA)	DC 0...20 mA
		PIN 2		●		Voltage input for temperature / pressure signal (input 2, TEMP / PRESS INPUT DC 0...10 V	DC 0...10 V
		PIN 1			●	Power supply for temperature / pressure transmitter	Approx. DC 20 V, Max. 25 mA
X62		PIN 5	III	●		Functional earth for shield connection	
		PIN 4		●		Reference ground	
		PIN 3		●		Current input for setpoint or load (input 3, SETPOINT INPUT)	DC 0...20 mA
		PIN 2		●		Voltage input for setpoint or load (input 3, SETPOINT INPUT)	DC 0...10 V
		PIN 1			●	Power supply for setpoint changeover	Approx. DC 24 V, Max. 2 mA
X63		PIN 3	III	●		Functional earth for shield connection	
		PIN 2			●	Reference ground	
		PIN 1			●	Current output for burner load (LOAD OUTPUT)	DC 4...20 mA, RLmax = 500 Ω

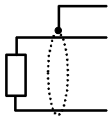
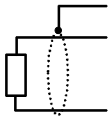
Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connection	Electrical rating
VSD module							
X70		PIN 1	III		●	Power supply for speed sensor	Approx. 10 V Max. 45 mA
		PIN 2		●		Speed input	Uin max = DC 10 V Uin min High level = DC 3 V Uin max Low level = DC 1.5 V
		PIN 3			●	Reference ground	
		PIN 4				Reserve	
		PIN 5		●		Functional earth for shield connection	
X71		PIN 1	III		●	Power supply for fuel meter	Approx. 10 V Max. 45 mA
		PIN 2		●		Fuel meter input gas	Uin max = DC 10 V Uin min High level = DC 3 V Uin max Low level = DC 1.5 V
		PIN 3			●	Reference ground	
		PIN 4		●		Functional earth for shield connection	
X72		PIN 1	III		●	Power supply for fuel meter	Approx. 10 V Max. 45 mA
		PIN 2		●		Fuel meter input oil	Uin max = DC 10 V Uin min High level = DC 3 V Uin max Low level = DC 1.5 V
		PIN 3			●	Reference ground	
		PIN 4		●		Functional earth for shield connection	
X73		PIN 1	III		●	Reference contact	Max. AC 24 V / DC 24 V, Max. 2 A
		PIN 2			●	Release contact	
		PIN 3		●		Alarm input	DC 0... 24 V
		PIN 4			●	0/4...20 mA control of VSD	0...20 mA RLmax = 750 Ω
		PIN 5			●	Reference ground	
		PIN 6		●		Functional earth	

Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connection	Electrical rating
O2 module							
X81	PIN 6		III	●		Temperature compensation QGO (U3)	DC [0...2 V], Ri > 100 kΩ
	PIN 5				●	Power supply temperature compensation (G2)	DC [12...18 V], Ra = 20 Ω
	PIN 4			●	●	GND (M)	
	PIN 3			●		Thermocouple (B2)	DC [0...33 mV], Ri > 100 kΩ
	PIN 2			●	●	GND (M)	
	PIN 1			●		Nernst voltage (B1)	DC [-25...1 mV], Ri > 100 kΩ
X84	PIN 5	GND	III	●		Signal reference	
	PIN 4	CANL		●		Communication signal	DC U <= 5 V, Rw = 120 Ω, level to ISO-DIS 11898
	PIN 3	CANH		●		Communication signal	
	PIN 2	12VAC2		●		AC supply for O2 module	AC 12 V +10% / -15%, 50...60Hz, Fuse max. 4A
	PIN 1	12VAC1		●		AC supply for O2 module	
X85	PIN 5	GND	III	●		Signal reference	
	PIN 4	CANL		●		Communication signal	DC U <= 5 V, Rw = 120 Ω, level to ISO-DIS 11898
	PIN 3	CANH		●		Communication signal	
	PIN 2	12VAC2		●		AC supply for O2 module	AC 12 V +10% / -15%, 50...60Hz, Fuse max. 4A
	PIN 1	12VAC1		●		AC supply for O2 module	

Description of connection terminals (cont'd)

Terminal marking	Connection symbol		Safety class	Input	Output	Description of connection	Electrical rating
						Combustion air / flue gas temperature sensor	
X86	PIN 3		III	●		Shield connection	
	PIN 2			●		Signal reference	
	PIN 1			●		Flue gas temperature sensor input Pt1000 / LG-Ni 1000	
X87	PIN 3		III	●		Shield connection	
	PIN 2			●		Signal reference	
	PIN 1			●		Combustion air temperature input Pt1000 / LG-Ni 1000	
X89-02	PIN 1	PE	I		●	Protective earth (PE)	
	PIN 2	Q5 N			●	QGO heating	
	PIN 3	Q4 L			●	QGO heating	At AC 120 V +10 % / -15%, 50...60 Hz, Imax. 2.5 A At AC 230 V +10 % / -15%, 50...60 Hz, Imax. 2.5 A
X89-01	PIN 1	PE	I	●		Protective earth (PE)	
	PIN 2	N		●		Power supply neutral conductors (N)	
	PIN 3	L		●		Power supply live conductor (L)	AC 230 V +10 %/ -15%, 50...60 Hz, Imax. 2.5 A

3 Block diagram inputs and outputs

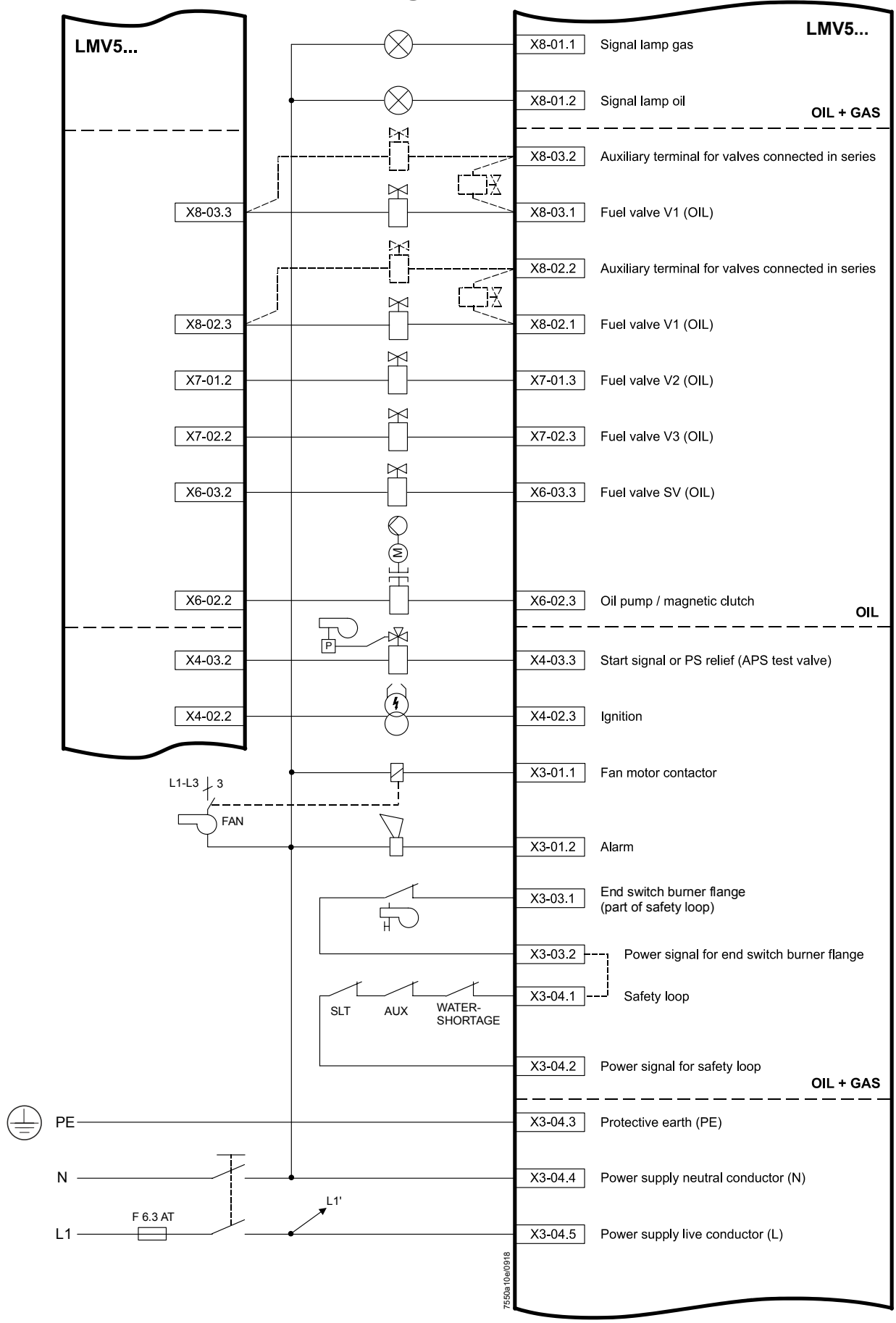


Figure 8: Block diagram inputs / outputs

Block diagram (cont'd)

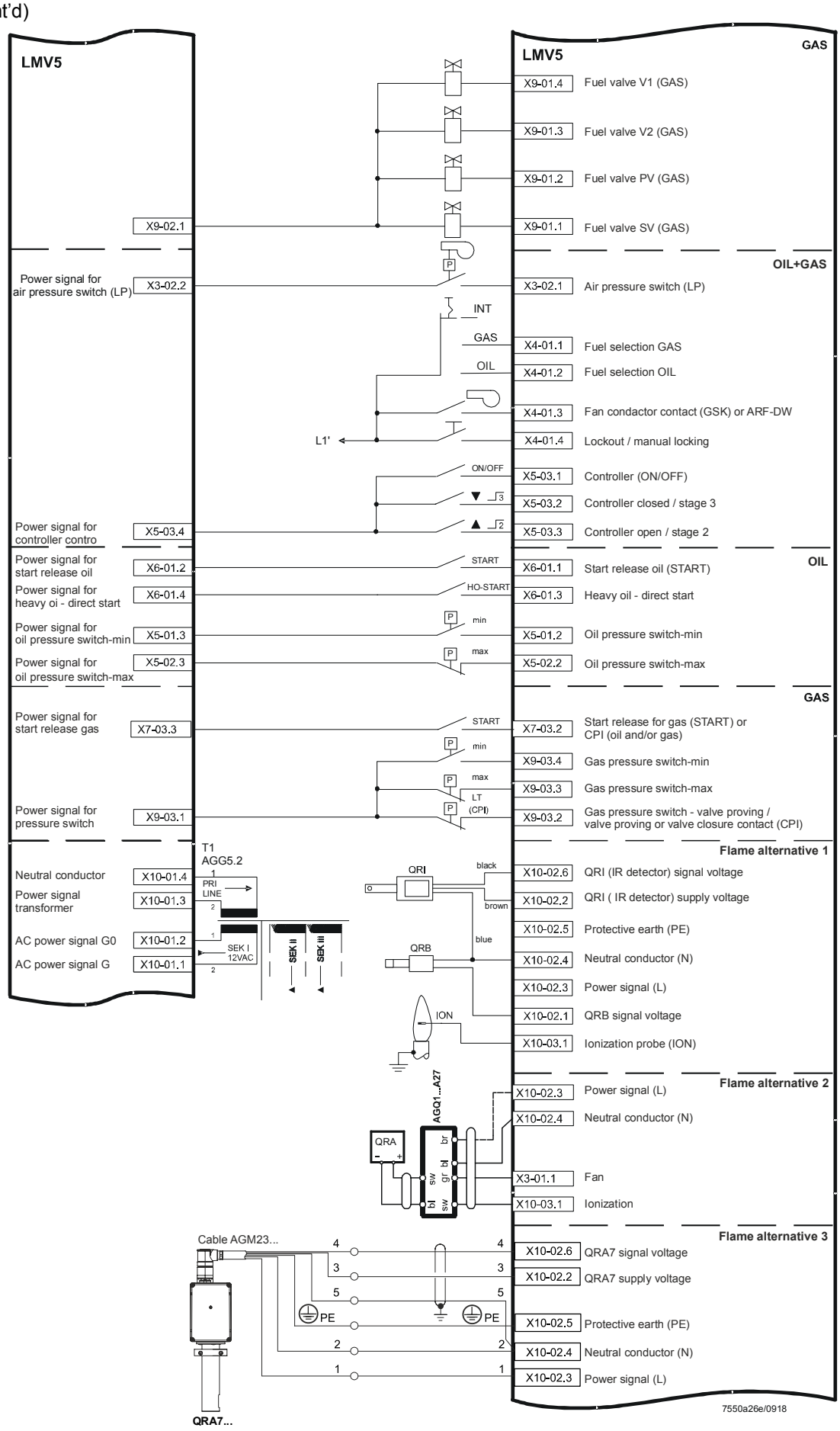


Figure 9: Block diagram inputs / outputs

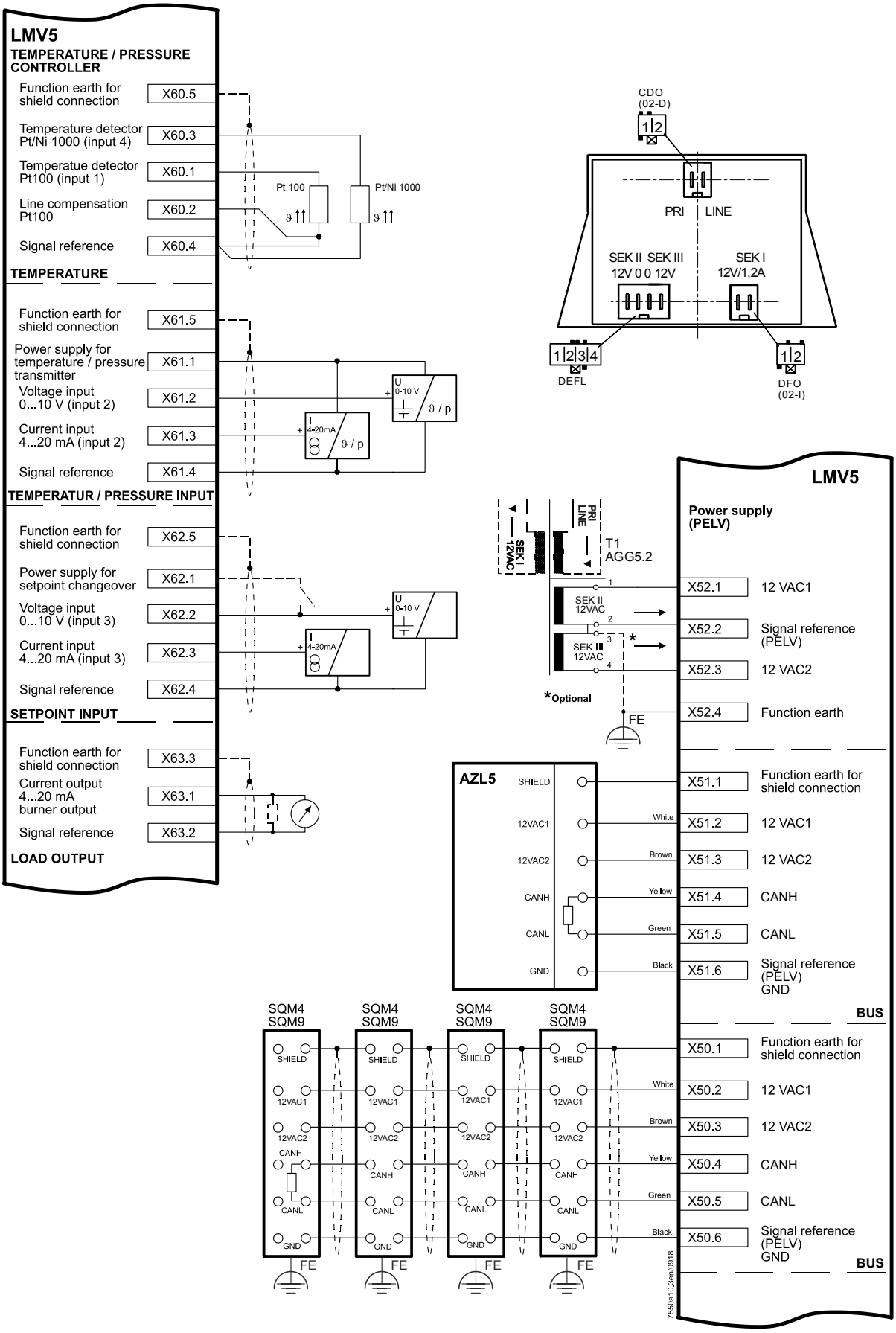


Figure 10: Block diagram inputs / outputs

Block diagram (cont'd)

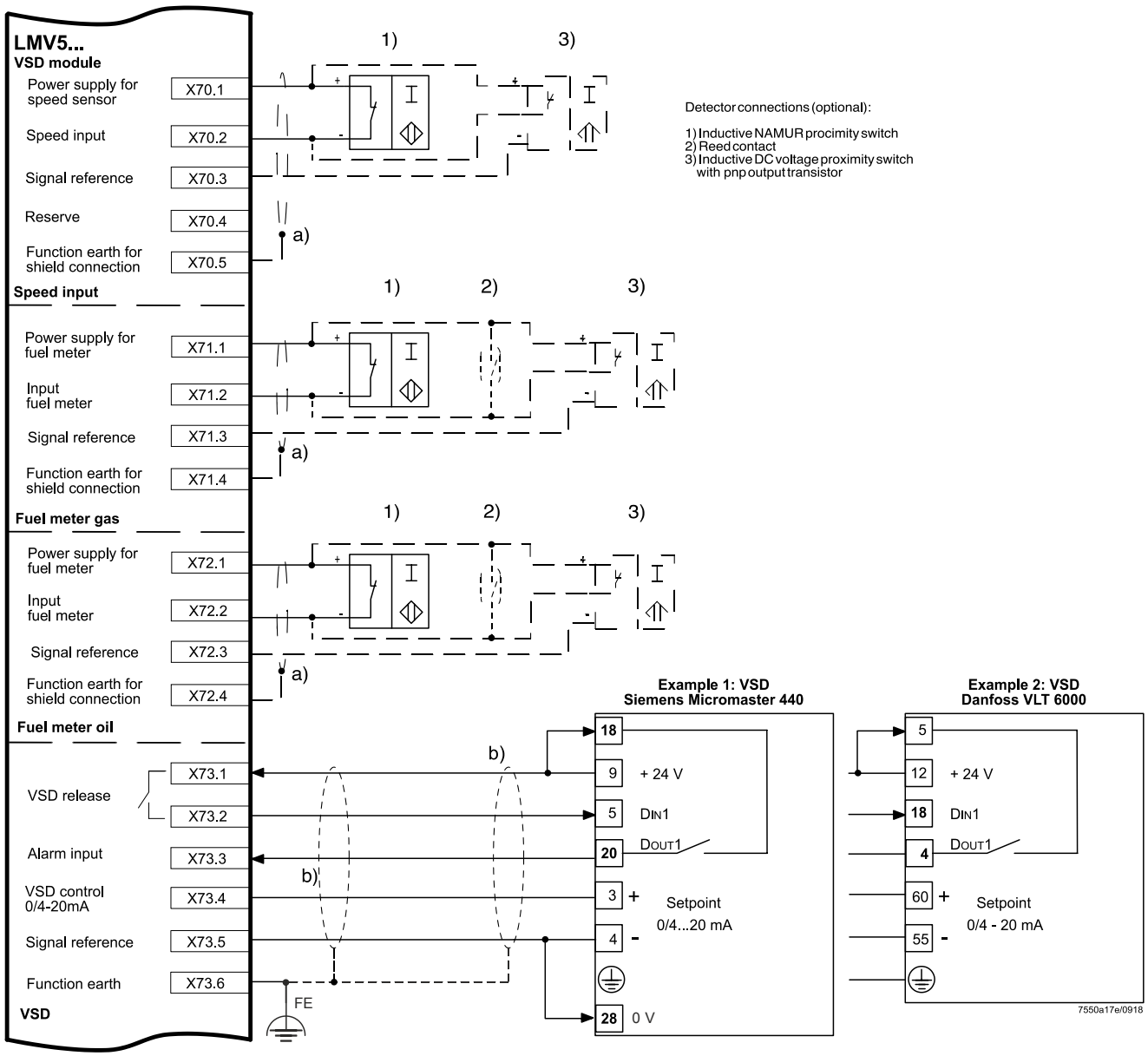


Figure 11: Block diagram inputs / outputs VSD module

Shielding

a) Optional shield connection for rough environmental conditions.

b) Alternative connection of VSD, refer to documentation of used VSD.

Block diagram (cont'd)

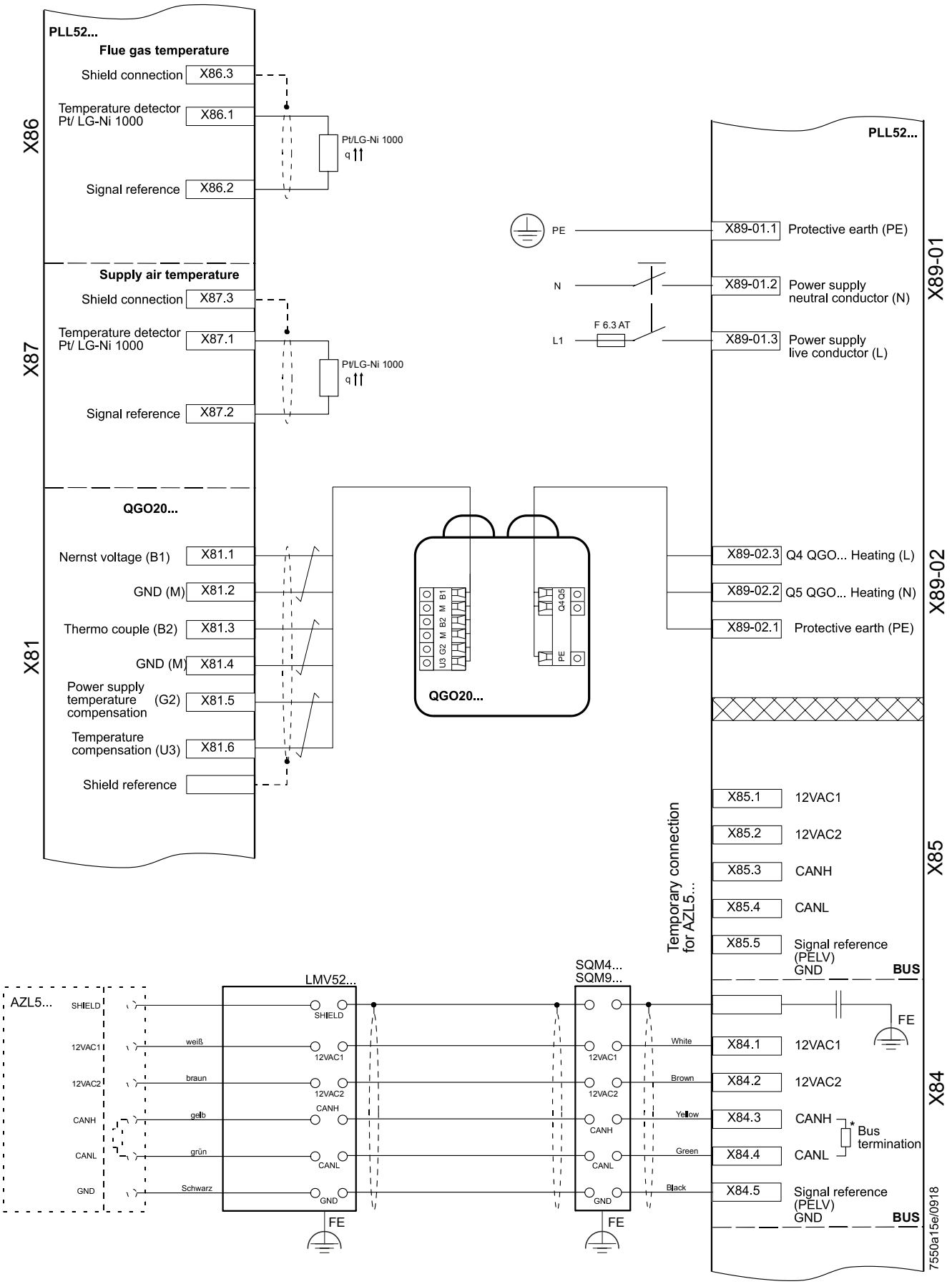
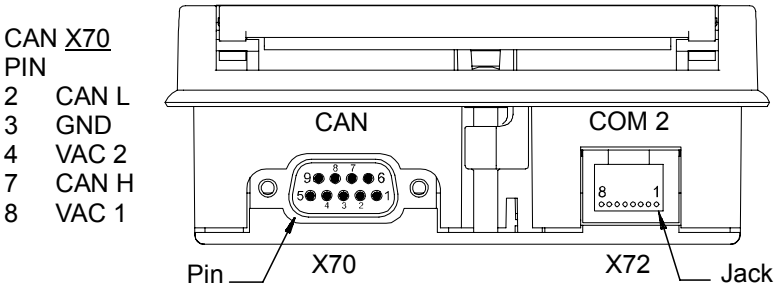
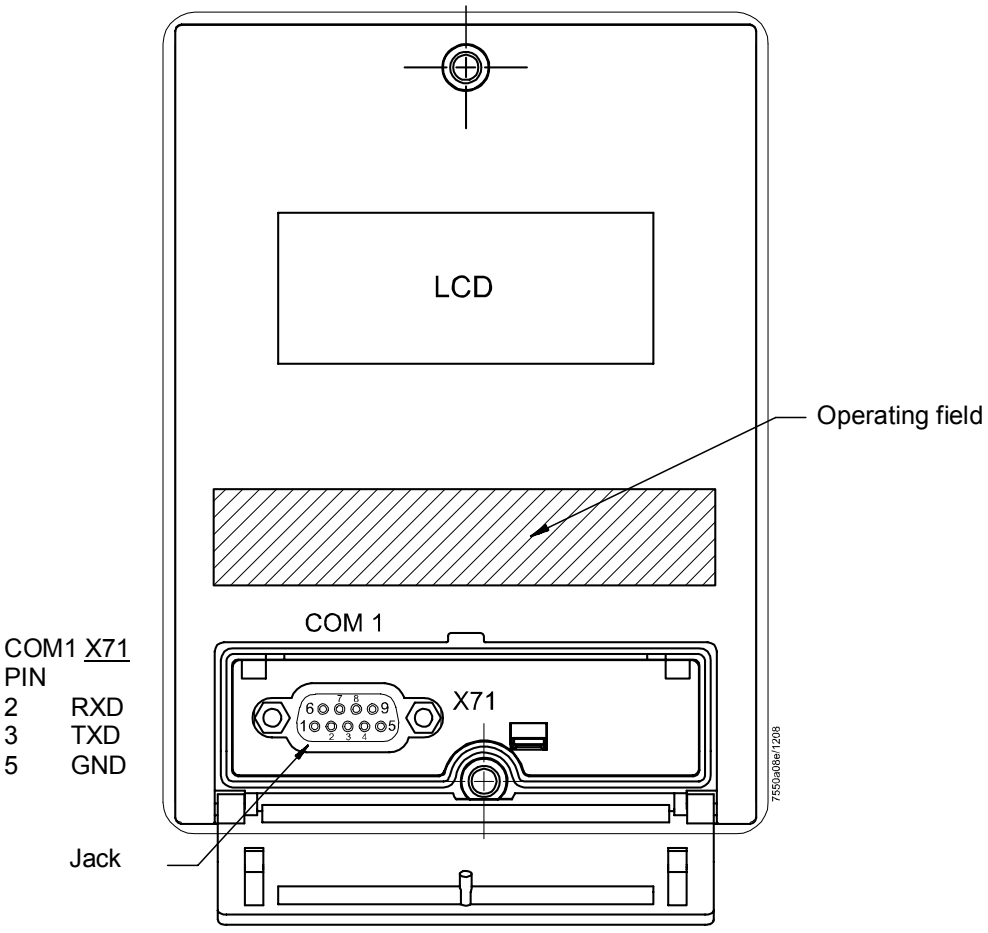


Figure 12: Block diagram inputs / outputs O2 module

4 Assignment of AZL5 terminals





Pins without designation = not connected

Figure 13: Assignment of AZL5 terminals

COM1	Port for PC (RS-232); for parameterization and visualization with the help of the PC tool software, SUB-D 9 pins
COM2	Port for BMS via external e-bus interface (RS-232)
CAN X70	CAN bus connection facility for LMV5, RJ45

Note!
COM1 and COM2 **cannot** be active at the same time!

5 Earthing and wiring the LMV5

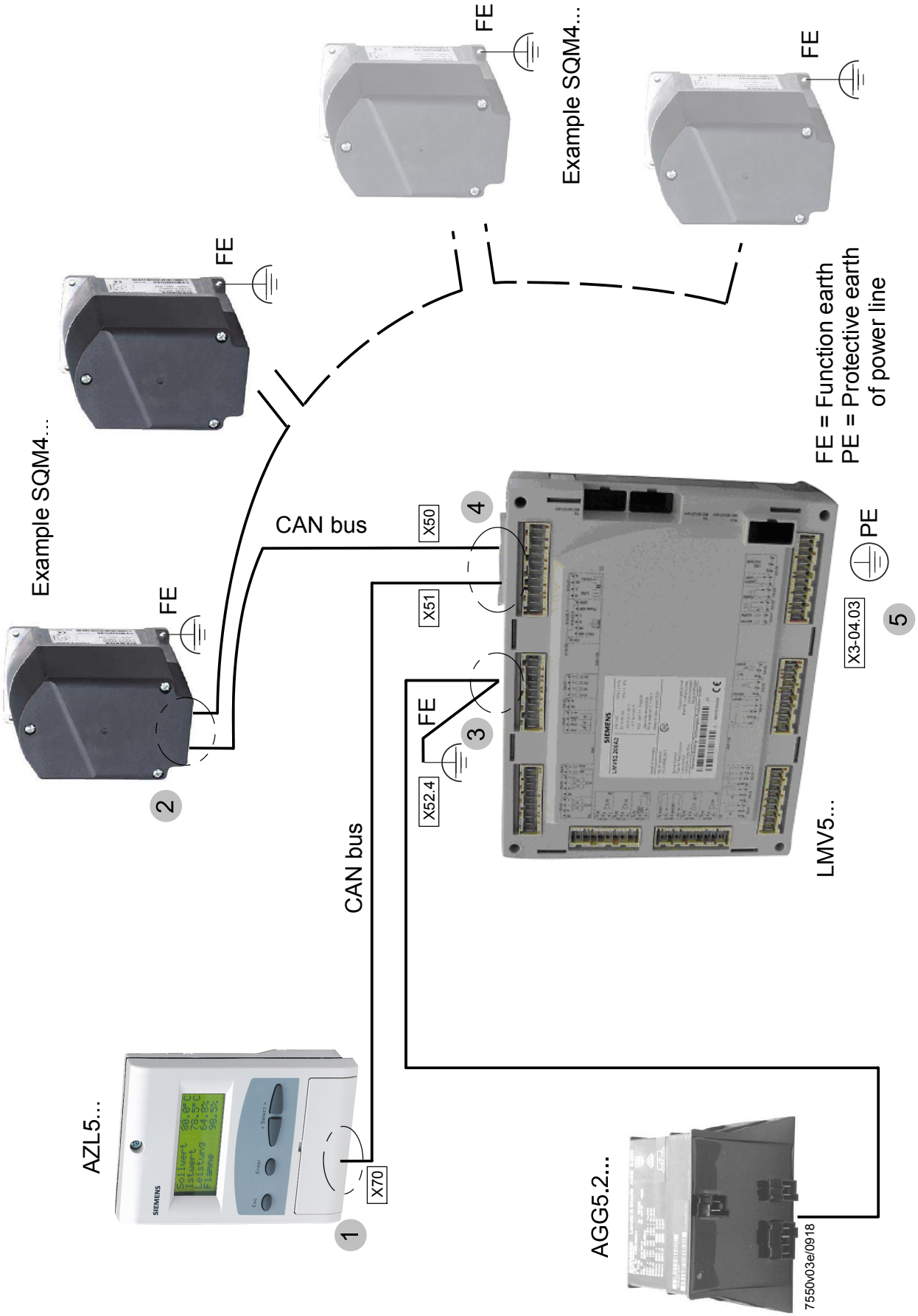
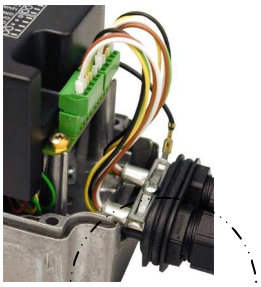
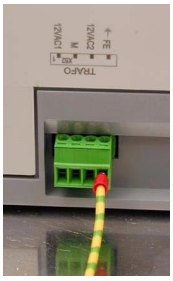
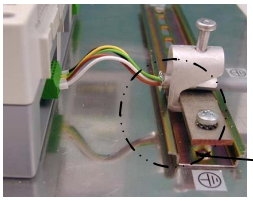
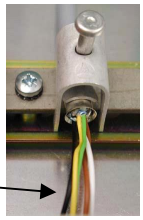


Figure 14: Earthing and wiring the LMV5

Wiring in compliance with EMC regulations

- Use shielded cables for the bus connections between LMV5, SQM4/SQM9 and AZL5 in control panels also
- Every actuator used with the LMV5 must be connected to the same functional earth (FE) or the same earthing point, using a short cable or a low-resistance housing connection like the LMV5
- Make certain that there is proper electrical contact between the housing of the SQM4/SQM9 and functional earth (use lock washers and galvanically conductive mounting plates)
- Run mains and bus cables separately in separate cable ducts while observing the greatest possible distance
- Run cables from and to ignition equipment separately while observing the greatest possible distance to bus cables
- Use the shortest distance for the high-voltage cable from the ignition equipment to the ignition electrodes
- When using bipolar ignition equipment, the cables should be run close together to ensure that the area of emissions is as small as possible

Earthing and wiring the LMV5

1		Plug AGG5.635 (3 m CAN bus cable with shielded connector) into X70 of the AZL5
2	   	Connect housing of the SQM4 to functional earth (FE): Combine inner shielding of data line with outer shielding of cable in a ferrule if possible and use clamp and cable to make the connection to functional earth on the actuator. <u>Ferrules without synthetic material collars:</u> For cable **AGG5.641** Osterrath Type H25/15 Part no. 012440 For cable **AGG5.631** Osterrath Type H35/18 Part no. 036890
3		Connect functional earth (X52 pin 4) to earthing point (FE) using a short cable.
4	Electrical environment in which the cables run parallel:   Electrical environment in which the cables are laid completely separately – even over short distances. 	For all shielded cables, secure the shield connection to a ground rail using a shield clamp (such as those available from WAGO). Keep unshielded cable sections as short as possible. Secure the shield connection to X50/X51 using an AGG510 screening shield. Route the inner shield of the cable to a data line. If possible, surround the outer shield of the cable with a ferrule and connect using an AGG5.110 screening shield. See Image 2 for how to assemble the ferrule.
5		Connect protective earth (PE) to X3-04.03.

6 Variable speed drive (VSD)

A VSD is one of the strongest sources of interference in a boiler house. For this reason, please observe the following recommendations:

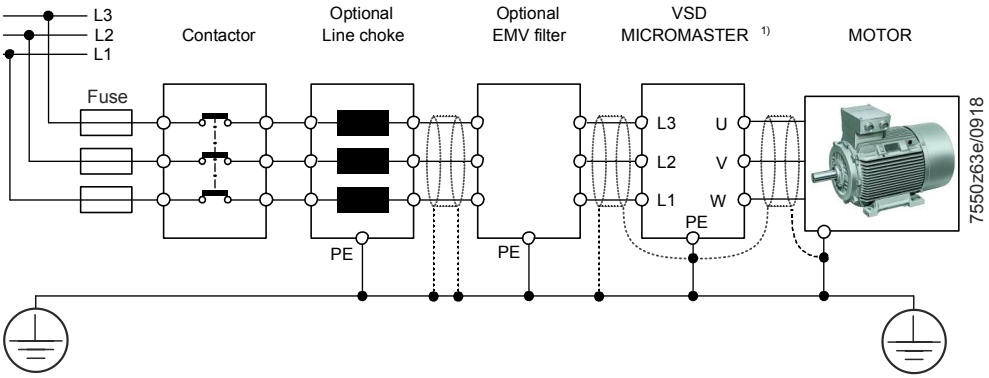


Figure 15: Block circuit diagram of VSD

- Only use VSDs with an EMC filter
- Cable from VSD to the fan motor (line voltage)
  Use a **completely separate shielded cable** from the VSD to the fan motor!
  Connect the shield at the VSD and motor side to earth.
  Details and further information can be found in the accompanying documentation for the VSD.
- Cable from LMV5 to the VSD (low voltage)
  Use a shielded cable from LMV5 to the VSD.
  The shielding for this cable must **only be connected at the LMV5 side with X73 pin 6 (FE)**, not at the VSD side:

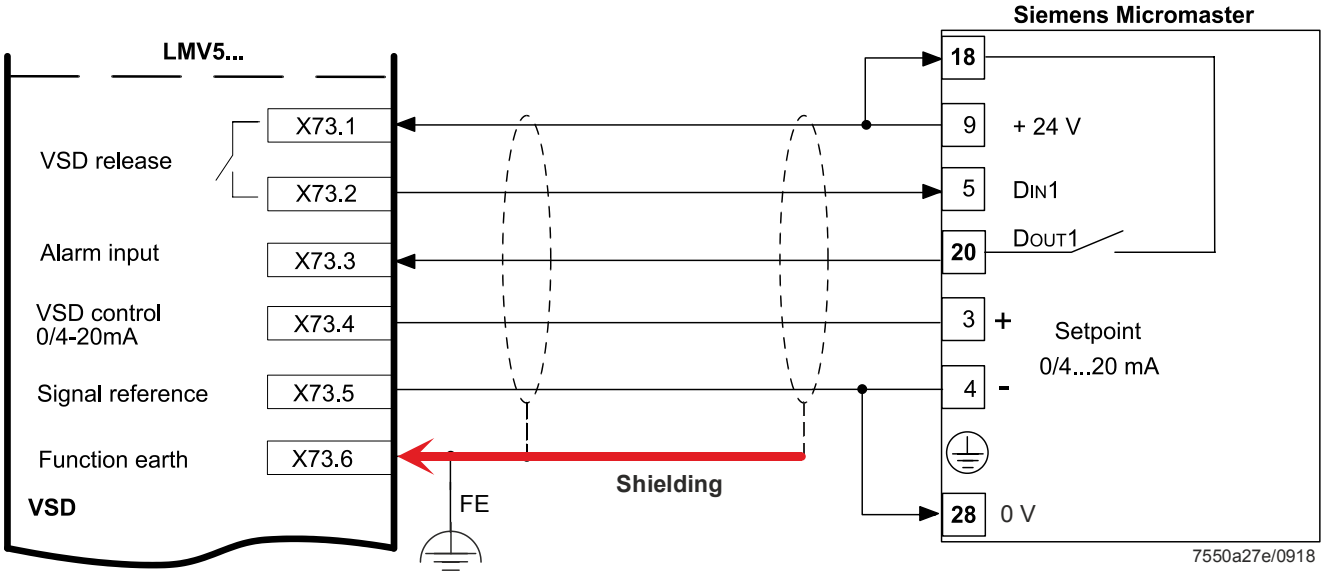


Figure 16: Cable shielding from the LMV5 to the VSD

Note!
If the LMV5 is mounted in a control cabinet, it is also possible to connect to the PE bar in the control cabinet as an alternative to X73 pin 6 / FE.

7 Ignition

The ignition is a further strong source of interference. For this reason, please observe the following recommendations:

- Keep the cable loop/length in the high-voltage ignition circuit as short as possible.
- Use a special EMC ignition cable.
- Avoid capacitive and inductive coupling to other signal lines.
  Use separate wiring for the high-voltage ignition cable, making sure to maintain the greatest possible distance from other cables and the burner housing.
  Example:
  Use an electrically insulating cable duct or distance spacer (made from plastic, for example) – see also the Appendix "*Example for wiring, earthing, and shielding the LMV5*".
- Use a double-pole ignition where possible (see drawings below).
- When using a double-pole ignition, the cables should run close together to ensure that the emissions range is as small as possible.

Double-pole ignition: **Recommended**

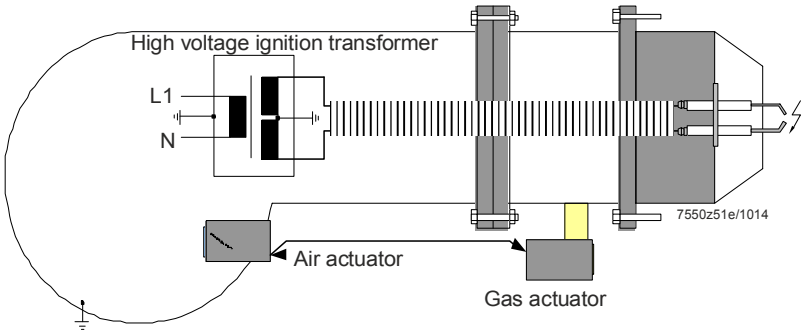


Figure 17: Double-pole ignition

Single-pole ignition: **Not** recommended

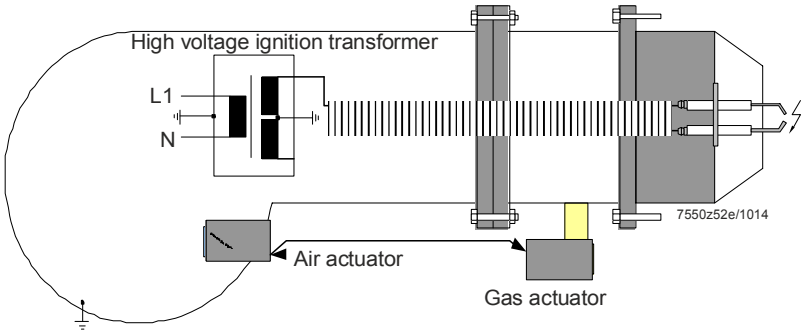


Figure 18: Single-pole ignition

If a single-pole ignition must be used, it is very important to have a low level of impedance at the mechanical connections (junctions) for the burner housing (no insulation material, e.g., paint), as this is the only way to ensure a **good** flow of current from the ignition spark back to the ignition transformer, resulting in **low** EM emissions:

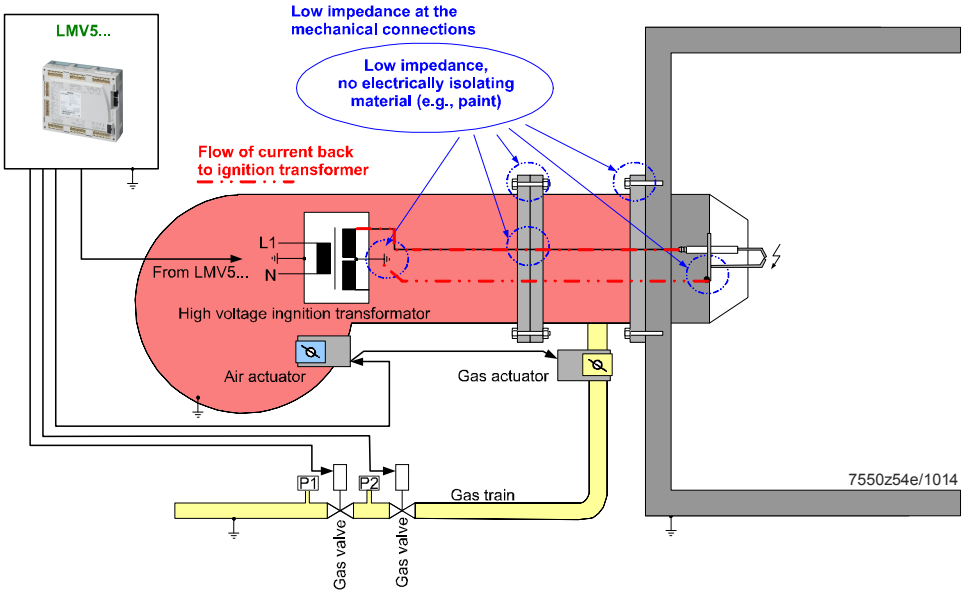


Figure 19: Single-pole ignition with low impedance at the burner housing

If the mechanical connections for the burner housing have a high level of impedance – e.g., due to paint – this causes multiple **poor** flows of current from the ignition spark back to the ignition transformer, resulting in **high** EM emissions.

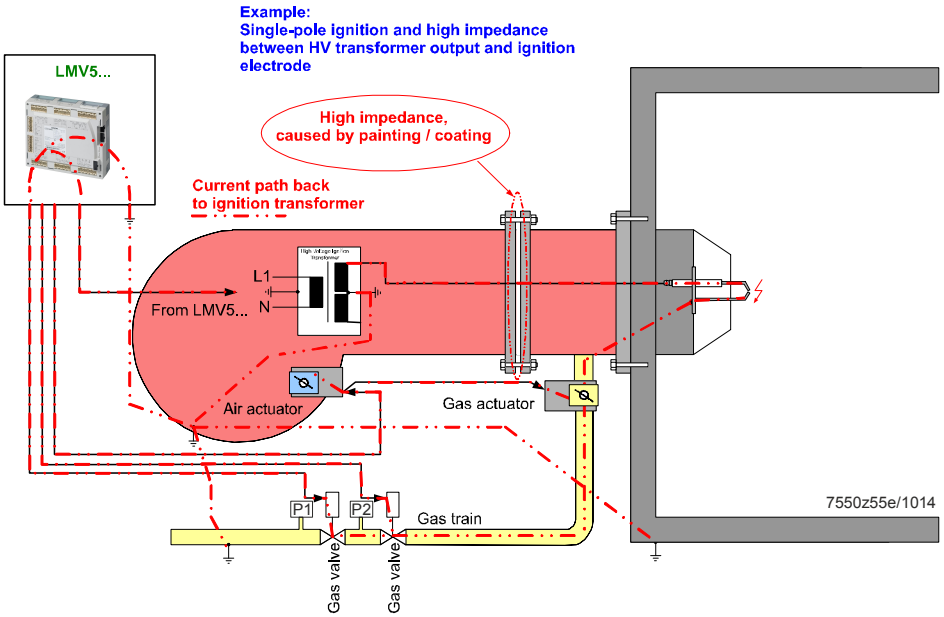


Figure 20: Single-pole ignition with high impedance at the burner housing

8 Earthing

8.1 Earthing systems

8.1.1 TN earthing system

In a TN earthing system, one of the points in the generator or transformer is connected to earth. In a three-phase system, this is typically the star point.

TN−S earthing:
Protective earth (PE) and neutral (N) are separate conductors.
This system is currently used in most homes and commercial facilities in North America and Europe.

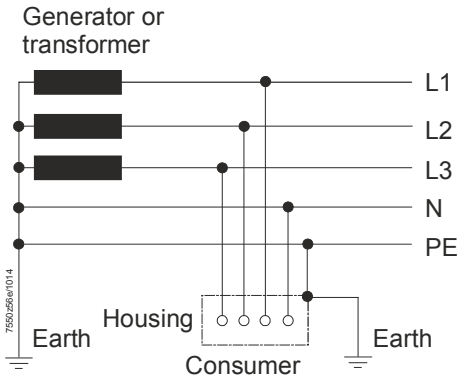


Figure 21: TN-S earthing

8.1.2 TT earthing system

In a TT earthing system (Terra – Terra), the protective earth connection for the consumer is provided by a local earth electrode and another is independently installed at the generator. There is no earth cable between the two.

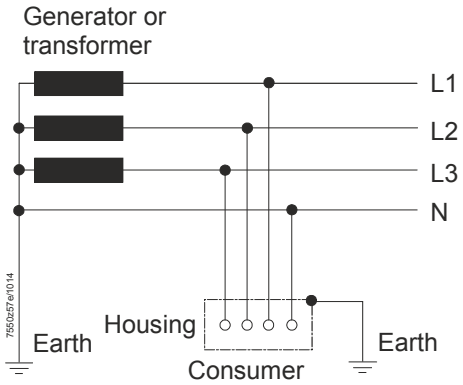


Figure 22: TT earthing

Note!
For the LMV5, it is preconditioned that either a TN or TT earthing system is used.

8.2 Protective earth (PE) and functional earth (FE)

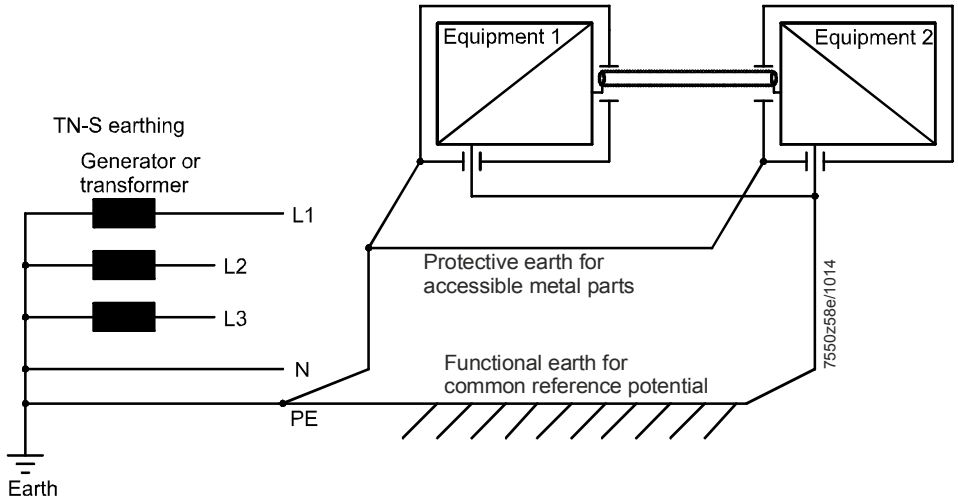


Figure 23: Protective earth, functional earth

Protective **E**arth (PE):
An equipment grounding conductor that avoids hazards by keeping the exposed conductive surfaces of a device at earth potential.
To avoid a potential voltage drop, there should be no current flowing through this conductor under normal circumstances.

Functional **E**arth (FE):
This is not designed to protect against electric shock – it is used to establish a common reference potential.

8.3 Recommendations

It is recommended to use a metal mounting plate for the LMV5 and the transformer AGG5.210. Use the mounting plate to provide the functional earth (FE) – see also the Appendix *"Example for wiring, earthing, and shielding the LMV5"*.

Note!
The connection between the LMV5 and the functional earth must be established by connecting the X52 pin 4 to the FE!

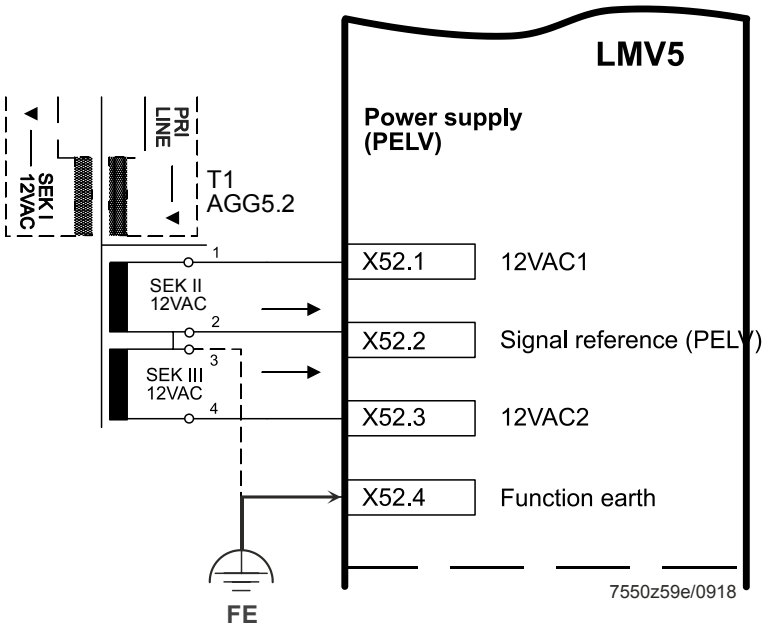


Figure 24: Connection between LMV5 and FE

* In some cases, connecting the terminal X52 pin 4 to FE results in improved EM immunity. Establish the connection with FE and check the results. If there is no improvement, remove the connection.

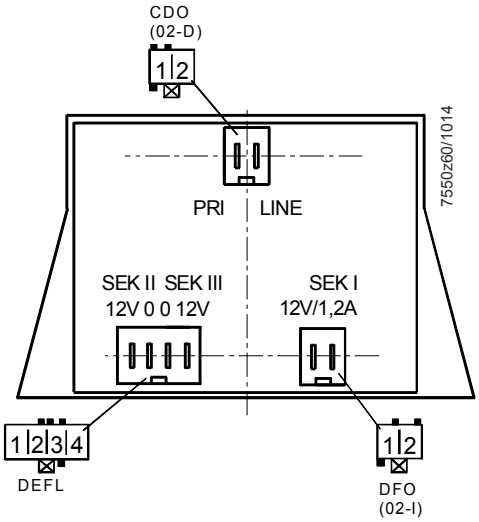


Figure 25: AGG5.210 / AGG5.220 supply transformer

- The FE is wired to the terminals for the shields inside the LMV5 (for temperature and pressure sensors, for example) – see Chapter *"Shielding".*
- Ensure that there is a good (low-resistance) connection from FE to the housing units for the SQM4 / SQM9 actuators. If necessary, connect the SQM45 / SQM48 / SQM91 actuators to FE using a separate cable with the maximum possible diameter. See also Chapter *"Shielding".*

9 Shielding

All FE (shield) connections are connected to connection X52 pin 4 inside the LMV5 (see figure).

Note!
The connection between the LMV5 and the functional earth must be established by connecting the X52 pin 4 to the FE!

See also Chapter *"Earthing"* and Appendix *"Example for wiring, earthing, and shielding the LMV5"*.
The shield terminals for the CAN bus (X50 pin 1, X51 pin 1) are connected directly to the X52 pin 4, while the other shield terminals are connected via capacitors to prevent DC current.

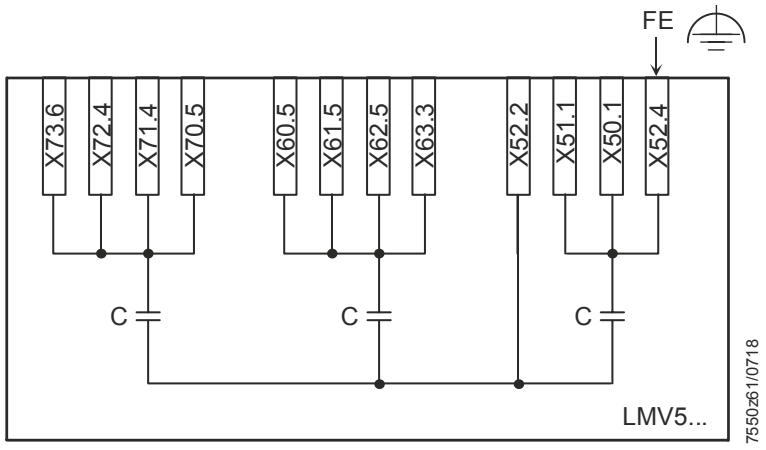


Figure 26: Connection from LMV5 to FE and internal wiring

Use shielded cables for the cables listed below:

- For the CAN bus cable, use the AGG5.631 and/or AGG5.641 accessory together with the AGG5.110 CAN bus connection shield to connect the CAN bus to the LMV5.
- Cables for the VSD:
  - Line voltage cable: VSD – fan motor
  - Low voltage cable: LMV5 – VSD, X73
- Cables for temperature or pressure sensors, setpoints, and load output on the LMV5: X60, X61, X62, X63
- Cables for the fuel counters on the LMV5: X71, X72
- Cables for the speed sensor: X70
- Cables for the QGO20 on the PLL52: X81
- Cables for temperature sensors on the PLL52: X86, X87
- Cables for QRA7 signal line numbers 3, 4, and 5 for cable lengths >10 m and <100 m.
  Use a signal cable with reinforced insulation and connect the shielding to protective earth (PE) or functional earth (FE).

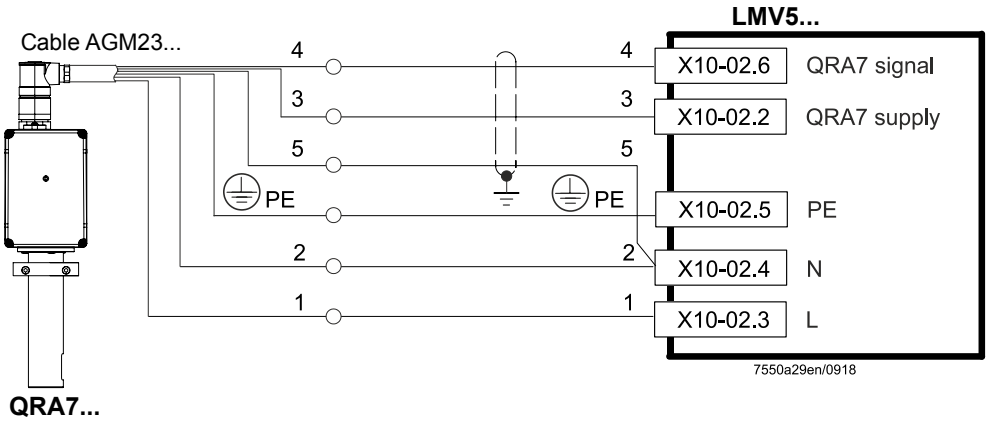


Figure 27: Connection diagram AGM23

10 Wiring

Separate wiring is recommended for the following cables:

Completely separate from all other cables

- Line voltage cable from VSD to fan motor – see also Chapter *"VSD"*
- High-voltage ignition cable – see also Chapter *"Ignition"*
- Cable for the flame sensors

Together in cable duct 1 for low voltage, e.g.:

- Cable for CAN bus
- Cable for VSD speed sensor, LMV5 X70
- Cable for VSD release and setpoint, LMV5 X73
- Cables for the load controller: Temperature or pressure sensor, setpoint, load output at LMV5 X60, X61, X62, X63

Together in cable duct 2 for line voltage, e.g.:

- Cable for ignition transformer
- Cables for other line voltage signals, e.g., gas pressure switches, air pressure switches, etc.
- Cables for SKPx5 / VGD gas valves
  The cables from the LMV5 to the SKPx5 / VGD gas valves should be connected at the LMV5 side as follows:
  X9-01 to V1-L, V2-L and X9-02 to N, PE
  Each SKPx5 should be wired separately to the control cabinet.
  N and PE should only be connected in the control cabinet (or at the LMV5).
  See also *"Example for wiring, earthing, and shielding the LMV5"* as well as the figure below:

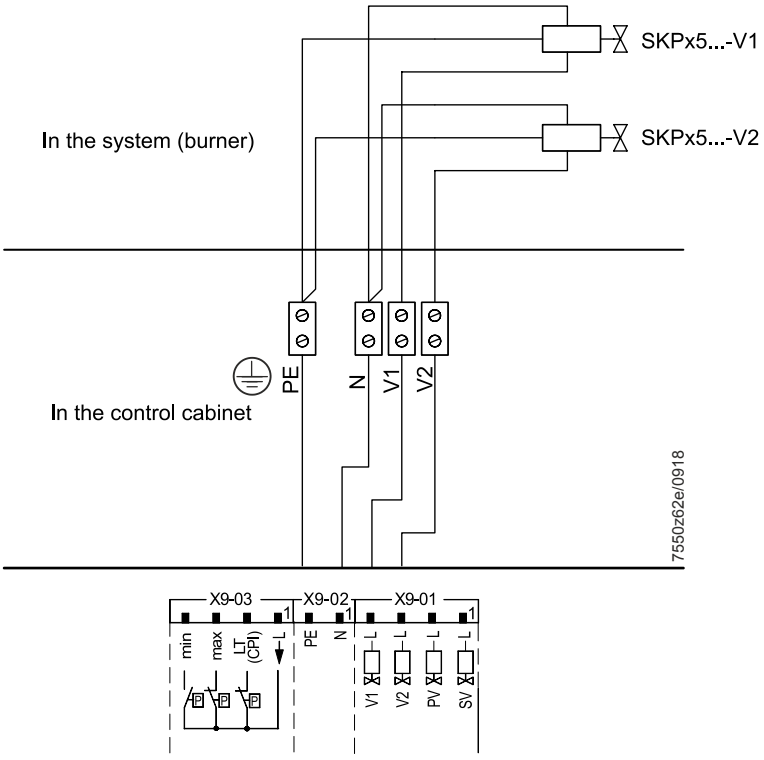


Figure 28: Wiring SKPx5-V1 / SKPx5-V2

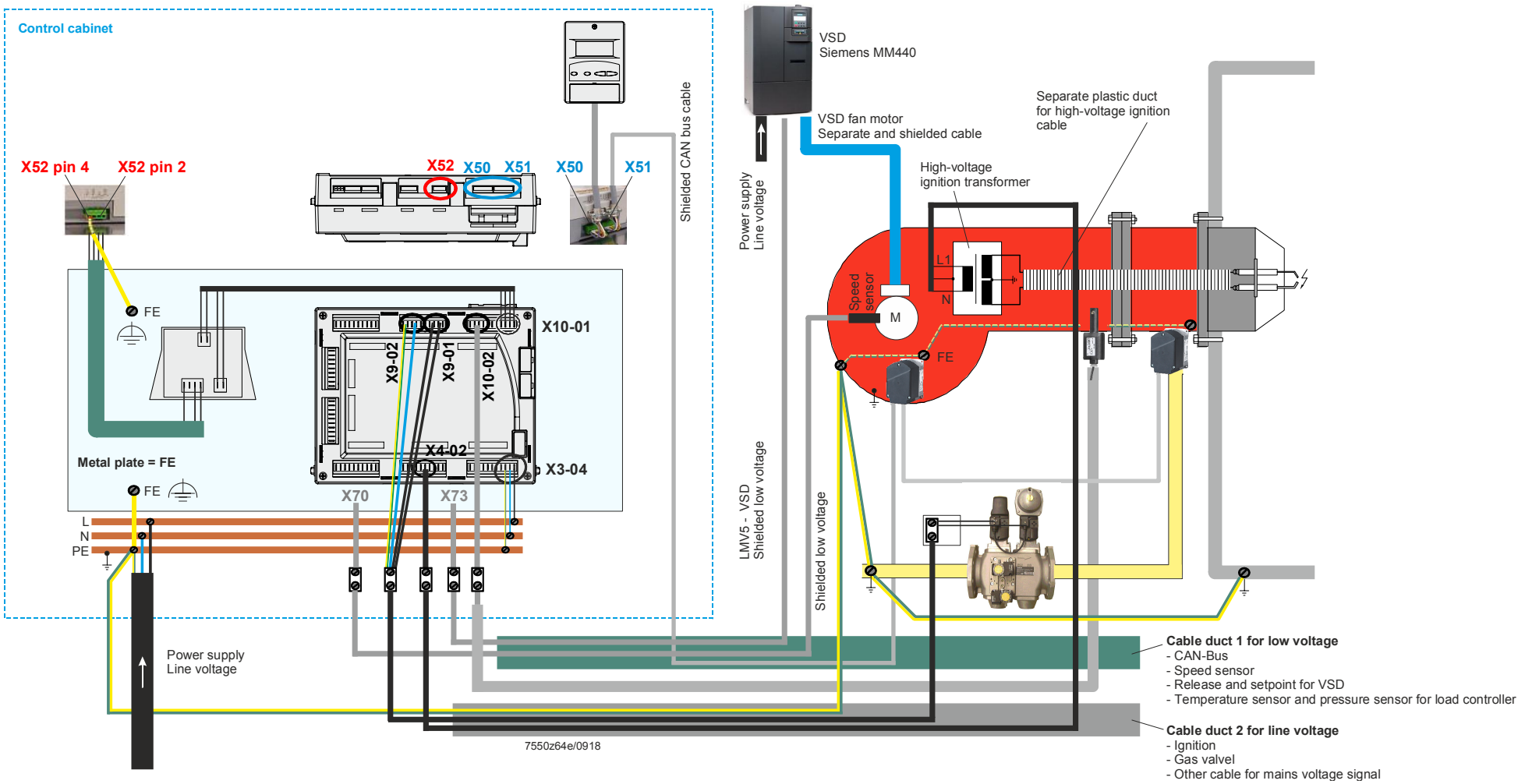


Figure 29: Example for wiring, earthing, and shielding the LMV5

11 Power supply to the LMV5

General

The LMV5 is powered via external transformer AGG5.2. This transformer supplies power to certain electronics sections via terminal X10 – 01 and to internal modules, actuators and AZL5 via terminal X52.
Run the power lines to the bus users together with the communication lines in a common cable.
Since the transformer's power line is restricted, a second power transformer is required if the system uses more than 4 SQM45 (or in the case of longer distances). The second power transformer is operated as shown in example 2.
In principle, the bus topology must always have a line structure and, therefore, must have a start and an end node.
The individual bus users must be connected in series, whereby the respective end nodes are to be terminated by bus terminating resistors.
The basic unit is a component of the communication line and to be looped in between the AZL5 and the actuators.
Within the LMV5, the AZL5 always assumes the function of a bus end node. The required bus terminating resistor is already integrated in that case.
With the actuators, the last user becomes the bus end node (here, the internal bus termination must be activated via a connecting plug).
The other node users within the line structure are to be configured without using a terminating resistor.

Example 1

Installation of all components in the burner;
CAN bus cable «LMV5 ↔ last actuator» <20 m

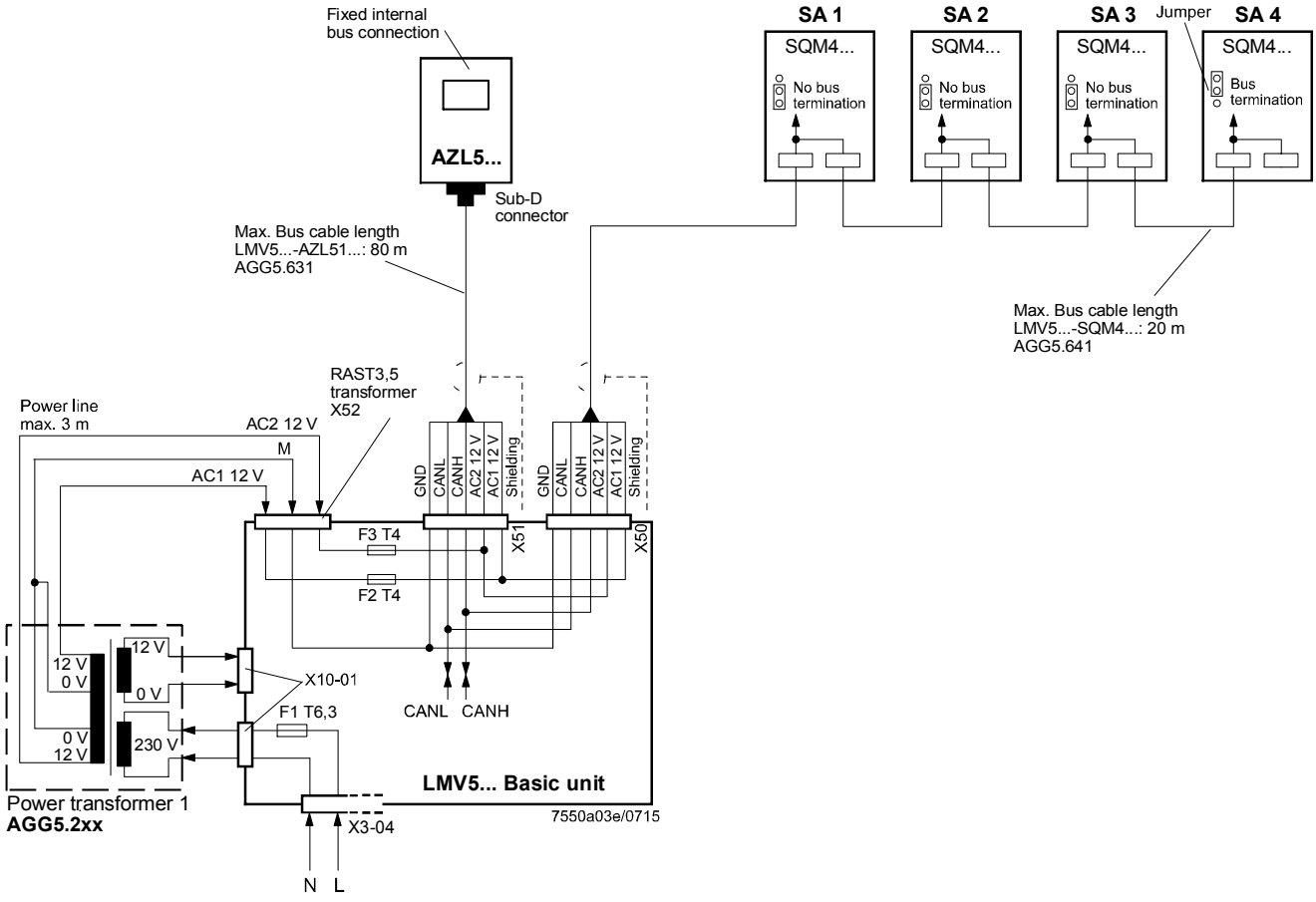


Figure 30: Installation of all components in the burner; CAN bus cable «LMV5 ↔ last actuator» <20 m

Note on example 1!
Total length of CAN bus cable ≤ 100 m

Example 2

LMV5 in the control panel, actuator on the burner;
CAN bus cable «LMV5 → last actuator» >20 m

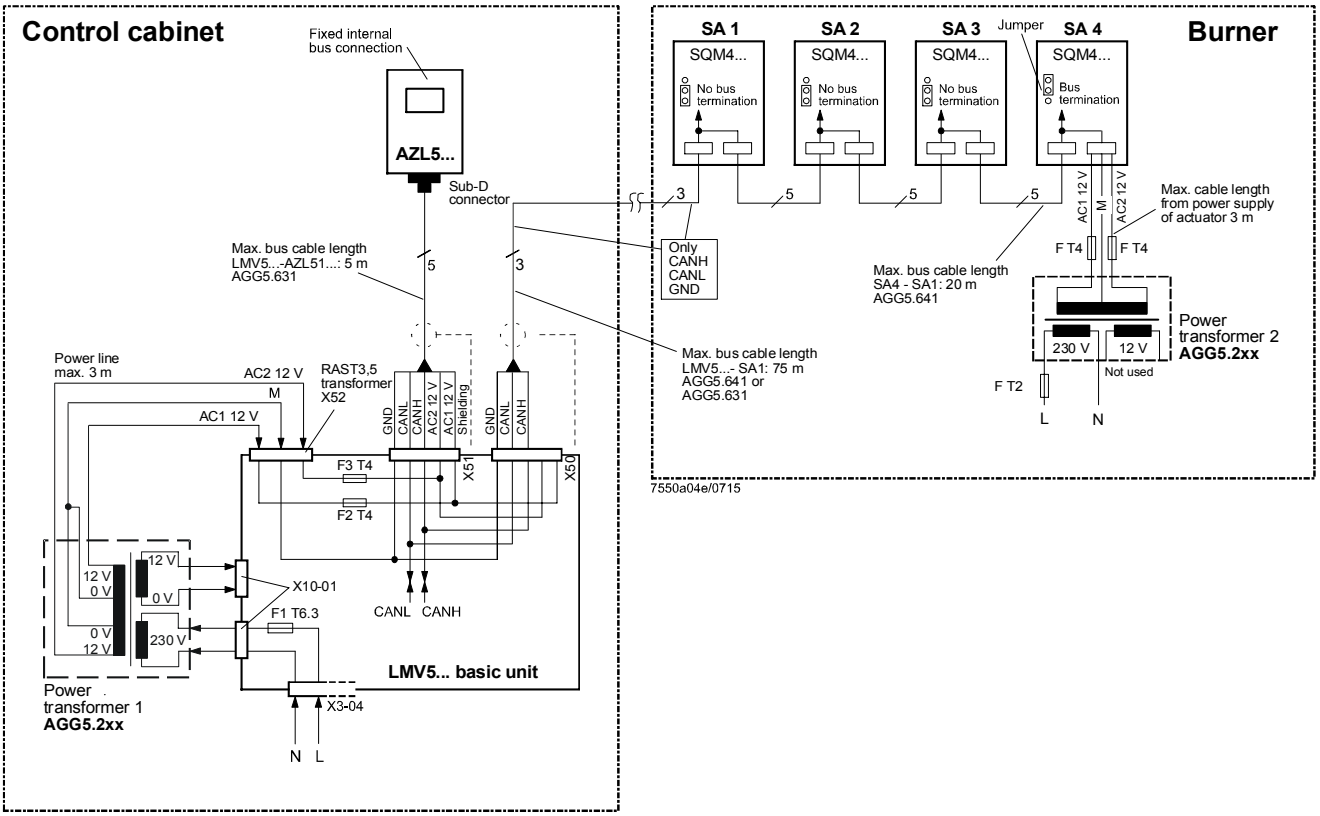


Figure 31: LMV5 in the control panel, actuator on the burner; CAN bus cable «LMV5 → last actuator» >20 m

Notes on example 2!
Total length of CAN bus cable ≤ 100 m

Whenever the distance between the LMV5 and the last actuator exceeds 20 m, or if more than 4 SQM45 is used on the burner (refer to sizing chart “Determination of maximum cable length“), a second transformer is required for powering the actuators. In that case, transformer 1 powers the LMV5 and the AZL5 (control panel). Transformer 2 powers the actuators (burner).

Note!
With the CAN bus cable connections from the LMV5 (control panel) to the first actuator (burner), the 2 voltages AC1 and AC2 on the LMV5 side must **not** be connected and only cables CANH, CANL and GND (+shielding) are to be connected to the first actuator (burner).
In that case, the actuators must be powered by a second transformer which to be located near the actuators.

The power from that transformer (lines AC1, AC2, M) must be fed to the actuator (ACT4 in the example above) and then connected through via bus cable AGG5.641 (cable type 1) to all the other actuators.
The fuses required for transformer 1 are accommodated in the LMV5.

Caution!
For transformer 2, these 3 fuses must be located close to the transformer (for type, refer to Basic Documentation P7550).

Example 3a

Installation of all components in the burner;
CAN bus cable «LMV52 ↔ last actuator» >20 m with 6 actuators and O2 module PLL52

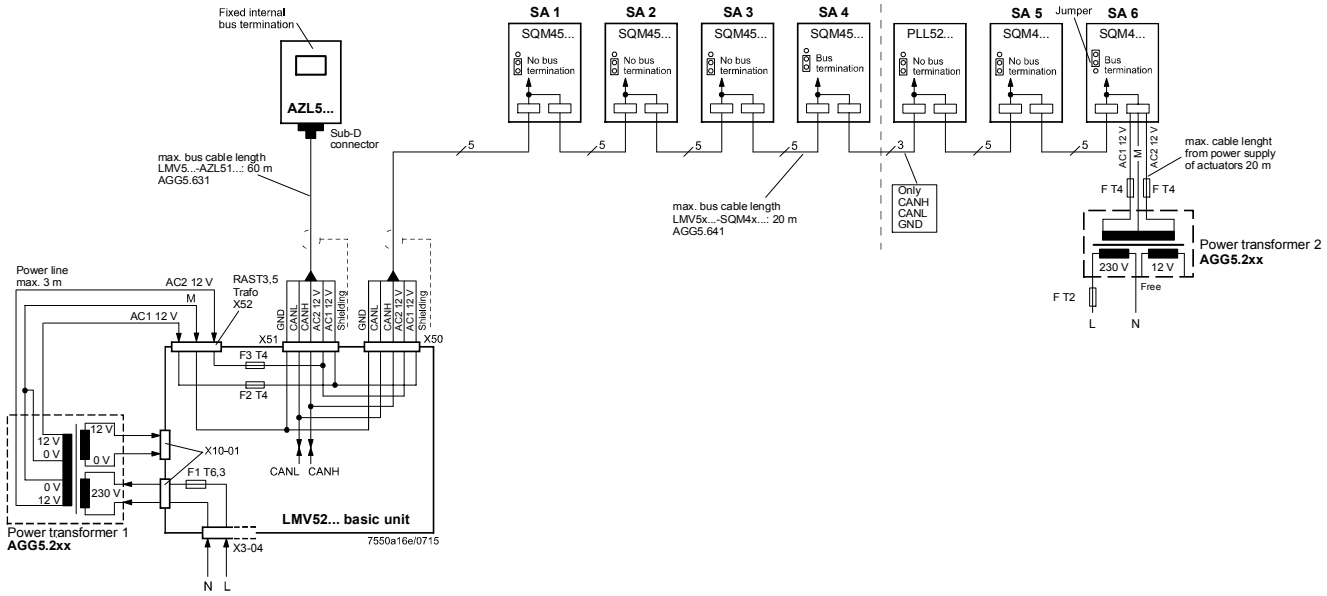


Figure 32: Installation of all components in the burner; CAN bus cable «LMV52 ↔ last actuator» >20 m with 6 actuators and O2 module PLL52

Example 3b

Installation in the control panel, actuator on the burner;
CAN bus cable «LMV52 ↔ last actuator» >25 m with 4 actuators and O2 module PLL52

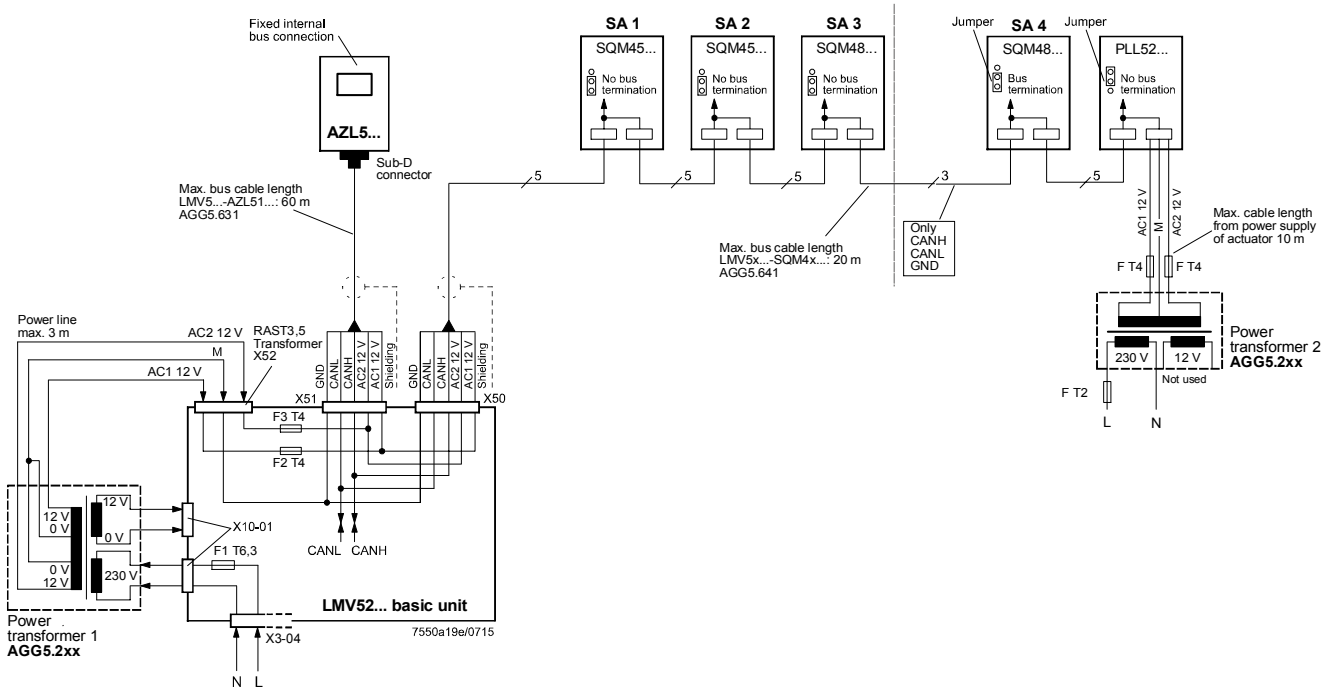


Figure 33: Installation in the control panel, actuator on the burner; CAN bus cable «LMV52 ↔ last actuator» >25 m with 4 actuators and O2 module PLL52

Notes on example 3a / 3b!
CAN bus cable with LMV52 and more than 4 actuators and O2 module PLL52

On LMV52 applications with more than 4 actuators (SQM45), a second transformer is required for powering the extra actuators.

In that case, transformer 1 powers the LMV52, the AZL5 and the first 4 actuators.

Note!
Interrupt the connection between the components at a suitable location. On the actuator side, the 2 voltages AC1 and AC2 must **not** be connected but only lines «CANH, CANL and GND» (+shield) to the O2 module and the other actuator.

The actuators (SA5, SA6) and the O2 module must be powered by a second transformer to be located near the actuators and the O2 module.

Connect the power supply line from that transformer to the O2 module PLL52 (in example 3a «SA6» / in example 3b «Auxiliary terminal) (lines AC1, AC2, M) and from there, via bus cable AGG5.641, through to the second actuator (SA) and the O2 module.
The fuses required for transformer 1 are accommodated in the LMV52.

Optionally, the supply voltage can also be delivered via a conduit box and fed into the connecting line between SA4 and PLL52.

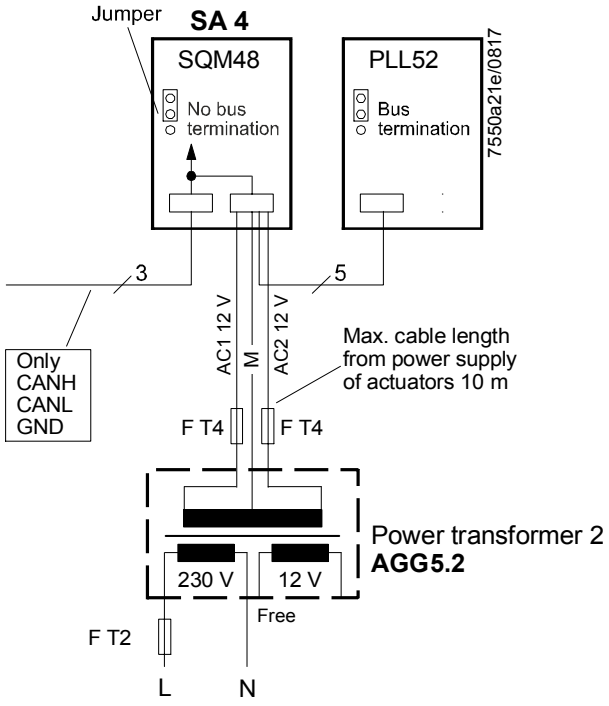


Figure 34: Installation in the control panel, on the burner and on the boiler; CAN bus cable «LMV52 ↔ last actuator» >25 m with 4 actuators and O2 module PLL52

Caution!
For transformer 2, the OEM must fit the 3 fuses close to the transformer.

Example 3c

Installation of all components in the burner; CAN bus cable «LMV52 ↔ last actuator» <20 m with 4 actuators and O2 module PLL52

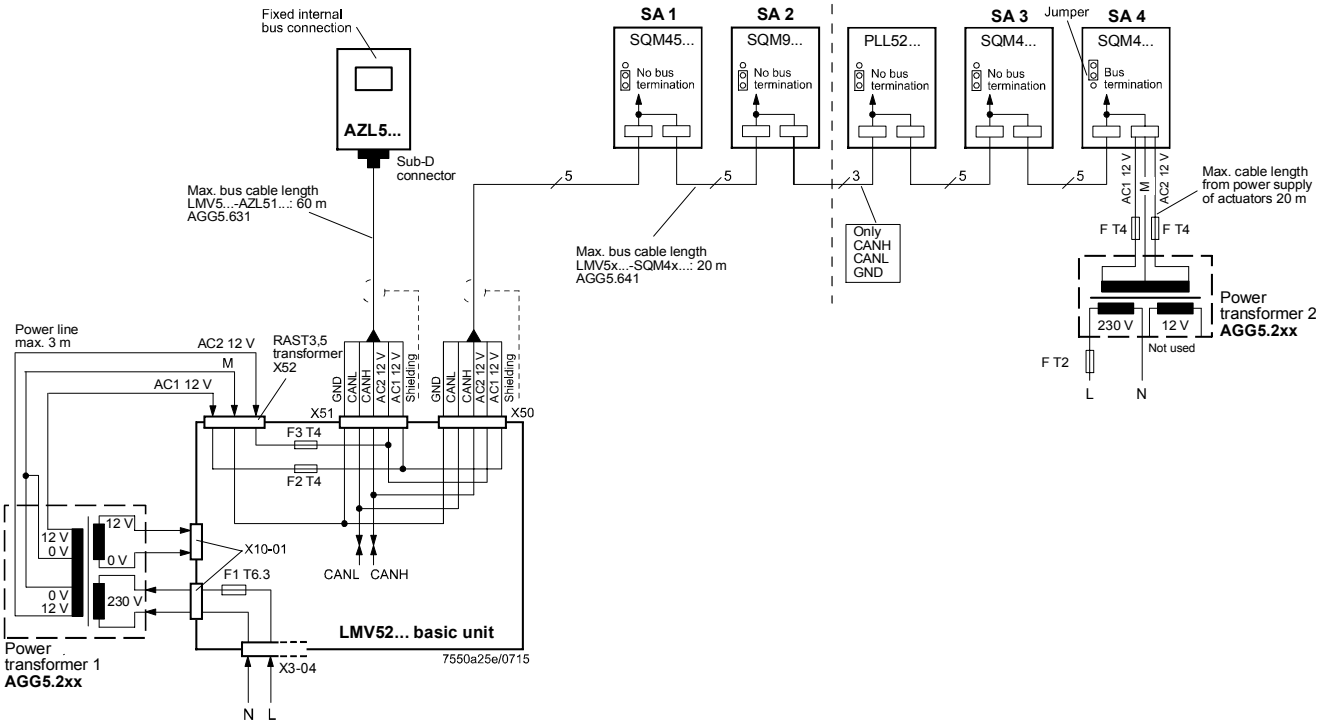
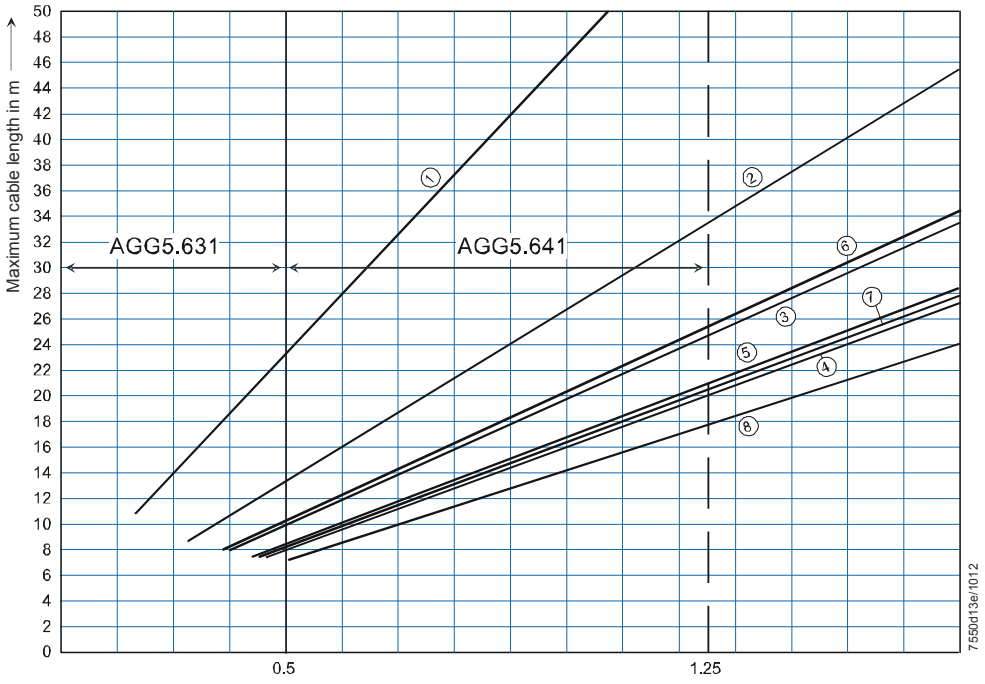


Figure 35: Installation of all components in the burner; CAN bus cable «LMV52 ↔ last actuator» <20 m with 4 actuators and O2 module PLL52

Determination of maximum cable length

The maximum cable length between transformer and bus users is dependent on the type of cable (cross-sectional area), the number of actuators and the type of actuator used (current).
The following graphs can be used to determine the maximum bus cable lengths between the transformer and the group of actuators or the AZL5, depending on the relevant influencing factors.
The assumption was made that the actuators within the group are close to one another.
The **minimum** cross-sectional area for the system examples shown results from the start of the curve.
The **maximum** cable lengths for the defined system cables AGG5.641 and AGG5.631 result from the points of intersection in the graph.

Diagram for cable length SQM45 / SQM48

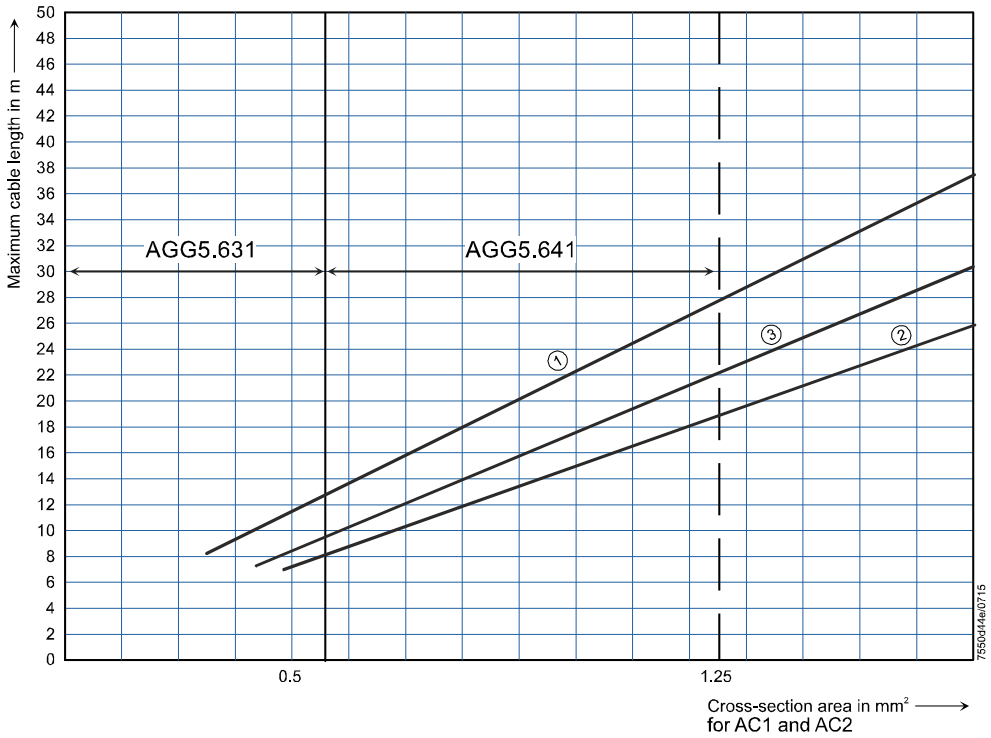


AGG5.631(cable type 2)
AGG5.641(cable typep 1)

① 1 x SQM45...
② 2 x SQM45...
③ 3 x SQM45...
④ 4 x SQM45...
⑤ 2 x SQM48...
⑥ 1 x SQM45... + 1 x SQM48...
⑦ 2 x SQM45... + 1 x SQM48...
⑧ 3 x SQM45... + 1 x SQM48...

Figure 36: CAN bus connection between power transformer and actuator group

Diagram for cable length
SQM45, SQM48 and SQM9



AGG5.631 (cable type 2)
AGG5.641 (cable type 1)

① 1 x SQM9...
② 1 x SQM48... + 1 x SQM9...
③ 1 x SQM45... + 1 x SQM9...

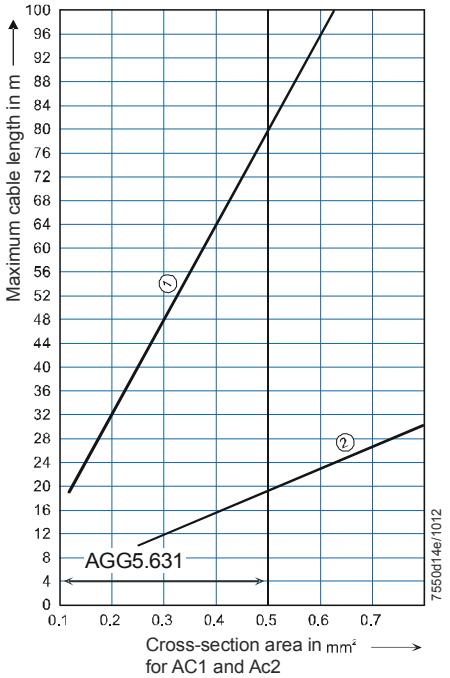
Figure 37: CAN bus connection between power transformer and actuator group

Note!
If, in addition a PLL52 is connected to the mains network, the maximum permissible cable lengths will have to be reduced by 2 m.

Example 1: System cable AGG5.641 (connecting cable to the actuators)
Actuators, 2 x SQM45

The point of intersection of the vertical line for the AGG5.641 (1.25 mm^2) and curve ② (2 x SQM45) gives a maximum cable length of 33.4 m between the transformer and the group of actuators.

Determination of maximum cable length (cont'd)



Bus connection with system AGG5.631 to AZL5

Point of intersection of vertical line AGG5.631 (0.5 mm^2) with curve ① produces a maximum cable length of 80 m between power transformer and AZL5.

Figure 38: CAN bus connection between transformer and AZL5

Types of cable

AGG5.641 (cable type 1) LMV5 ↔ SA

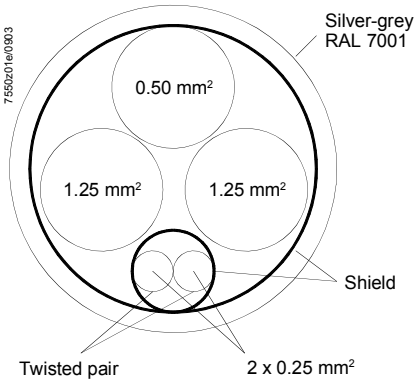


Figure 39: AGG5.641

AGG5.631 (cable type 2) LMV5 ↔ AZL5

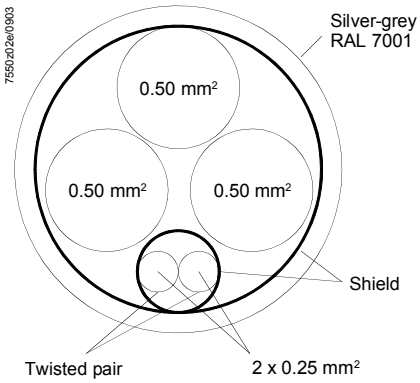


Figure 40: AGG5.631

12 Connection of accessories

Connecting cable to the PC (zero modem cable)

AZL COM1 Stecker 9-polig		Kabel	PC-COM Buchse 9-polig	
1				1
2	RxD		RxD	2
3	TxD		TxD	3
4				4
5	GND		GND	5
6				6
7				7
8				8
9				9

7550t01/0102

Figure 41: Connecting cable to the PC

The connection must be crossed between signals RxD and TxD.

In place of the connecting cable, it is also possible to use a combination of standard data communication components (e.g. data cable SUB-D 9 pins, m/f 1:1 and mini adapter null modem SUB-D 9 pins, m/f).

Assignment of pins

Coupling module Modbus / Profibus from Siemens AZL5 to Trebing & Himstedt SPI3

Trebing & Himstedt SUB-D		AZL5 RJ45
Pin	RS-232	Pin
2	RxD	3
3	TxD	1
5	GND	4 6

Trebing & Himstedt SUB-D		Converter	AZL5 RJ45
Pin	RS-485	RS-232 / RS-485	Pin
3	Bus-P	depends	1
8	Bus-N	on	3
		manufacturer	4 6

Connecting cable to eBus adapter

AZL COM2 8-pin RI 45		Cable	e-bus PC adapter 25-pin SUB-D connector	
1	TxD			2
2	—		—	
3	RxD			3
4	GND			7
5	U1			20
6	GND		—	
7	U2			4
8	—		—	

7550t02e/0704

Figure 42: Connecting cable to the eBus adapter

When preparing and fitting a connecting cable between AZL5 and a converter, note that pins 5 and 7 can deliver a current of maximum 5 mA each. Ensure adequate insulation against external potential.

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Siemens AG Building Technologies
Berliner Ring 23
D-76437 Rastatt
Tel. 0049-7222-598-279
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