Low Voltage

VarPlus Logic VL series

PF Correction Controller

Modbus user manual

Schneider Electric

VarPlus Logic VL6 / VL12 PFC controller: to download the user manual or other documentation visit www.schneider-electric.com. Type the device model (e.g., VarPlusLogic VL12) in the search field.

Contents

Safety instructions

Important information

Please read these instructions carefully and examine the equipment to become familiar with its operation before installing or servicing it. The following special messages that you will come across in this document or on the device are designed to warn you about potential hazards or draw your attention to information that will clarify or simplify a procedure.

The addition of one of these two symbols to a "Danger" or "Warning" safety label indicates that there is an electrical hazard that can result in injury if the instructions are not followed.

This is the safety warning symbol. It warns you of potential risks of personal injury. You must comply with all safety messages that follow this symbol in order to avoid the risk of injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result** in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **could result** in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **could result** in minor or moderate injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol is not used with this signal word.

NOTE: Provides additional information to clarify or simply a procedure.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. Schneider Electric will not accept any liability for consequences arising from the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety instructions

Before you begin

- This manual cannot be used to define or determine the suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof.

- When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

⚠ DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 or applicable local standards.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Do not exceed the device's ratings for maximum limits.
- Turn off all power supplying this equipment before working on or inside equipment.
- After removing power, wait 10 minutes to allow the capacitors to discharge before opening the doors or removing the covers.
- Always use a properly rated voltage sensing device to confirm power is off.
- Carefully inspect the interior for tools left behind before closing and sealing the door.
- Replace all devices, doors and covers before turning on power to this equipment.
- Do not modify the mechanical or electrical parts.
- For installation with network nominal voltage higher than 480 V LL, add a step down transformer on voltage measurement input to comply with the PFC controller max. voltage.

Failure to follow these instructions will result in death or serious injury.

- The equipment is factory-assembled and does not require any action during the installation except those indicated below.

Overview

The VarPlus Logic VL offers the ability to read values from the device and modify the settings of the device by use of the Modbus protocol. RS485 is used on the physical layer.
As this is a bus-capable interface, it is possible to connect more than one VarPlus Logic VL to a single pair of wires and access the units by use of an ID number.
Additional documentation for the Modbus protocol can be found at www.modbus.org.
The Modbus standards are also available there.

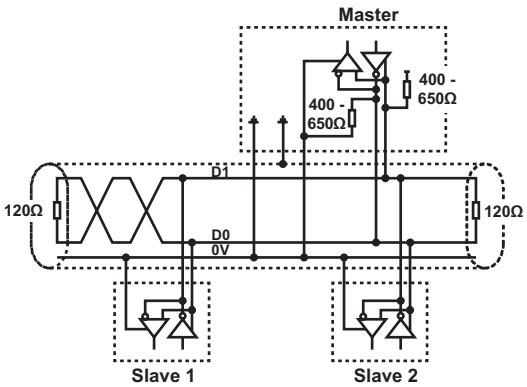
Characteristics for connection to RS485 Bus

The RS 485 standards allows variants of some characteristics:
- polarization
- line terminator
- number of slaves
- bus length

Characteristics	Standard value	VarPlus Logic VL
Maximum of number of slaves (without repeater)	32 slaves	32 slaves
Type of trunk cable	Single, shielded, twisted-pair cable, with 120 Ω characteristics impedance, and at least a third conductor	Same as standard value
Maximum bus length	1300 m (4300 ft) at 192 kBaud	1000 m (3300 ft) at 115 kBaud
Maximum length of tap-offs	Depends on the transmission rate	• 20 m (66 ft) for 1 tap-off • 40 m (131 ft) divided by the number of tap-offs on the multiple junction box
Bus polarization	• A 450... 650 Ω pull-up resistor at 5 V • A 450...650 Ω pull-down resistor at the common	• Same as standard value • Same as standard value ***Note:*** *these resistors are not integrated in the VarPlus Logic VL.*
Line terminator	A 120 Ω line terminator at both ends of the bus	Same as standard value
Common polarity	The common polarity is connected to the protective ground in at least one point on the bus.	Same as standard value

Modbus network standard diagram

The standard diagram corresponds to the Modbus specification on the www.modbus.org site and, in particular, to the 2-wire multidrop serial bus diagram. The simplified diagram is as follows:



VarPlus Logic connection

Two different types of RS485 connection are available:
- 2-wire RS485: this type uses only two data wires, which form one data channel. This means that, after sending a request, the bus master has to deactivate its transmitter to make the data line free for the answering device (Half-duplex mode),
- 4-wire RS485: this types uses one data line (two wires) for the master to slave direction and another one (two more wires) for the slave to master direction.

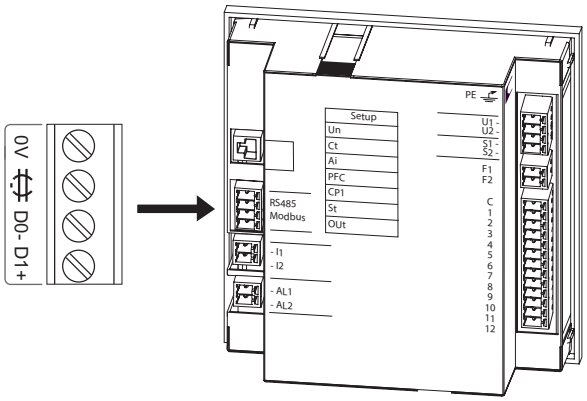
Note: *The VarPlus Logic VL does not support 4-wire RS485.*

Overview

The 2-wire version requires another connected line, the common ground GND. So, for the 2-wire version you need a cable with three wires.

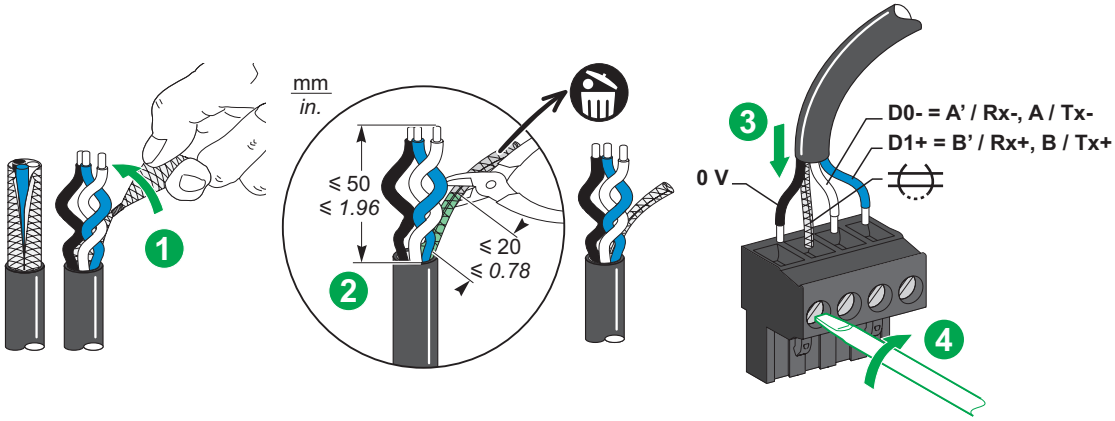
Always use shielded cable on the slave-master and master-slave cables. Do not use shielded cable for the GND (OV) connection; rather connect it to a protective ground to reduce electromagnetic influences.

The VarPlus Logic VL uses a 4-pin connector, as shown below:



- Pin assignments:
  - 0 V signal and power supply common
  - ⏚ modbus shield pin (no internal connection to 0 V or PFC controller ground terminal)
  - D0- transceiver terminal 0
  - D1+ transceiver terminal 1.
- Insulation (max continuous voltage): 1.3 kV.
- Wire: 0.2 to 1 mm² (30-19 AWG). Recommanded cable Belden 3106A (shielded, AWG22 3 wires).
- Torque: 0.5 to 5 Nm.

Open style connector wiring rules



Note: *Add a heat-shrink sleeve at the end of the stripped cable shield to protect the end of the cable.*

The yellow LED next to terminal indicates the status of the communication between the PFC controller (slave) and a master:
- If the yellow LED is blinking, communication is established.
- If the yellow LED is off, there is no active communication between master and slave.

VarPlus Logic Modbus setup

Modbus parameters must be configured through the expert setup menu in section 700 (see *VarPlus Logic User manual* paragraph 5).
- BAUD RATE (701): the valid range is 1200 - 115200 baud.

Default value = 19200.
- PARITY (702): parity to be None, Even or Odd.

Default value = Even.
- SLAVE ADRESS (703): the valid range is 1 - 247.

Default value = 1.

The settings for baud rate and parity must be the same for all bus devices; the address must be unique for each device.

Modbus / RS485

The Modbus protocol

Serial transmission modes

The VarPlus Logic VL always uses the RTU mode. ASCII mode is not implemented.

Function codes

The table below describes function codes supported by VarPlus Logic VL.

Function code Decimal	Hexadecimal	Description
03	0x03	Read holding register
04	0x04	Read input register
06	0x06	Write single register
08	0x08	Diagnostic functions
16	0x10	Write multiple register
43/14	0x2B/0x0E	Product identification
100/4	0x64/0x04	Read scattered holding register

Exception codes

If a slave is not able to execute a command that was sent by the master, it answers with exception codes. See the Modbus specification for a full list of codes. We do not include this list here, because the master software will be able to handle most exceptions automatically. If you must program the Modbus master stack, you will need the full specifications (which include the error codes).

Master-Slave protocol

For communication, a master-slave protocol is used. Only the bus master can initiate a transfer. The master begins by sending a command to a slave. The command includes a data frame with the corresponding function code. The slave then executes the command.

- The unicast mode is normally used to communicate on a Modbus system. One single slave is addressed by the slave number in the master's data packet. The valid address range is between 1 and 246. The slave then executes the command and answers by sending an acknowledge data packet back to the master.
- The master cannot receive an answer to a query in multicast mode. The command is executed in parallel by all slaves, and there is no acknowledgment.

The master initiates a multicast transfer by using "0" as slave number.

Address space

The data in the VarPlus Logic VL is organized and accessed by means of addresses. Each address accesses one data word. The data words are always 16 bits long. The VarPlus Logic VL does not differentiate the addresses between the function codes. There is one address space available. To access each address's data, any valid function code can be used. The units included in the Modbus table are:

Type	Description	Windows
Float32	32-bit floating-point number.	as defined in IEEE Standard 754.
Uint16	Unsigned 16-bit integer value.	0 – 65 535
Uint32	Unsigned 32-bit integer value	0 – 4 294 967 295
Sint16	Signed 32-bit integer value.	- 32768 – +32767
Sint32	Signed 32-bit integer value.	- 2 147 483 648 – +2 147 483 647
Bitmap	/	/

As the data is organized in 16-bit words, a set of sequential addresses has to be read for longer data items. For these, the base address is given in the tables. To read a Float32 with base address 12, you need to read two 16-bit words from addresses 12 and 13. These values are concatenated (big Endian format) to form the needed 32-bit result.

Note: *For data encoded in one word (16 bits), the Modbus standard specifies that the Most Significant Byte (MSB) is transmitted first and the Least Significant Byte (LSB) second. For data encoded in two words (32 bits), Most Significant Word is transmitted first and Least Significant Word second.*

All registers corresponding to the value that is not applicable contain value 0x8000.

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Modbus table

Measurement values

The measured values are available beginning from address 0 in intervals of two data words.
If voltage is too small to calculate valid harmonics from it, the value at the base address (= the fundamental) reads 0.0 %. This indicates that the higher harmonics for the voltage are also invalid.
The values Apparent power Ssum, Active power P-sum, Reactive power Q-sum, Lacking reactive power ΔQ and Power factor (P/S) relate to a symmetrical three-phase power system.
See the *VarPlus Logic VL User Manual* for detailed explanation on all these measurement values.
All these values can be accessed with function codes 03_{hex}, 04_{hex} and $64/4_{hex}$.

Address	Register	Value	Words	Type	Unit
0x001F4	501	U LL	2	Float32	V
0x001F6	503	U LN	2	Float32	V
0x001F8	505	Current: see note	2	Float32	A
0x001FA	507	Frequency	2	Float32	Hz
0x001FC	509	Active power P-sum	2	Float32	W
0x001FE	511	Reactive power Q-sum: see note	2	Float32	VAr
0x00200	513	Apparent power S-sum: see note	2	Float32	VA
0x00202	515	Lacking reactive power ΔQ: see note	2	Float32	VAr
0x00204	517	Cos φ: see note	2	Float32	-
0x00206	519	Power factor (P/S)	2	Float32	-
0x00208	521	Average Power factor APF	2	Float32	-
0x0020A	523	Tan φ	2	Float32	-
0x0020C	525	Ambient temperature	2	Float32	°C
0x0020E	527	Maximum temperature	2	Float32	°C
0x00210	529	Total harmonic distortion THD U	2	Float32	%
0x00212	531	Capacitor overload current ratio	2	Float32	%
0x00214	533	Harmonics U 3. order	2	Float32	%
0x00216	535	Harmonics U 5. order	2	Float32	%
0x00218	537	Harmonics U 7. order	2	Float32	%
0x0021A	539	Harmonics U 9. order	2	Float32	%
0x0021C	541	Harmonics U 11. order	2	Float32	%
0x0021E	543	Harmonics U 13. order	2	Float32	%
0x00220	545	Harmonics U 15. order	2	Float32	%
0x00222	547	Harmonics U 17. order	2	Float32	%
0x00224	549	Harmonics U 19. order	2	Float32	%
0x00226	551	Operation hours	2	Uint32	s

Note: *when the user parameter Q offset is entered, this value is added to the Current, Apparent Power, Reactive Power, lacking Reactive Power (ΔQ), Cosφ: see VarPlus Logic user manual (Transformer compensation) for more detailed explanation.*

Modbus / RS485

User Parameter settings

Parameters set by the user are stored in different data types.
The base addresses and the data type are in the table below.
See *VarPlus Logic VL User Manual* for detailed explanation on all these parameters.
All these values can be accessed with function codes 03_{hex}, 04_{hex}, 06_{hex}, 10_{hex} and $64/4_{hex}$.

Address	Register	Value	Words	Type	Unit
0x0064	101	See table below	1	Uint16	-
0x0065	102	See table below	1	Uint16	-
0x0066	103	See next page	1	Uint16	-
0x0067	104	See next page	1	Uint16	-
0x0068	105	Phase offset	1	Uint16	°
0x0069	106	Temperature offset	1	Sint16	°C
0x006A	107	Asymmetry Factor	1	Sint16	-
0x006B	108	Limit for Hunting alarm	1	Uint16	-
0x006C	109	Nominal Voltage L - L	2	Float32	V
0x006E	111	CT ratio	2	Float32	-
0x0070	113	PT ratio	2	Float32	-
0x0072	115	Tolerance nominal voltage	2	Float32	-
0x0074	117	Control sensitivity	2	Float32	-
0x0076	119	Target cos φ1 (-0.7…1.0…0.7= 0.70cap…1.00…0.70ind)	2	Float32	-
0x0078	121	Target cos φ2 (-0.7…1.0…0.7= 0.70cap…1.00…0.70ind)	2	Float32	-
0x007A	123	Switching Time interval	2	Float32	s
0x007C	125	Step Exchange interval	2	Float32	s
0x007E	127	Q offset (-9999kvar…9999kvar)	2	Float32	VAr
0x0080	129	Discharge Time	2	Float32	s
0x0082	131	Limit for THDU alarm	2	Float32	-
0x0084	133	Delay Time for (THDU, Overload, Temp.) alarm	2	Float32	s
0x0086	135	Limit for Max. Switching cycles alarm	2	Uint32	-
0x0088	137	Limit for Max. Operation time alarm	2	Uint32	s
0x008A	139	Limit for capacitor overload current ratio	2	Float32	-
0x008C	141	Limit for temp 1 (Fan relay)	2	Float32	°C
0x008E	143	Limit for temp 2 (Alarm relay)	2	Float32	°C

Addresses 100 through 103 are user parameter settings that are not numeric values. At this point, all user parameters are coded binary. Each single bit represents an adjustment available in menu "Measurement" or "Control." For these addresses, the UINT 16 value is coded as follows:

Address	Register	Value	Words	Type	Unit
0x0064	101	Validity for flags 1	1	Uint16	-
0x0065	102	User parameter flags 1	1	Uint16	-

User parameter flags 1

Bit0	(1) = Connection Measurement L- L	(0) = Connection measurement L- N
Bit1	(1) = Measurement FIX 50 Hz	If bit1 and bit2 both set to zero measurement is set to Auto-synchronization frequency
Bit2	(1) = Measurement FIX 60 Hz	
Bit3	Reserved	
Bit4	Reserved	
Bit5	(1) = Switch to cos φ2 if Power export	(0) = Do not switch to cos φ2 if Power export
Bit6	(1) = Step exchange on	(0) = Step exchange off
Bit7	(1) = Step recognition on	(0) = Step recognition off
Bit8	(1) = Lock faulty steps	(0) = Do not lock faulty steps
Bit9	(1) = Start control, see note	(0) = Stop or hold control (depending bit 10 selection)
Bit10	(1) = Hold control	(0) = Stop control
Bit11	(1) = LIFO algorithm	If bit11 and bit12 are both set to zero, the control algorithm is set to AUTO.
Bit12	(1) = PROGRESSIVE algorithm	
Bit13	(1) = Steps off if Q capacitive	(0) = No action on steps if Q is cap.
Bit14	Reserved	
Bit15	Reserved	

Note: *If bit9=1, the PFC controller starts whatever the bit10.*

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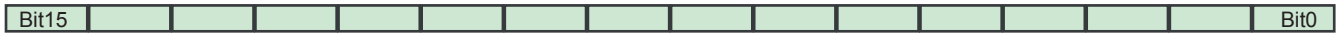
Adress	Register	Value	Words	Type	Unit
0x0066	103	Validity for flags 2	1	Uint16	-
0x0067	104	User parameter flags 2	1	Uint16	-

User parameter flags 2



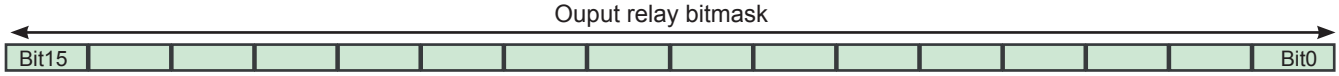
Bit0	(1) = Reset Alarms manually	(0) = Reset Alarms automatically
Bit1	(1) = Switch steps off if THDU & Capacitor overload current ratio & Temperature alarms occur.	(0) = No action on step control if THDU & Capacitor overload current ratio & Temperature alarms occur.
Bit2	(1) = Freeze control if I is lower than the limit	(0) = Normal operation if I is lower than the limit
Bit3	(1) = Enable service alarm	(0) = Disable service alarm
Bit4	(1) = Enable control alarm	(0) = Disable control alarm
Bit5	(1) = Enable faulty step alarm	(0) = Disable faulty step alarm
Bit6	(1) = Enable step power lost alarm	(0) = Disable step power lost alarm
Bit7	(1) = Enable hunting alarm	(0) = Disable hunting alarm
Bit8	Reserved	
Bit9	(1) = DI active on positive edge	(0) = DI active on negative edge
Bit10	Reserved	
Bit11	Reserved	
Bit12	Reserved	
Bit13	Reserved	
Bit14	Reserved	
Bit15	Reserved	

Output Relay status

The state of the used relay outputs, fan relay and alarm relay can be seen in the bit mask below. If the referring bit = 1, the relay is closed.
All these values can be accessed with function codes 03_{hex}, 04_{hex} and $64/4_{hex}$.

Adress	Register	Value	Words	Type	Unit
0x12C	301	Validity for Output Relay bitmask	1	Uint16	-
0x12D	302	Output Relay bitmask	1	Uint16	-

Ouput relay bitmask



Bit0	(1) = Relay output 1 closed	(0) = Relay output 1 open
Bit1	(1) = Relay output 2 closed	(0) = Relay output 2 open
Bit2	(1) = Relay output 3 closed	(0) = Relay output 3 open
Bit3	(1) = Relay output 4 closed	(0) = Relay output 4 open
Bit4	(1) = Relay output 5 closed	(0) = Relay output 5 open
Bit5	(1) = Relay output 6 closed	(0) = Relay output 6 open
Bit6	(1) = Relay output 7 closed	(0) = Relay output 7 open
Bit7	(1) = Relay output 8 closed	(0) = Relay output 8 open
Bit8	(1) = Relay output 9 closed	(0) = Relay output 9 open
Bit9	(1) = Relay output 10 closed	(0) = Relay output 10 open
Bit10	(1) = Relay output 11 closed	(0) = Relay output 11 open
Bit11	(1) = Relay output 12 closed	(0) = Relay output 12 open
Bit12	(1) = Fan relay closed	(0) = Fan relay open
Bit13	(1) = Alarm relay closed	(0) = Alarm relay open
Bit14	Reserved	
Bit15	Reserved	

Note: *on VL6, bit6 to bit11 always zero. Validity bitmask then is 0x303F. On VL12, 0x3FFF.*

Modbus / RS485

Example:

6 steps with folllowing configuration:
- step 1: Fix off
- step 2 and 3: Fix on
- step 4, 5 and 6: Auto

- Register 202: x000111 because:
- steps 1, 2, 3 are Fix (on or off),
- steps 4, 5, 6 are in auto.

- Register 204: x000110, from right to left:
- 0: for step 1 in Fix off
- 1: for step 2 in Fix on
- 1: for step 3 in Fix on
- 0: for step 4 in Auto
- 0: for step 5 in Auto
- 0: for step 6 in Auto.

Steps database

The base addresses and the data types can be found in the table below. See *VarPlus Logic VL User Manual* for detailed explanation on all these values. All these values can be accessed with function codes 03_{hex}, 04_{hex},and $64/4_{hex}$.

Adress	Register	Value	Words	Type	Unit
0x0C8	201	Validity of fix steps mask	1	Uint16	-
0x0C9	202	Fix steps (1 = fix)	1	Uint16	-
0x0CA	203	Validity of fix steps on / off mask	1	Uint16	-
0x0CB	204	Fix steps on / off (1 = on)	1	Uint16	-
0x0CC	205	Validity of defective steps mask	1	Uint16	-
0x0CD	206	Defective steps (1 = defective)	1	Uint16	-

[bit0 = output 1] to [bit11 = output 12]

All further addresses and data types for the other step information can be found in the table below. The values for the step sizes are based on nominal voltage.

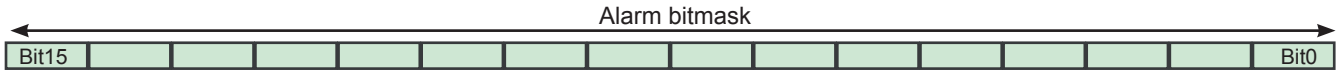
Adress	Register	Value	Words	Type	Unit
0x0CE	207	Current step size step 1	2	Sint32	VAr
0x0D0	209	Current step size step 2	2	Sint32	VAr
0x0D2	211	Current step size step 3	2	Sint32	VAr
0x0D4	213	Current step size step 4	2	Sint32	VAr
0x0D6	215	Current step size step 5	2	Sint32	VAr
0x0D8	217	Current step size step 6	2	Sint32	VAr
0x0DA	219	Current step size step 7	2	Sint32	VAr
0x0DC	221	Current step size step 8	2	Sint32	VAr
0x0DE	223	Current step size step 9	2	Sint32	VAr
0x0E0	225	Current step size step 10	2	Sint32	VAr
0x0E2	227	Current step size step 11	2	Sint32	VAr
0x0E4	229	Current step size step 12	2	Sint32	VAr
0x0E6	231	Initial step size step 1	2	Sint32	VAr
0x0E8	233	Initial step size step 2	2	Sint32	VAr
0x0EA	235	Initial step size step 3	2	Sint32	VAr
0x0EC	237	Initial step size step 4	2	Sint32	VAr
0x0EE	239	Initial step size step 5	2	Sint32	VAr
0x0F0	241	Initial step size step 6	2	Sint32	VAr
0x0F2	243	Initial step size step 7	2	Sint32	VAr
0x0F4	245	Initial step size step 8	2	Sint32	VAr
0x0F6	247	Initial step size step 9	2	Sint32	VAr
0x0F8	249	Initial step size step 10	2	Sint32	VAr
0x0FA	251	Initial step size step 11	2	Sint32	VAr
0x0FC	253	Initial step size step 12	2	Sint32	VAr
0x0FE	255	Switching cycles step 1	2	Uint32	-
0x100	257	Switching cycles step 2	2	Uint32	-
0x102	259	Switching cycles step 3	2	Uint32	-
0x104	261	Switching cycles step 4	2	Uint32	-
0x106	263	Switching cycles step 5	2	Uint32	-
0x108	265	Switching cycles step 6	2	Uint32	-
0x10A	267	Switching cycles step 7	2	Uint32	-
0x10C	269	Switching cycles step 8	2	Uint32	-
0x10E	271	Switching cycles step 9	2	Uint32	-
0x110	273	Switching cycles step 10	2	Uint32	-
0x112	275	Switching cycles step 11	2	Uint32	-
0x114	277	Switching cycles step 12	2	Uint32	-

Modbus / RS485

Alarm status

The following registers contain information on alarms.
The assignment of the alarms can be seen in the bit mask below.
If the referring bit = 1, the alarm is active.
See *VarPlus Logic VL User Manual* for detailed explanation of all alarm parameters. All these values can be accessed with function codes 03_{hex}, 04_{hex} and $64/4_{hex}$.

Adress	Register	Value	Words	Type	Unit
0x2BC	701	Validity of alarm bitmask	1	Uint16	-
0x2BD	702	Alarm bitmask	1	Uint16	-



Bit0	(1) = “Hunting Alarm” active	(0) = “Hunting Alarm” off
Bit1	(1) = “Capacitor overload current ratio Alarm” active	(0) = “Capacitor overload current ratio Alarm” off
Bit2	(1) = “Max Switching cycles” active	(0) = “Max Switching cycles” off
Bit3	(1) = “Max Operation hours” active	(0) = “Max Operation hours” off
Bit4	(1) = “Temp. 2 limit (Alarm)” active	(0) = “Temp. 2 limit (Alarm)” off
Bit5	Reserved	
Bit6	(1) = “Step power loss Alarm” active	(0) = “Step power loss Alarm” off
Bit7	(1) = “Faulty Step Alarm” active	(0) = “Faulty Step Alarm” off
Bit8	(1) = “THDU Alarm” active	(0) = “THDU Alarm” off
Bit9	(1) = “Control Alarm” active	(0) = “Control Alarm” off
Bit10	(1) = “Over current Alarm” active	(0) = “Over current Alarm” off
Bit11	(1) = “Low current Alarm” active	(0) = “Low current Alarm” off
Bit12	(1) = “Voltage tolerance alarm” active	(0) = “Voltage tolerance Alarm” off
Bit13	Reserved	
Bit14	Reserved	
Bit15	Reserved	

Alarm buffer

The alarm buffer is organized as a shift buffer with five memory cells.
The latest alarm is stored in cell number1, all other alarms shifted by one, the oldest is erased. Each cell is organized as a bitmask, which holds the bit of the occurred alarm.
All these values can be accessed with function codes 03_{hex}, 04_{hex} and $64/4_{hex}$.

Adress	Register	Value	Words	Type	Unit
0x320	801	Alarm 1 (latest)	1	Uint16	-
0x321	802	Alarm 2	1	Uint16	-
0x322	803	Alarm 3	1	Uint16	-
0x323	804	Alarm 4	1	Uint16	-
0x324	805	Alarm 5 (oldest)	1	Uint16	-

Modbus / RS485

Device identification 16-bit registers

These values can be accessed with function codes 03_{hex} and 04_{hex} and $64/4_{hex}$.

Address	Register	Value	Words	Type	Unit	Value (VL6/ VL12)
0x190	401	Product Identifier	1	Uint16	-	17170/17171
0x191	402	FW [X,X]	1	Uint16	-	
0x192	403	FW [X,'.']	1	Uint16	-	
0x193	404	FW [Y,Y]	1	Uint16	-	
0x194	405	FW [Y,'.']	1	Uint16	-	
0x195	406	FW [Z,Z]	1	Uint16	-	
0x196	407	FW [Z,0x00]	1	Uint16	-	
0x197	408	Product Family ['C','o']	1	Uint16	-	Co
0x198	409	Product Family ['n','t']	1	Uint16	-	nt
0x199	410	Product Family ['r','o']	1	Uint16	-	ro
0x19A	411	Product Family ['l','l']	1	Uint16	-	ll
0x19B	412	Product Family ['e','r']	1	Uint16	-	er
0x19C	413	User Application ['O','t']	1	Uint16	-	Ot
0x19D	414	User Application ['h','e']	1	Uint16	-	he
0x19E	415	User Application ['r',0x00]	1	Uint16	-	r
0x19F	416	Serial Number DateCode WW	1	Uint16	-	w
0x1A0	417	Serial Number DateCode YY	1	Uint16	-	y
0x1A1	418	Serial Number first two digits	1	Uint16	-	
0x1A2	419	Serial Number second two digits	1	Uint16	-	
0x1A3	420	Serial Number third two digits	1	Uint16	-	
0x1A4	421	Serial Number fourth two digits	1	Uint16	-	
0x1A5	422	HW [X,X]	1	Uint16	-	
0x1A6	423	HW [X,'.']	1	Uint16	-	
0x1A7	424	HW [Y,Y]	1	Uint16	-	
0x1A8	425	HW [Y,'.']	1	Uint16		
0x1A9	426	HW [Z,Z]	1	Uint16	-	
0x1AB	427	HW [Z,0x00]	1	Uint16	-	

Function Code 43 MEI Type 14

The VarPlus Logic controller fulfills conformity level 0x82: extended identification (stream and individual access)

- Vendor Name
- Product Code
- Major Minor Revision
- Vendor URL
- Product Name
- Product Model
- User Application Name

Read Device Identification request for VarPlus Logic: Read DevID 01.

Query		Response	
Description	**Data**	**Description**	**Data**
Function Code	0x2B	Function code	0x2B
MEI Type	0x0E	MEI Type	0x0E
Read DevID code	01	Read DevID code	01
Object ID	00	Conformity Level	0x82
		More Follows	00
		Next ObjectID	00
		Number Of Objects	07
		Object0.ID	00
		Object0.Length	0x12
		Object0.Value	“Schneider Electric”
		Object1.ID	01
		Object1.Length	0x0E
		Object1.Value	VPL06N or VPL12N
		Object2.ID	02
		Object2.Length	0x0B
		Object2.Value	“XXX.YYY.ZZZ”

Read Device Identification request for VarPlus Logic: Read DevID 02, Read DevID 03.

Query		Response	
Description	**Data**	**Description**	**Data**
Function Code	0x2B	Function code	0x2B
MEI Type	0x0E	MEI Type	0x0E
Read DevID code	02,03	Read DevID code	02,03
Object ID	00	Conformity Level	0x82
		More Follows	00
		Next Object ID	00
		Number Of Objects	06
		Object0.ID	00
		Object0.Length	0x12
		Object0.Value	“Schneider Electric”
		Object1.ID	01
		Object1.Length	0x0E
		Object1.Value	“VPL06N”or“VPL12N”
		Object2.ID	02
		Object2.Length	0x0B
		Object2.Value	“XXX.YYY.ZZZ”
		Object3.ID	03
		Object3.Length	0x21
		Object3.Value	“http://www.schneider-electric.com”
		Object4.ID	04
		Object4.Length	0x0D
		Object4.Value	“VarPlus Logic”
		Object5.ID	05
		Object5.Length	0x03 or 0x04
		Object5.Value	“VL6” or “VL12”
		Object6.ID	06
		Object6.Length	0x05
		Object6.Value	“Other”

Storage settings

Before saving any register changes, read the user manual for the VarPlus Logic controller to understand the functions of each register and safety concerns of modifying a register settings. Some registers are referenced by other functions. Changing a setting in one register can impact other functions that are also using that register.

⚠ WARNING

UNINTENDED OPERATION

- Registers must only be configured by personnel with a thorough understanding of the device and system in which it is installed.
- Change only the registers described in this manual.
- Ensure your changes are saved to non-volatile memory.

Failure to follow these instructions can result in death or serious injury.

The controller immediately uses all settings sent over Modbus communication. This information is stored only in working memory (volatile memory). After a power outage, these settings will be lost and will be reset to the factory setting. To store new settings permanently, you must store the data in non-volatile memory (EPROM).

The table below describes how to write to non-volatile memory.

NOTICE

HAZARD OF EQUIPMENT DAMAGE

- Do not modify registers without a thorough understanding of the impact on the device's flash memory.
- The lifetime of flash memory storage is limited; do not save data to flash memory too frequently.

Failure to follow these instructions can result in premature flash memory failure.

These values can be accessed with function codes 10_{hex}.

Adress	Register	Value	Words	Type	Unit
0xFFF	4096	Store parameter data in EPROM	1	Uint16	-

If you write "29864" to the above address, register 4096 is set to 1 for 5 seconds. During these 5 seconds, data is stored in non-volatile memory, but time-out errors can occur. Read the register to verify that new values have been saved.

Troubleshooting

If the Modbus connection is not working correctly, check the following points:

1. If there is no communication at all, look for the error between the VarPlus Logic VL and the master.
Possible causes are:
- Check adjustment of baud rate, parity, and address at the Varlogic Plus Logic VL; possibly make changes in the configuration.
- The Modbus lines D0- and D1+ might be interchanged. If necessary, correct them.
- Verify the settings of the RS485/RS232 converter. If needed, use the converter data sheet.
- Verify that the port is not being used by another application. If it is, use a different port.
- Check the termination and polarization resistors. If necessary, rectify.

2. Is the cable of the Modbus connection damaged? All plug connections are correct? If necessary, replace.

3. Is the pin assignment of the RS485 connection correct? If necessary, correct the pin assignment.

4. The shielding of the Modbus line must not be connected with the ground of the Modbus; but the shielding should be connected to protective ground. If necessary, correct the issue.

5. If communication is possible, but there are problems with the customer software, check the following points:
- Check adjustment of Modbus address, parity, and baud rate in the software.
- Check data format.

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