LEO with VRU controller

Features with VRU:

- Controller and transmitter in the same unit
- Independent mounting position, even for static sensor
- Analog and digital bus comunication always included
- MP-bus, Modbus RTU and BACnet MS/TP
- NFC communication and setting of parametres wih TROX FlowCheck app

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12 = BUDN
Belimo Universal VRU-D3-M/B (0-500 Pa)

Ø100 - Ø400 - LM24A-VST (5 Nm)
Ø500 - Ø630 - NM24A-VST (10 Nm)

13 = BUDNF
Belimo Universal VRU-D3-M/B (0-500 Pa)

Ø100 - Ø315 - LF24A-VST (4 Nm spring return)
Ø400 - Ø630 - NF24A-VST (10 Nm spring return)

BUDN and **BUDNF** have dynamic sensor, suitalbe for air volume control with normal conditions.

14 = BUSN
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø400 - LM24A-VST (5 Nm)
Ø500 - Ø630 - NM24A-VST (10 Nm)

15 = BUSNF
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø315 - LF24A-VST (4 Nm spring return)
Ø400 - Ø630 - NF24A-VST (10 Nm spring return)

16 = BUSS
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm fast actuator - 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm fast actuator - 4 sek)

BUSN, BUSNF and **BUSS** have static sensor, suitable for air volume contoll with pollution

17 = BUPN
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø400 - LM24A-VST (5Nm)
Ø500 - Ø630 - NM24A-VST (10Nm)
18 = BUPNF
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø315 - LF24A-VST (4 Nm spring return)
Ø400 - Ø630 - NF24A-VST (10 Nm spring return)

BUPN and **BUPNF** have static sensor, for duct pressure control

19 = BURN
Belimo Universal VRU-M1R-M/B (-75Pa - +75 Pa)

Ø100 - Ø400 - LM24A-VST (5 Nm)
Ø500 - Ø630 - NM24A-VST (10 Nm)

20 = BURNF
Belimo Universal VRU-M1R-M/B (-75 Pa - +75 Pa)

Ø100 - Ø315 - LF24A-VST (4 Nm spring return)
Ø400 - Ø630 - NF24A-VST (8 Nm spring return)

BURN and **BURNF** have static sensor, for room pressure control

21 = BUDS
Belimo Universal VRU-D3-M/B (0-500 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BUDS have dynamic sensor, for duct pressure control and fast actuator.

22 = BUPS
Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BUPS have static sensor, for duct pressure control with polluted air and fast actuator

23= BUDS-2
2 x Belimo Universal VRU-D3-M/B sensor (0-500 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BUDS-2 is equipped with 2 controllers with dynamic sensors. 1 for duct pressure control and 1 for air volume measurement, for normal conditions and fast actuator.

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24 = BUPS-2
2 x Belimo Universal VRU-M1-M/B (0-600 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BUPS-2 is equipped with 2 controllers with static sensors. 1 for duct pressure control and 1 for air volume measurement, for polluted conditions and fast actuator.

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25 = BURS
Belimo Universal VRU-M1R-M/B (-75 Pa - +75 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm fast actuator 4 sek)

BURS have static sesor for room pressure control with fast actuator.

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26 = BURDS-2
1 x Belimo Universal VRU-M1R-M/B (-75 Pa - +75 Pa)
1 x Belimo Universal VRU-D3-M/B (0-500 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BURDS-2 is equipped with 2 controllers. 1 for room pressure control and 1 with dynamic sensor for air volume measurement, for normal conditions and fast actuator.

27= BURSS-2
1 x Belimo Universal VRU-M1R-M/B (-75 Pa - +75 Pa)
1 x Belimo Universal VRU-M1-M/B (600 Pa)

Ø100 - Ø315 - LMQ24A-VST
(4 Nm, fast actuator 2,4 sek)
Ø400 - Ø630 - NMQ24A-VST
(8 Nm, fast actuator 4 sek)

BURSS-2 is equipped with 2 controllers. 1 for room pressure control and 1 for air volume measurement, with polluted conditions and fast actuator.

28= BUDN
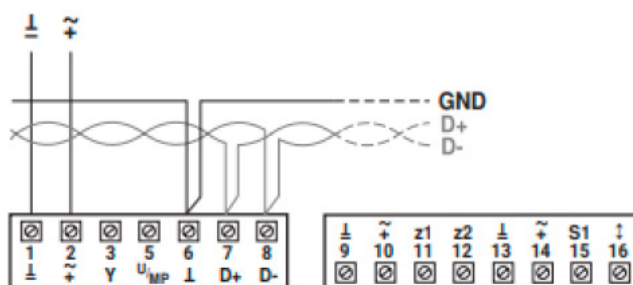2 x Belimo Universal VRU-D3-M/B sensor (0-500Pa)

Ø100 - Ø400 - LM24A-VST (5 Nm)
Ø500 - Ø630 - NM24A-VST (10 Nm)

BUDN-2 si equipped with 2 controllers with dynamic sensors. 1 for duct pressure control and 1 for air volume measurement under normal conditions.

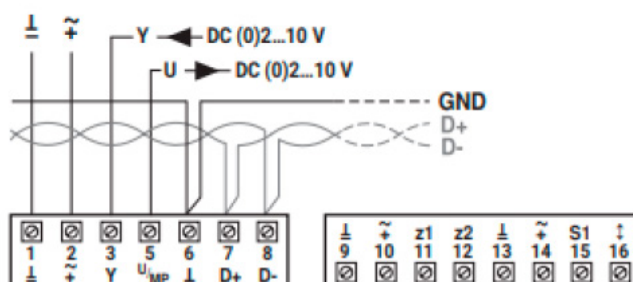| Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	1.5 W
	Power consumption for wire sizing	2 VA plus connected VST actuator
	Power consumption for wire sizing note	Imax 20 A @ 5 ms
	Connection supply / control	Terminals 2.5 mm²
	Sensor input S1	Connection of external sensor (passive / active / switch)
	Actuator Connection (I) (M)	AC/DC 24 V, PP-Link for VST actuator
Functional data	Communicative control	BACnet MS/TP Modbus RTU MP-Bus
	Operating range Y	2...10 V
	Input Impedance	100 kΩ
	Operating range Y variable	0.5...10 V
	Position feedback U note	Max. 0.5 mA Options: Volume / Δp / Position
	Position feedback U variable	0...10 V Start point 0...8 V End point 2...10 V
	Override control	z1 motor stop / damper OPEN (AC/DC 24 V) z2 damper CLOSE / MAX (AC/DC 24 V)
	Parametrisation	via Belimo Assistant App / PC-Tool

BACnet MS/TP / Modbus RTU

Priority rule BACnet/Modbus control (d)
1. z1
2. z2
3. Bus Watchdog
4. a) adaption
   b) synchronisation
5. Bus override
6. Bus setpoint: Min...Max

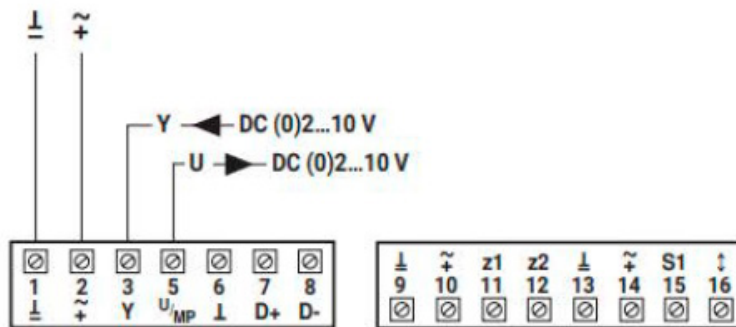### BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)

Priority rule BACnet/ Modbus hybrid mode (e)
1. z1
2. z2
3. Bus Watchdog
4. a) adaption
   b) synchronisation
5. Bus override
6. Y-step: Actuator CLOSE / MIN / MAX
7. Bus setpoint: Min...Max

Wiring diagrams

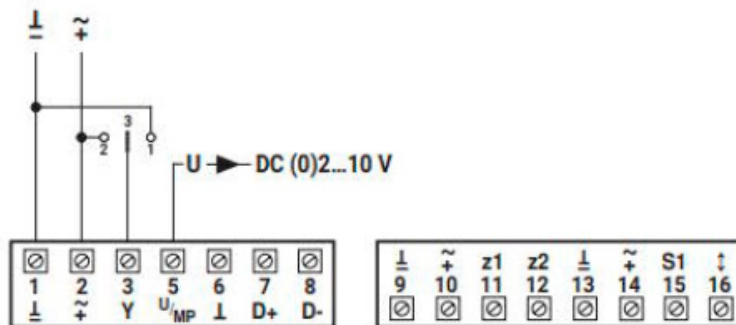### AC/DC 24 V, modulating (VAV)

Priority rule - Analog VAV-control (a)
1. z1
2. z2
3. a) adaption
   b) synchronisation
4. Y-modulating: Min...Max

(see override control z1/z2)

AC/DC 24 V, contactor step control (CAV)

Priority rule - Analog CAV-step control (b)
1. z1
2. z2
3. a) adaption
   b) synchronisation
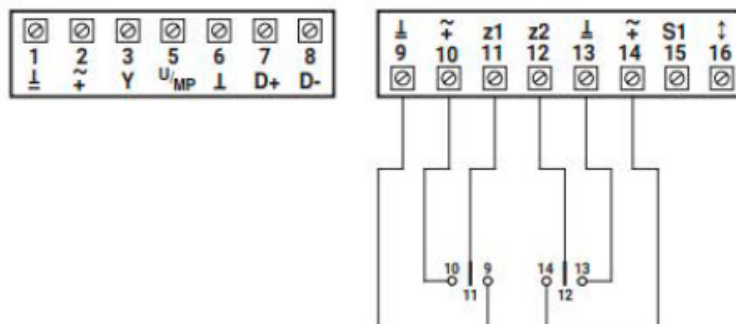4. Y-steps: Close-Min-Max

(see override comtrol z1/z2)

Contact 2-3 = MAX
3 uncoated = MIN
Contact 1-3 = CLOSE (Mode 2...10 V)
　　　　　　　MIN (Mode 0...10 V)

AC/DC 24 V, override control z1/z2

Override control z1
Contact 11-9 = Motor STOP
Contact 11-10 = Damper OPEN

Override control z2
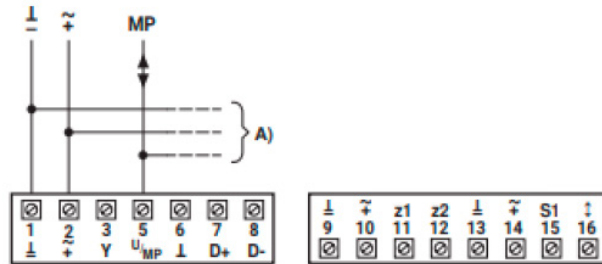Contact 12-13 = Damper CLOSED
Contact 12-14 = MAX

11/12 uncoated = priority rule
　　　　　　　a/b/c/d/e

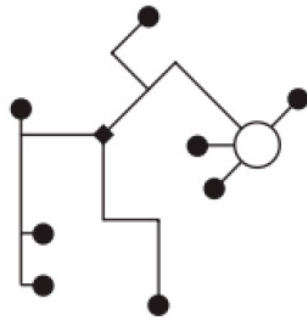## Functions for devices with specific parameters (Parametrisation necessary)

MP-Bus

Priority rule MP-Bus control (c)
1. z1
2. z2
3. Bus watchdog
4. a) adaptation
   b) synchronisation
5. Y-step: Actuator CLOSED / MIN / MAX
6. Bus override
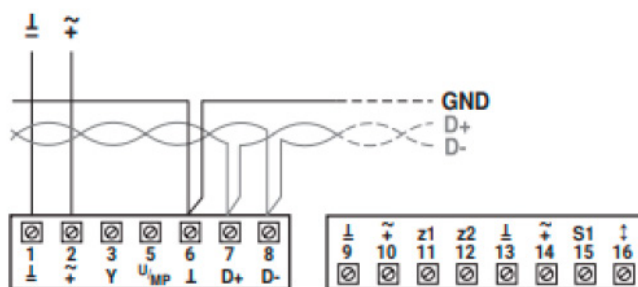7. Bus setpoint: Min...Max

A) additional MP-Bus nodes (max. 8)

MP-Bus Network topology

There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable
• no shielding or twisting necessary
• no terminating resistors required

BACnet MS/TP / Modbus RTU

Priority rule BACnet/Modbus control (d)
1. z1
2. z2
3. Bus Watchdog
4. a) adaption
   b) synchronisation
5. Bus override
6. Bus setpoint: Min...Max

BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)
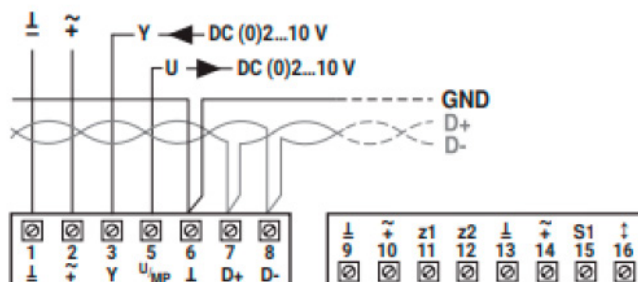
Priority rule BACnet/ Modbus hybrid mode (e)
1. z1
2. z2
3. Bus Watchdog
4. a) adaption
   b) synchronisation
5. Bus override
6. Y-step: Actuator CLOSE / MIN / MAX
7. Bus setpoint: Min...Max

LEO with VRU controller

Operation	No.	Adr.	Register		Access
	1	0	Setpoint [%]		R/W
	2	1	Override control		R/W
	3	2	Command		R/W
	4	3	Actuator type		R
	5	4	Relative position [%]		R
	6	5	Absolute position [°] [mm]		R
	7	6	Relative volumetric flow [%]		R
	8	7	Absolute volumetric flow [m3/h]		R
	9	8	Sensor value 1 [mV] [Ω] [-]		R
	10	9	-		-
	11	10	Absolute volumetric flow in selected units	LowWord	R
	12	11		HighWord	
	13	12	Setpoint Analog [%]		R
	51	50	Relative delta Pressure [%]		R
	52	51	Absolute delta Pressure [Pa]		R
	53	52	-		-
	54	53	Absolut delta Pressure in selected units	LowWord	R
	55	54		HighWord	

Service	No.	Adr.	Register		Access
	100	99	Bus termination		R
	101	100	Series number 1st part		
	102	101	Series number 2nd part		R
	103	102	Series number 4th part		
	104	103	Firmware version		R
	105	104	Malfunction and service information		R
	106	105	Min [%]		R/W
	107	106	Max [%]		R/W
	108	107	Sensor type 1		R/W
	109	108	Bus fail position		R/W
	110	109	Communication Watchdog		R/W
	111	110	Vnom m3/h		R
	112	111	-		-
	113	112	Nominal volumetric flow in selected units	LowWord	R
	114	113		HighWord	
	115	114	-		-
	116	115	-		-
	117	116	Control Mode		R
	118	117	Unit Selection Flow		R/W
	119	118	Setpoint source		R/W
	120	119	Operation Mode		R/W
	121	120	-		
	122	121	-		
	123	122	-		
	124	123	Room Pressure Cascade		R
	125	124	Application Selection		R
	126	125	System Altitude		R/W
	127	126	Nominal delta Pressure in selected units		R
	128	127	-		
	129	128	Nominal delta Pressure in Pa		R
	146	145	Unit Selection Pressure		R/W