

Reactive power controller

multicomp

Monitoring



Recording

Optimizing



multicomp reactive power controllers are the main component of reactive power compensation facilities. After calculating the compensation power, they automatically switch capacitor stages on or off in order to reduce the strain on electrical supply installations loaded unnecessarily by inductive reactive current, and to reduce reactive consumption costs.

multicomp 96 LCD bus

Intelligent control for 4-quadrant operation, with freely programmable stage power and KBR eBus interface.

**multicomp 144 LCD**

Self-optimizing system through freely programmable stage powers

**multicomp 96 LCD bus**

4 to 24 switch relays to control the compensation modules.

multicomp 144 LCD

Housing size
(H x W x D in mm)

144 x 144 x 60

Data display

LCD



4 quadrant - reactive power controllers

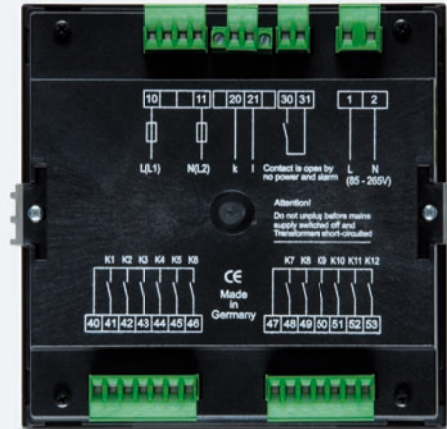
Highlights

- Real reactive power measurement and calculation of the necessary compensation power in 4-quadrant operation
- Rapid compensation with few switching operations
- Display with two-line LC display, stage status and recovery
- Control logic always circuit switching for the same stages
- Manual-0-automatic switch separately programmable for each stage

An overall view of **technical details** can be found on pages 102/104.
The **housing dimensions** are listed on page 106.

The microcontroller-controlled **multicomp 144 LCD** records all network data relevant to the control of small facilities via A/D transformer inputs. After calculating the required compensation power to achieve the desired target $\cos \varphi$, the available capacitor stages are automatically switched on or off with a few switching operations. The multicomp 144 LCD switches capacitors of the same

powers in circuit switching. Programming is menu assisted and performed with two buttons. Facility-specific values are stored in a non-volatile memory. Each stage can be switched individually via the built-in manual-0-automatic function.



Rear side multicond 144 LCD

→ 4-quadrant operation

Through the increasing economic exposure of energy costs, more and more own generation plants will be setup. This can result, in low load periods of companies, in energy being fed back into the supply network. All possible conditions concerning consumption and the delivery of active and reactive power must therefore be taken into account at the control system. If for example, asynchronous generators are used to generate energy, it may happen that active power is fed into the supply network and reactive power is taken from the supply network.

multicomp 96 LCD bus



Housing size
(H x W x D in mm) **96 x 96 x 60**

Data display **LCD**

Interface **KBR eBus**
Modbus

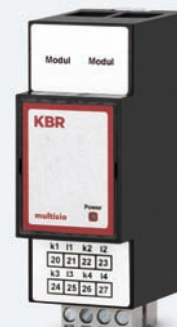
4 quadrant - reactive power controllers

- Highlights**
- Detecting and compensating the missing compensation power in case of recovery into the energy supplier network
 - The network analysis and limiting value monitoring function for the protection of capacitors from overvoltages, overcurrents and excessive harmonic load.
 - Integrated temperature measurement input for monitoring the ambient temperature and switching on ventilators if the limiting values are exceeded
 - Modular up to 24 stages

An overall view of **technical details** can be found on pages 103/105.
The **housing dimensions** are listed on page 106.

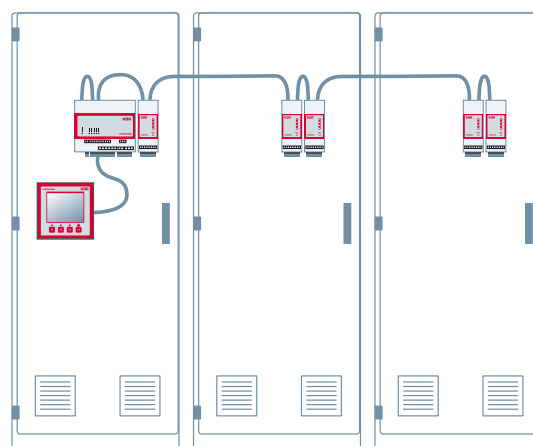
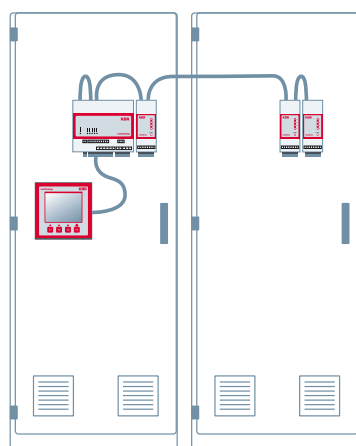
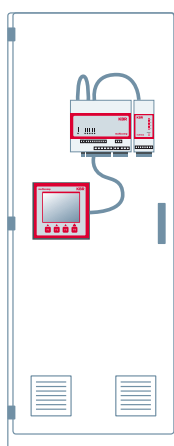
The **multicomp 96 LCD bus** reactive power controller works automatically in 4-quadrant operation (generator operation), i.e. even with energy feedback to the utility company network, missing compensated power is detected without a problem and compensated. Through the integrated temperature measurement input, the ambient temperature in the reactive power compensation

equipment is also monitored, and if a predefined limiting temperature is exceeded, the fan is switched on. The multicomp 96 LCD also has an interface for connection to the KBR Energybus, whereby all settings can be conveniently made from the PC (without the display module). In addition, the bus communication can be adjusted from the KBR eBus to the Modbus RTU/ASCII.

Display module **multicond 96 LCD bus**Relay module **2D2-4RO****2D2-1TI2RO****1D2-4CI**

The **multicond 96 LCD bus** and the **multicond safety and maintenance module**, in combination with the **temperature module multi-tm** and the **relay module multi-ro**, perform reliable monitoring and switching functions during reactive current compensation. Thanks to the use of ribbon cables, a simple expansion of the facility is possible.

- Simple connection of expansion facilities thanks to ribbon and bus technology
- Each cabinet can be represented separately with the web-based analysis software visual energy 4
- Smaller cabling expense
- Each facility cabinet can be controlled and monitored individually (control via ventilation, temperature measurement, safety shutdown)



Controller cabinet		Controller and expansion cabinet		Controller cabinet and 2 expansion cabinets	
400/16		400/8	400/4	400/16	400/4
2 x 25, 3 x 50, 2 x 100 kvar		4 x 50, 2 x 100 kvar		4 x 50, 2 x 100 kvar	
1 x multicond 96 LCD bus 1 x 2D2-4RO		1 x multicond 96 LCD bus 1 x 2D2-4RO		1 x multicond 96 LCD bus 1 x 2D2-4RO	
		1 x 2D2-4RO 1 x 2D2-1TI2RO		1 x 2D2-4RO 1 x 2D2-1TI2RO	
		1 x 2D2-4RO 1 x 2D2-1TI2RO		1 x 2D2-4RO 1 x 2D2-1TI2RO	

multicomp

Technical details

		DEVICE TYPE	multicomp 144 LCD
STAGES	Relay outputs; 250 VA per output; 250 V AC; 50/60 Hz	[1]	6
		[2]	12
		[3]	6 optocoupler outputs
		[4]	12 optocoupler outputs
		[5]	6 relay and 6 optocoupler outputs
	Power per stage [kvar] programmable		free
SWITCHING PERFORMANCE	Discharge times programmable		0 ... 900 sec.
	Manual-0-automatic switch Status display		
	Learning function for automatic programming via induced current measurement (requirement: transformer x/1A fitted into the cable to the compensation facility)		Via series transformer
	Rotary field and phase allocation programmable		■
	Self-optimizing (circuit switching of the same stages)		■
	Special switching functions for		–
MONITORING FUNCTIONS	Switch-off limit for light load operation		Fixed
	No-voltage trigger		■
	Excess current switch-off (only in connection with induced current measurement)		–
	Excess current switch-off		Fixed
	Temperature measurement and monitoring with fan control and emergency switch-off		–
	Harmonics monitoring with alarm message and emergency switch-off Additional displays		■
	Alarm messages programmable		■
	Target cos φ monitoring; alarm if unreachable		■
	Switching operation monitoring with display per stage		■
SPECIAL OPERATING MODE	Controller status display (over/ undercompensation)		■
	Thyristor high-speed circuit breaker		■
DISPLAYS	Display type		LCD
	Measurement parameters (RMS values)		U_{PH-N} , U_{PH-PH} , $\cos \varphi$, $f_{network}$, I_{main} , $P_{overall}$, $Q_{overall}$ requirement
	Operating time display		–
MEASUREMENT	Measuring precision: Voltage Current Power		2% 2% 4%
	Update speed		200 ms
	Single phase measurement (4Q)		Phase-phase or phase-neutral

	multicomp 96 LCD bus	Relay module	Temperature module	Current measurement module
	4D6-ESBDS-1-1V1C6RO	2D2-4RO	2D2-1T12RO	1D2-4CI
	Modular 4 – 24	4	2	–
	free			
	0 ... 900 sec.			
	For each stage ☐			
	Via series transformer or in connection with multisio 1D2-4CI via induced current transformer			
	☐			
	☐			
	Combination filter			
	Fixed			
	☐			
	☐ In connection with 1D2-4CI			
	☐			
	☐			
	☐ Voltage: DF – U; 3rd – 19th harm.			
	☐			
	☐			
	☐			
	☐			
	–			
	LCD (dot matrix 128 x 96)			
	U_{L-N} or U_{L-L} $\cos \varphi$ δ f_{network} I_{main} I_{induced} $P_{\text{tot.}}$ $Q_{\text{overall requirement}}$			
	☐			
	2% 2% 4%			
	~ 300 ms			
	Phase-phase or phase-neutral			

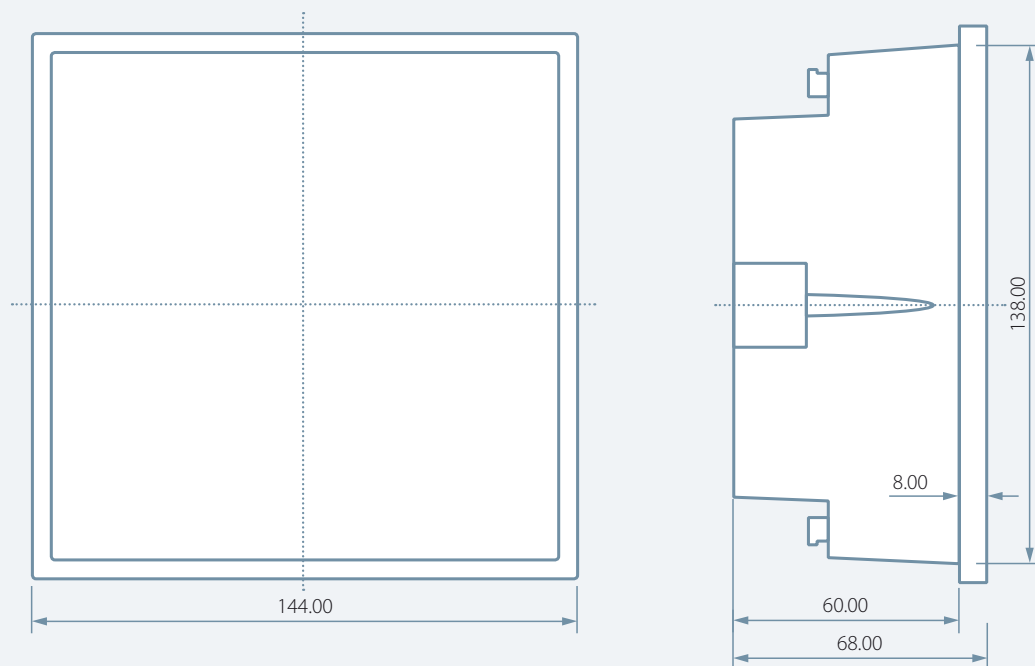
multicomp Technical details

			DEVICE TYPE	multicomp 144 LCD 2F144-1V1C6RO 2F144-1V1C12RO 3F144-1V1C6DO 3F144-1V1C12DO 3F144-1V1C6DO6RO		
MEMORY	Long-term memory for switching operations			–		
PASSWORD PROTECTION	With digit code			■		
INPUTS	Voltage path	Low voltage; direct measurement		30 V ... 690 V ... 790 V AC		
		Medium voltage		–		
	Current path	Series transformer		1 x 0,05 A ... 5 A ... 6 A AC		
		Induced current transformer		–		
	Frequency range			50 or 60 Hz		
	2. Setpoint cos φ2	Automatic switchover in case of energy recovery		To cos φ = 1		
OUTPUTS	Additional relay outputs Error message relay / fan relay			■ Error message relay		
INTERFACES	Serial interface with KBR eBus protocol			–		
POWER SUPPLY	Operating voltage	Frequency	Power consumption	85 – 265 V AC/DC 50 – 60 Hz 12 VA		
DIMENSIONS	Housing: Flush mounting, size in mm (H x W x D)			144 x 144 x 60		

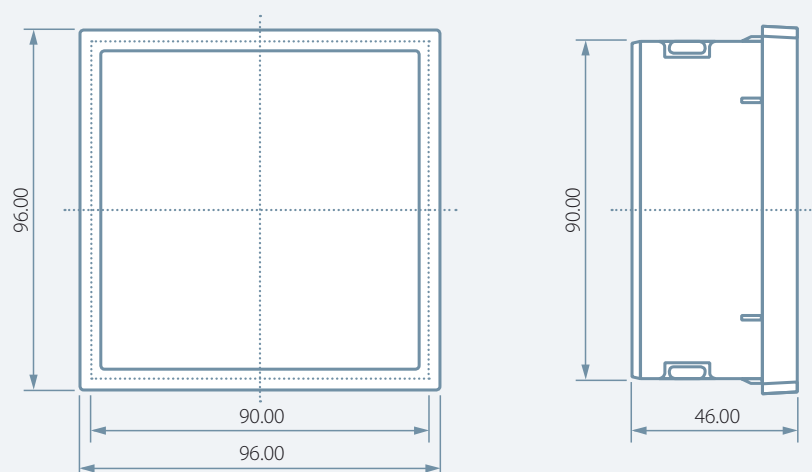
multicomp 96 LCD bus		Relay module	Temperature module	Current measurement module
4D6-ESBSDS-1-1V1C6RO		1D2-BS-4RO	1D2-BS-4TI	1D2-4CI
For events and error messages; battery-buffered with timestamp				
1 x 100 V ... 500 V ... 600 V AC				
0.01 kV ... 30 kV programmable				
1 x 0.01 A ... 1 A ... 1.2 A AC and 1 x 0.05 A ... 5 A ... 6 A AC				
–				
40 – 70 Hz				
– automatic switchover in case of energy recovery to cos φ2, value freely programmable				
 				
RS485 Modbus				
85 V – 265 V AC/DC 50 – 60 Hz 15 VA				
90 x 106 x 60		90 x 35 x 60	90 x 35 x 60	90 x 35 x 60

multicomp Dimensions

multicomp 144 LCD

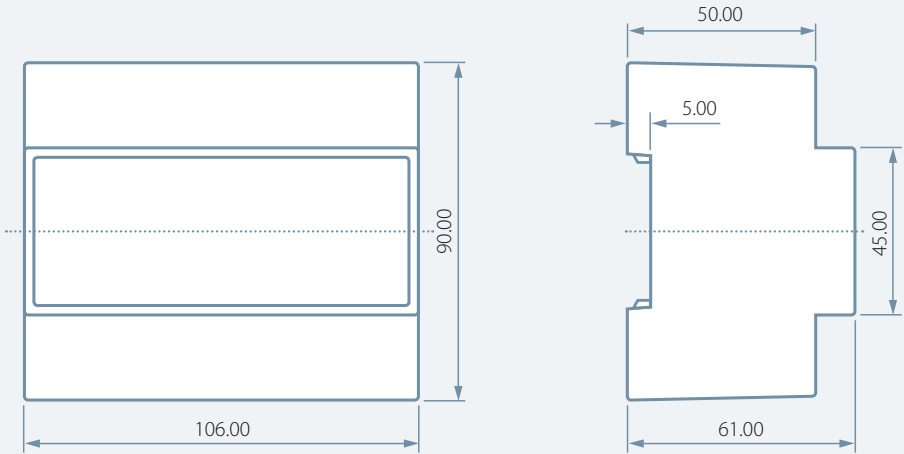


multicomp 96 LCD bus



Switchboard cutout (H x W x D) 90 x 90

multicomp controller module



multisio relay, temperature and current measuring module

