Reactive power controller

multicomp

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 φ, 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 multicomp 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 **multicomp 96 LCD bus**

Relay module **2D2-4RO**

2D2-1TI2RO

1D2-4CI

The **multicomp 96 LCD bus** and the **multicomp 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	400/4
2 x 25, 3 x 50, 2 x 100 kvar	4 x 50, 2 x 100 kvar	4 x 100 kvar	4 x 50, 2 x 100 kvar	4 x 100 kvar	4 x 100 kvar
1 x multicomp 96 LCD bus 1 x 2D2-4RO	1 x multicomp 96 LCD bus 1 x 2D2-4RO	1 x 2D2-4RO 1 x 2D2-1TI2RO	1 x multicomp 96 LCD bus 1 x 2D2-4RO	1 x 2D2-4RO 1 x 2D2-1TI2RO	1 x 2D2-4RO 1 x 2D2-1TI2RO

multicomp Technical details

		multicomp 144 LCD
DEVICE TYPE		[1] 2F144-1V1C6RO [2] 2F144-1V1C12RO [3] 3F144-1V1C6DO [4] 3F144-1V1C12DO [5] 3F144-1V1C6DO6RO
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
	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	■
SWITCHING PERFORMANCE	**Self-optimizing** (circuit switching of the same stages)	■
	Special switching functions for	–
	Switch-off limit for light load operation	Fixed
MONITORING FUNCTIONS	**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	■
	Controller status display (over/ undercompensation)	■
SPECIAL OPERATING MODE	**Thyristor high-speed circuit breaker**	■
DISPLAYS	**Display type**	LCD
	Measurement parameters (RMS values)	U_{PH-N}, U_{PH-PH}, cos φ, $f_{network}$, 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

■ Standard version – Not available

	multicomp 96 LCD bus 4D6-ESBSDS-1-1V1C6RO	**Relay module** 2D2-4RO	**Temperature module** 2D2-1TI2RO	**Current measurement module** 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 φ | δ | $f_{network}$ | I_{main} | $I_{induced}$ | $P_{tot.}$ | $Q_{overall\ requirement}$			
	■			
	2% | 2% | 4%			
	~ 300 ms			
	Phase-phase or phase-neutral			

Status: April 2010. All changes reserved.

multicomp Technical details

			multicomp 144 LCD
DEVICE TYPE			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

■ Standard version – Not available

	multicomp 96 LCD bus 4D6-ESBSDS-1-1V1C6RO	**Relay module** 1D2-BS-4RO	**Temperature module** 1D2-BS-4TI	**Current measurement module** 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

Status: April 2010. All changes reserved.

multicomp Dimensions

multicomp 144 LCD

multicomp 96 LCD bus

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

All measurement details in mm. Not suitable for taking measurements.

multicomp controller module

multisio relay, temperature and current measuring module