Brief Manual

MFR 1

- Option Su04 -

Version 3.1xxx

This Brief Manual of Option Su04

is only valid in combination with the MFR 13 Manual "37142"

Version 37188
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NOTE

This brief manual can only be used together with the complete manual MFR 1. It should give information about features included in the software option described below.

1.1 Measuring Filters

NOTE

In case of option Su04 is available, the timing behaviour of the AC measurement can be changed.

Function:

The instantaneous measured values (one period, i.e. 20 ms at 50 Hz) can be filtered internally. The time constants for the filters are adjustable.

This allows different features:

a.) Fast output and display

In case of selecting a small value for the time constant, the unit allows a very fast reaction without having additional internal time delays. By setting the measuring filter to „OFF“ the instantaneous values will be given out directly without any internal filtering.

b.) Attenuation of outputs and display in case of swinging values

In case of extreme swinging AC values, an improvement can be achieved by increasing the filtering constants. This will effect an attenuation of swinging values given out via display, analogue outputs, or serial interface.

```
Measuring filter
Voltage    0.00s
```

Measuring Filter for Voltage **OFF..2.56 s**

The measuring intervals for the voltage measurement can be adjusted. This allows to avoid oscillations at the analogue outputs in case of input voltage is swinging. A reduced filter value can be set in order to increase the refresh rate of the analogue outputs or the serial interface.

```
Measuring filter
Current    0.00s
```

Measuring Filter for Current **OFF..2.56 s**

The measuring intervals for the current measurement can be adjusted. This allows to avoid oscillations at the analogue outputs in case of input current is swinging. A reduced filter value can be set in order to increase the refresh rate of the analogue outputs or the serial interface.

```
Measuring filter
Power      0.00s
```

Measuring Filter for Power **OFF..2.56 s**

The measuring intervals for the power measurement can be adjusted. This allows to avoid oscillations at the analogue outputs in case of input power is swinging. A reduced filter value can be set in order to increase the refresh rate of the analogue outputs or the serial interface.

```
Measuring filter
Frequency  0.00s
```

Measuring Filter for Frequency **OFF..2.56 s**

The measuring intervals for the frequency measurement can be adjusted. This allows to avoid oscillations at the analogue outputs in case of frequency is swinging. A reduced filter value can be set in order to increase the refresh rate of the analogue outputs or the serial interface.

1.2 Interface Telegram Type 313

Number					Content (words)	Unit	Remark
3964		MOD bus	CAN bus	Profi-Bus			
00	**01**	**1**	**MUX=1, 1**	**0**	Telegram call sign	"313"	Telegram type
02	**03**	**2**	**MUX=1, 2**	**1**	Voltage L12	V	
04	**05**	**3**	**MUX=1, 3**	**2**	Frequency L12	Hz × 100	
06	**07**	**4**	**MUX=2, 1**	**3**	Bus voltage L12	V	
08	**09**	**5**	**MUX=2, 2**	**4**	Bus frequency L12	Hz × 100	
10	**11**	**6**	**MUX=2, 3**	**5**	Phase angle L12	0,1°	
12	**13**	**7**	**MUX=3, 1**	**6**	Voltage L23	V	
14	**15**	**8**	**MUX=3, 2**	**7**	Voltage L31	V	
16	**17**	**9**	**MUX=3, 3**	**8**	Voltage L1N	V	
18	**19**	**10**	**MUX=4, 1**	**9**	Voltage L2N	V	
20	**21**	**11**	**MUX=4, 2**	**10**	Voltage L3N	V	
22	**23**	**12**	**MUX=4, 3**	**11**	Current L1	-	5000 = 100% rated
24	**25**	**13**	**MUX=5, 1**	**12**	Current L2	-	5000 = 100% rated
26	**27**	**14**	**MUX=5, 2**	**13**	Current L3	-	5000 = 100% rated
28	**29**	**15**	**MUX=5, 3**	**14**	Power factor cos phi	dim.less × 100	
30	**31**	**16**	**MUX=6, 1**	**15**	Active power	*0,1 kW	High Word
32	**33**	**17**	**MUX=6, 2**	**16**			Low Word
34	**35**	**18**	**MUX=6, 3**	**17**	Reactive power, high word	* 0,1 kvar	High Word
36	**37**	**19**	**MUX=7, 1**	**18**			Low Word
38	**39**	**20**	**MUX=7, 2**	**19**	Generator active energy	KWh	High Word
40	**41**	**21**	**MUX=7, 3**	**20**			Low Word
42	**43**	**22**	**MUX=8, 1**	**21**	Rated current primary	A	
44	**45**	**23**	**MUX=8, 2**	**22**	Internal alarms 1	Bit 15 = 1 \ Bit 14 = 0 /	Overfrequency level 2
						Bit 13 = 1 \ Bit 12 = 0 /	Underfrequency level 2
						Bit 11 = 1 \ Bit 10 = 0 /	Overvoltage level 2
						Bit 9 = 1 \ Bit 8 = 0 /	Undervoltage level 2
						Bit 7 = 1 \ Bit 6 = 0 /	Load imbalance
						Bit 5 = 1 \ Bit 4 = 0 /	Overcurrent level 1
					Note (example Bit 15/14):	Bit 3 = 1 \ Bit 2 = 0 /	Overload
					0/1 = protective device has not tripped 1/0 = protective device has tripped	Bit 1 = 1 \ Bit 0 = 0 /	Reverse power

Number				Content (words)	Unit	Remark
3964	MOD bus	CAN bus	Profi-Bus			
46 47	**24**	**MUX=8, 3**	**23**	Internal alarms 2	Bit 15 = 1 \ Bit 14 = 0 /	Overfrequency level 1
					Bit 13 = 1 \ Bit 12 = 0 /	Underfrequency level 1
					Bit 11 = 1 \ Bit 10 = 0 /	Overvoltage level 1
					Bit 9 = 1 \ Bit 8 = 0 /	Undervoltage level 1
					Bit 7 = 1 \ Bit 6 = 0 /	Internal
					Bit 5 = 1 \ Bit 4 = 0 /	Tripping df/dt
					Bit 3 = 1 \ Bit 2 = 0 /	Asymmetry (voltage)
				Note (example Bit 15/14):	Bit 1 = 1 \ Bit 0 = 0 /	Vector shift
				0/1 = protective device has not tripped		
				1/0 = protective device has tripped		
48 49	**25**	**MUX=9 1**	**24**	Internal alarms 3	Bit 15 = 1 \ Bit 14 = 0 /	Power factor level 1
					Bit 13 = 1 \ Bit 12 = 0 /	Power factor level 2
					Bit 11 = 1 \ Bit 10 = 0 /	Inductive reactive power
					Bit 9 = 1 \ Bit 8 = 0 /	Capacitive reactive power
					Bit 7 = 1 \ Bit 6 = 0 /	Positive active load surge
					Bit 5 = 1 \ Bit 4 = 0 /	Negative active load surge
					Bit 3 = 1 \ Bit 2 = 0 /	Overcurrent level 2
				Note (example Bit 15/14):	Bit 1 = 1 \ Bit 0 = 0 /	Interface fault
				0/1 = protective device has not tripped		
				1/0 = protective device has tripped		
50 51	**26**	**MUX=9, 2**	**25**	Internal alarms 4	Bit 15 = 1 \ Bit 14 = 0 /	Busbar Overfrequency
					Bit 13 = 1 \ Bit 12 = 0 /	Busbar Underfrequency
					Bit 11 = 1 \ Bit 10 = 0 /	Busbar Overvoltage
					Bit 9 = 1 \ Bit 8 = 0 /	Busbar Undervoltage
					Bit 7 = 1 \ Bit 6 = 0 /	Internal
					Bit 5 = 1 \ Bit 4 = 0 /	Internal
					Bit 3 = 1 \ Bit 2 = 0 /	Internal
				NOTE (example Bit 15/14):	Bit 1 = 1 \ Bit 0 = 0 /	Internal
				0/1 = protective device has not tripped		
				1/0 = protective device has tripped		

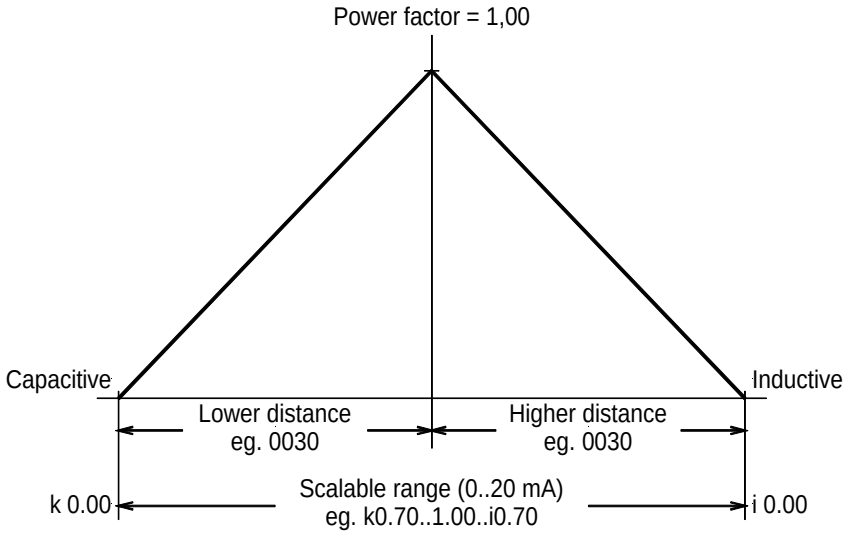
Number				Content (words)	Unit	Remark
3964	MOD bus	CAN bus	Profi-Bus			
52 53	**27**	**MUX=9, 3**	**26**	Internal alarms 5	Bit 15 = 1 \ Bit 14 = 0 /	Internal
					Bit 13 = 1 \ Bit 12 = 0 /	Internal
					Bit 11 = 1 \ Bit 10 = 0 /	Internal
					Bit 9 = 1 \ Bit 8 = 0 /	Internal
					Bit 7 = 1 \ Bit 6 = 0 /	Internal
					Bit 5 = 1 \ Bit 4 = 0 /	Internal
					Bit 3 = 1 \ Bit 2 = 0 /	Zero voltage
				Note (example Bit 15/14): 0/1 = protective device has not tripped 1/0 = protective device has tripped	Bit 1 = 1 \ Bit 0 = 0 /	Power limiting value exceeded
54 55	**28**	**MUX=10, 1**	**27**	Internal alarms 6	Bit 15 = 1 \ Bit 14 = 0 /	Residual voltage level 1 (Option Iv)
					Bit 13 = 1 \ Bit 12 = 0 /	Earth fault current level 1 (Option Ik)
					Bit 11 = 1 \ Bit 10 = 0 /	Directional earth fault level 1 (Options Iv + Ik)
					Bit 9 = 1 \ Bit 8 = 0 /	Earth fault current level 2 (Option Ik)
					Bit 7 = 1 \ Bit 6 = 0 /	Directional earth fault level 2 (Options Iv + Ik)
					Bit 5 = 1 \ Bit 4 = 0 /	Residual voltage level 2 (Option Iv)
					Bit 3 = 1 \ Bit 2 = 0 /	Internal
				Note (example Bit 15/14): 0/1 = protective device has not tripped 1/0 = protective device has tripped	Bit 1 = 1 \ Bit 0 = 0 /	Internal

1.2.1 Description of the Data Format

NOTE

The value is calculated from the measured value and the exponent!

Voltage	0..65,535 unsigned	measured in [V]
Current	0..7,500 unsigned	5,000 refers to nominal current primary The nominal value is sent in the telegram
Active power	32 Bit, signed	measured in 0,1 kW positive = positive power negative = negative power (reverse power)
Reactive power	32 Bit signed	measured in 0,1 kvar positive = inductive, generator overexcited negative = capacitive, generator underexcited
Frequency		measured in [Hz × 100]
Active energy	32 Bit, unsigned	measured in [kWh] positive = export of active energy negative = import of active energy
Power factor cos phi	-99..+100	measured in [Cos phi × 100] positive = inductive, generator overexcited negative = capacitive, generator underexcited



a.) Examples

U_{G12} = 13806 =	13806 V
I_{G1} = 1250 =	250 A (rated current = 1000 A)
I_{G1} = 1250 =	25.0 A (rated current = 100 A)
I_{G1} = 1000 =	16.0 A (rated current = 80 A)
P_{GN} = 123 456 =	12,345.6 kW
f_{GN} = 5230	
5230 [Hz · 100] = 52,30 [Hz] =	52.30 Hz
Cos phi = 87	
87 [Cos phi · 100] = 0,87 [Cos phi] =	i0.87

b.) Bit Modification on Tripping of a Protective Device

If one of the protective devices has responded, the corresponding bits (for instance Bit 15/14 = overfrequency level 2) change from not tripped (= 0/1) to tripped (= 1/0).

1.2.2 Frame Date for the Interfaces

a.) Frame Data for the MOD-Bus RTU Slave

Parameter

Transmission protocol..... MOD-Bus RTU Slave
Hardware..... interface RS485 or RS 232
Transmitting rate..... settable
Slave address..... settable
Parity..... settable

With one command a maximum of **28** words can be read or **10** words can be written. Modbus function codes 03, 04, 06 and 16 are supported.