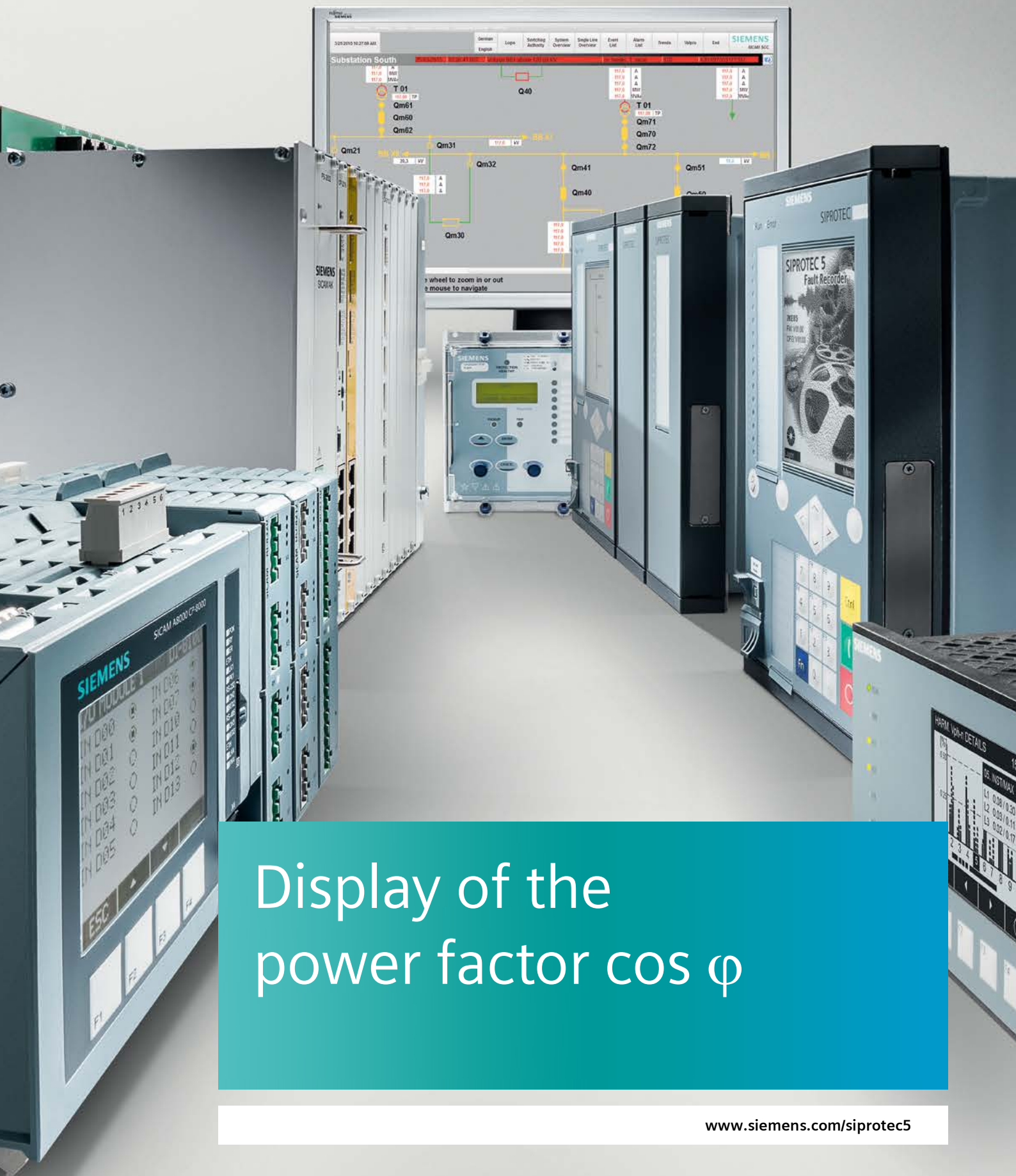


SIEMENS

Ingenuity for life



Display of the
power factor $\cos \varphi$

SIPROTEC 5 Application

Display of the power factor $\cos \varphi$

SIPROTEC 5 Application

Display of the power factor $\cos \varphi$

APN-035, Edition 1

Content

1	Display of the power factor $\cos \varphi$	3
1.1	Introduction.....	3
1.2	Implementation.....	3
1.3	Summary.....	6

1 Display of the power factor $\cos \varphi$

1.1 Introduction

In SIPROTEC 5 the power factor λ is calculated acc. $\frac{|P|}{S}$, factor therefore between 0 and 1. In SIPROTEC 4 refer to $\cos \varphi = \frac{P}{S}$, factor is between -1 and 1.

The application describes how the power factor $\cos \varphi$ can be calculated and visualized on the display with the help of CFC chart.

1.2 Implementation

1.2.1 New user defined measured value

Create a new user defined measured value „cos(phi)“ in the information matrix:

Information		Destination				
		LEDs		Recorder		
		Expansion mo				
Signals	Number	Type	14	3.15	3.16	Signal
(All)	(All)	(All)	
▶ Mes.v.fail.det	21.2671					
▼ User-def. MV	21.0					
▶ Mode (controllable)	21.0.51	ENC				
▶ Behavior	21.0.52	ENS				
▶ Health	21.0.53	ENS				
▶ cos(phi)		MV				
▶ Process monitor	21.1131					*
▼ Operational values	21.761					
▶ Behavior	21.761.114...	ENS				
▶ Health	21.761.114...	ENS				

Set the number of decimal places in the properties of the Measured Value “cos(phi)“ to 1:

cos(phi) [SignalData.UserDefined] Properties

General

Details

User information

Details

Name:

Original name:

IEC 61850 name:

IEC 61850 path:

General

Deadband for magnitude: %

Unit

Unit:

Multiplier:

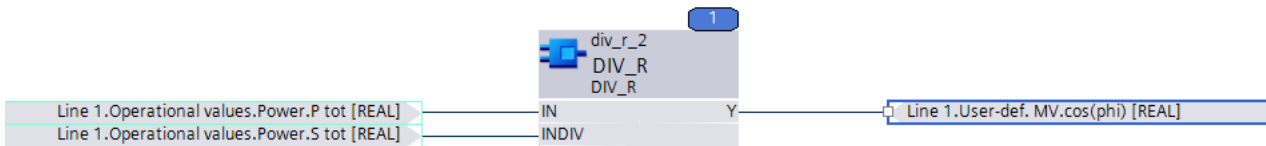
Number of decimal places:

SIPROTEC 5 Applikation

Display of the power factor $\cos \varphi$

1.2.2 CFC Plan

Select function chart (CFC) task: Measurement and insert the chart DIV_R. The DIV_R block divides a floating-point number (numerator) = Input IN by a 2nd floating-point number (denominator) = Input INDIV.



1.2.3 Display

Assign the measured value to the desired display; e.g. to the measured values as follows:

The screenshot shows the 'Operational values' display with a grid of values. The 'PF' (Power Factor) value is highlighted with a red box and shows 'cos(phi) ####.#'. Below the display is the 'Properties' window for the signal 'cos(phi)'. The 'Number of decimal points' is set to 1, which is also highlighted with a red box. Other properties include 'Signal name: cos(phi)', 'Signal type: MV', 'Signal path: Line 1.User-def. MV.cos(phi)', and 'Connected device: ExtractedProject_1_V06.20.75L87'.

Set the number of decimal places in the properties of the Measured Value "cos (phi)" to 1.

1.2.4 Test

Load configuration to device and inject current and voltage.

Signals	All Internal		
	03:02:23,461		
Physical Meaning	Amplitude	Phase	Frequency
Analog Profile:	<User Defined>		
PhysU1	57,735 V	0,00 °	50,000 Hz
PhysU2	57,735 V	-120,00 °	50,000 Hz
PhysU3	57,735 V	120,00 °	50,000 Hz
PhysU4	100,000 V	30,00 °	50,000 Hz
PhysU5	0,000 V	0,00 °	50,000 Hz
PhysU6	0,000 V	0,00 °	50,000 Hz
PhysU7	0,000 V	0,00 °	50,000 Hz
PhysU8	0,000 V	0,00 °	50,000 Hz
PhysI1	10,000 mA	120,00 °	50,000 Hz
PhysI2	10,000 mA	0,00 °	50,000 Hz
PhysI3	10,000 mA	-120,00 °	50,000 Hz

The above injected current and voltage will have a negative $\cos \varphi$. If desired the pre-configured power factor "PF" can be deleted from the display.

Operational values		1/1
VA	231kV	VAB 400kV
VB	231kV	VBC 400kV
VC	231kV	VCA 400kV
V0	0kV	V2 0kV
IA	10A	
IB	10A	
IC	10A	
3I0	0A	I2 0A
S	6.9MVA	
P	-3.5MW	
Q	-6.0Mvar	
f	50.0Hz	
PF	0.5	cos(phi) -0.5

SIPROTEC 5 Applikation

Display of the power factor $\cos \varphi$

1.3 Summary

The calculation and display of the power factor differs between SIPROTEC 4 and SIPROTEC 5. Through the use of CFC charts the display of the power factor as $\cos\varphi$ value can be adjusted.

Published by
Siemens AG 2016
Energy Management Division
Digital Grid
Automation Products
Humboldtstr. 59
90459 Nuremberg, Germany

www.siemens.com/siprotec

For more information,
please contact our
Customer Support Center.

Tel.: +49 180 524 70 00

Fax: +49 180 524 24 71

(Charges depending on provider)

Email: support.energy@siemens.com

© 2016 Siemens. Subject to changes and errors.
The information given in this document only contains
general descriptions and/or performance features which
may not always specifically reflect those described, or
which may undergo modification in the course of further
development of the products. The requested performance
features are binding only when they are expressly agreed
upon in the concluded contract.

For all products using security features of OpenSSL, the
following shall apply:
This product includes software developed by the OpenSSL
Project for use in the OpenSSL Toolkit.
(<http://www.openssl.org/>)
This product includes cryptographic software written by
Eric Young (eay@cryptsoft.com)
This product includes software written by Tim Hudson
(tjh@cryptsoft.com)
This product includes software developed by Bodo Moeller.