

Industrial controls

SIRIUS Innovations
Star-Delta (Wye-Delta) Combination
Assembly and Wiring

[Application description](#) • June 2010

Applications & Tools

Answers for industry.

SIEMENS

Industry Automation and Drives Technologies Service & Support Portal

This document is available via the Siemens AG Industry Automation and Drives Technologies Internet service portal. The document can be downloaded directly via the following link:

<http://support.automation.siemens.com/WW/view/en/41737766>

If you have any questions on this article, please contact us at the following e-mail address:

online-support.automation@siemens.com

SIEMENS

SIRIUS Innovations Star-delta (wye-delta) Combination

Assembly and Wiring

Preface

1

Application description

2

Wiring of the application

3

Further reading

4

History

5

Guarantee and liability

Note

Application examples are non-binding and do not claim to be complete with regard to configuration, equipment or to any contingency. The application examples are not customer-specific solutions. They are merely intended to assist in dealing with typical problems. You are solely responsible for the correct operation of the described products. These application examples do not relieve you of your responsibility for safe usage, installation, operation and maintenance. By using these application examples, you accept that we are not liable for any damage beyond the liability described. We reserve the right to make changes to these application examples at any time, without prior notice. If the suggestions in this application example deviate from other Siemens publications (e.g. catalogs), the contents of the other document have priority.

We assume no liability for any of the information contained in this document.

We are not liable for any damage caused by the use of the examples, information, programs, configuration and performance data, etc. described in this application example, independent of the legal ground upon which this is based, unless we are imperatively liable according to the product liability law, e.g. due to cases of premeditation, an act of gross negligence, injury to life, body or health, or unless the quality of a product has been guaranteed, or due to fraudulent concealment of a defect or serious breach of contract. Damages due to serious breach of contract are, however, restricted to prevalent and foreseeable contractual damages, inasmuch as there is no premeditation or gross negligence nor imperative liability due to injury to life, body or health. This does not constitute a change in the burden of proof to your disadvantage.

Propagation or reproduction of these application examples or parts thereof is not permitted unless expressly allowed by Siemens Industry Sector.

Table of contents

	Guarantee and liability	4
1	Preface	6
1.1	Objective of the application	6
2	Application description.....	7
2.1	Content	7
2.2	Assembly	8
2.2.1	Overview	8
2.2.2	Requirements	8
2.2.3	Advantages of this solution	9
2.2.4	Required hardware components	9
2.2.5	Alternative solution (optional).....	9
3	Wiring of the application.....	10
3.1	Content	10
3.2	Connecting	10
3.2.1	Wiring of the main current circuit.....	10
3.2.2	Wiring of the control current circuit.....	11
4	Further reading	13
4.1	Internet link information	13
5	History.....	14

Preface

1.1 Objective of the application

This application description describes the connection of the improved SIRIUS switching devices.

This application shows the assembly of a star-delta (wye-delta) combination for a pump.

Core content of this application

The following core issues are discussed:

- Assembly and wiring of a star-delta (wye-delta) combination

Basic knowledge of this topic is required.

Structure of the document

The documentation of this application is divided into the following main parts.

Table 1-1

Part	Description
Application description	This chapter gives you an overview. The required standard hardware components are introduced.
Wiring of the application	This section shows the electrical wiring of the application.
Further reading	This chapter provides further information, e.g. literature references.

2

Application description

2.1 Content

This application example describes the assembly and connection of a star-delta (wye-delta) combination to a pump. The pump is additionally protected by a current monitoring relay. The current monitoring relay monitors the rms value of AC currents for any overshooting or undershooting of the set thresholds.

Control of the contactors can be carried out by a PLC or another contact block (e.g. switch or contactor).

2.2 Assembly

2.2.1 Overview

A star-delta (wye-delta) combination is required for the pump. The star-delta (wye-delta) combination is fully wired and mechanically connected.

The control current circuit (control of the contactors), the setting option for the switching time from star operation to delta operation and the main current circuit are displayed for commissioning.

Figure 2-1 Connection of the star-delta (wye-delta) combination

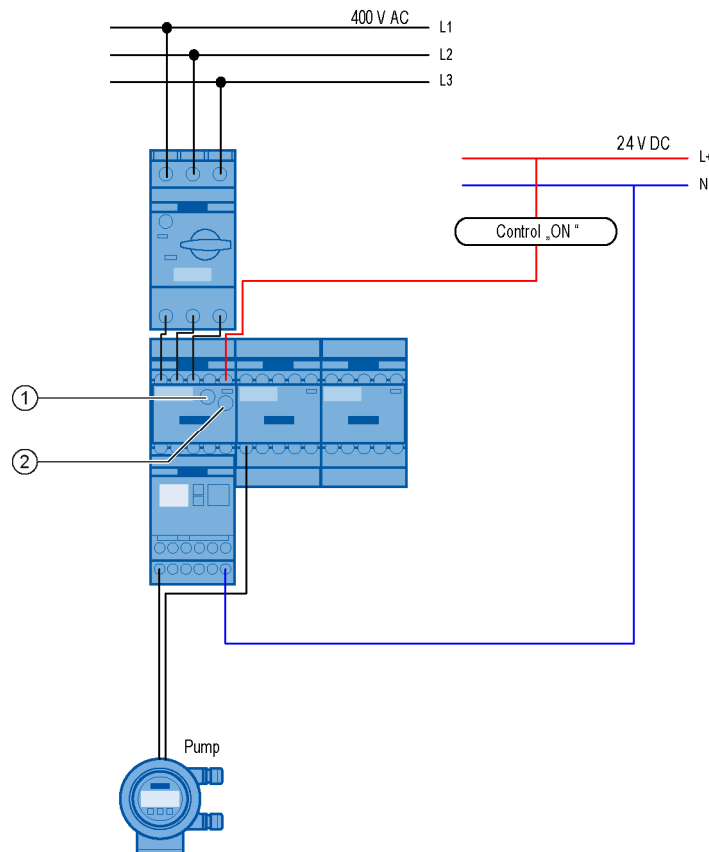


Table 2-2

1	Time range selector switch
2	Runtime control

2.2.2 Requirements

The three-phase motor's maximum output in this example is 7.5 kW. The control for the star-delta (wye-delta) combination is via a 24 V DC supply.

2.2.3 Advantages of this solution

The star-delta (wye-delta) combination's contactors are mechanically and electrically interlocked.

2.2.4 Required hardware components

The following table shows the minimum configuration of the hardware components.

Table 2-3 Hardware components

Component	Quantity	MLFB / order number	Note
Motor starter protector	1	3RV2011-1KA10	—
Star-delta (wye-delta) combination	1	3RA2416-8XF31-1BB4	Fully-wired and mechanically connected
Current monitoring relay	1	3RR2241-1FW30	Digital

2.2.5 Alternative solution (optional)

The following table shows the hardware components required for star-delta (wye-delta) combination self-assembly.

Table 2-4 Hardware components (self-assembly)

Component	Quantity	MLFB / order number	Note
Motor starter protector	1	3RV2011-1KA10	—
<ul style="list-style-type: none"> • Line contactor • Delta contactor 	2	3RT2017-1BB41	Performance range: 5.5 kW
Star (wye) contactor	1	3RT2015-1BB41	Performance range: 3 kW
Assembly kit for star-delta (wye-delta) combinations	1	3RA2913-2BB1	With integrated connecting cable
Function module for star-delta (wye-delta) start	1	3RA2816-0EW20	—
Current monitoring relay	1	3RR2241-1FW30	Digital

Wiring of the application

3.1 Content

This section shows the electrical wiring of the application.

3.2 Connecting

This chapter describes how the main current circuit and the control current circuit are connected.

3.2.1 Wiring of the main current circuit

Figure 3-2 Wiring of the main current circuit

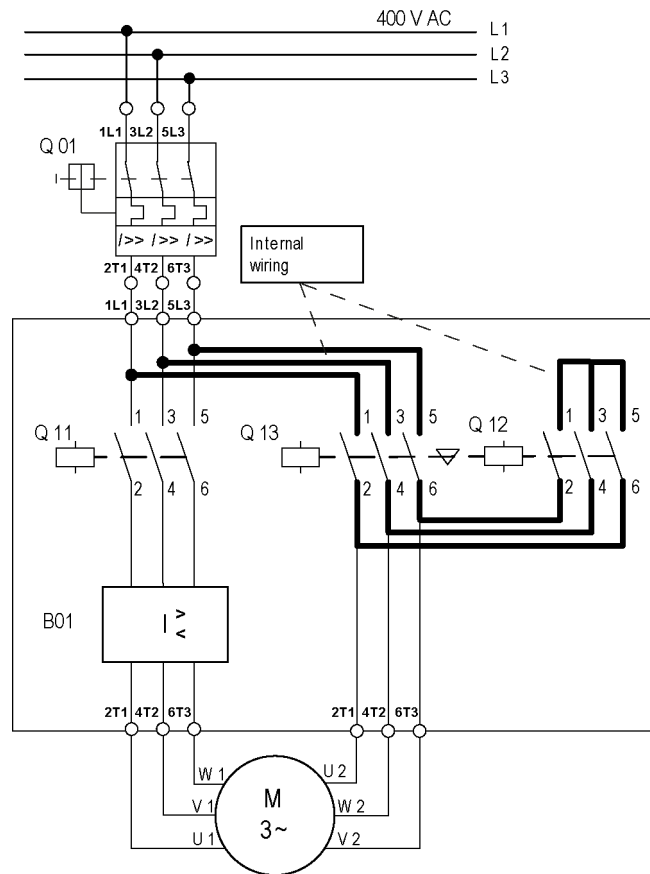


Table 3-5

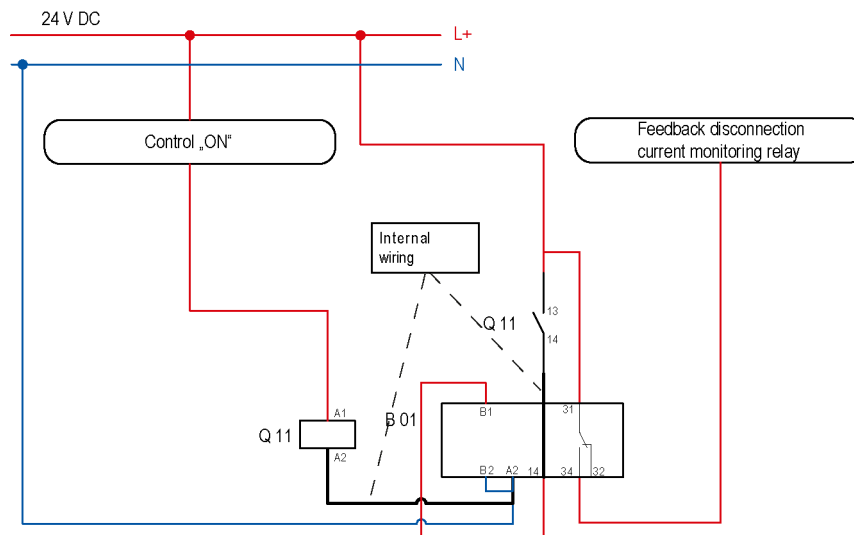
B01	Motor starter protector
-----	-------------------------

3.2.2 Wiring of the control current circuit

Circuit diagram with set lower current limit

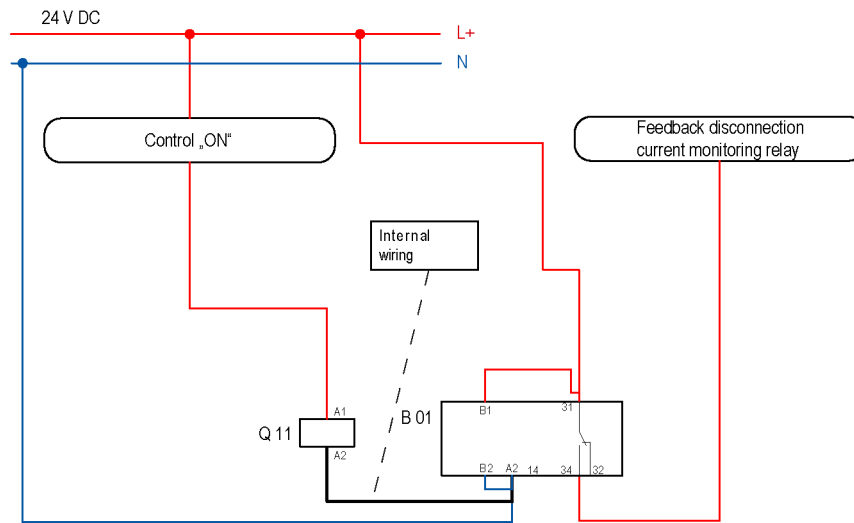
If the current monitoring relay is parameterized for current undershooting, shutdown of the voltage supply (B1/B2) occurs if the star-delta (wye-delta) combination is not controlled. This setting minimizes error risk.

Figure 3-3 Control current circuit with set lower current limit



Circuit diagram without set lower current limit

Figure 3-4 Control current circuit without set lower current limit



Installation of the hardware

The hardware components can be found in chapter 2.2.4.

The structure of the hardware components is shown in chapter 2.2.1.

Note

The installation guidelines must always be observed.

4

Further reading

4.1 Internet link information

This list is not complete. It only provides a selection of possible further reading.

Table 4-6

	Topic	Title
\1\	Link to the document	http://support.automation.siemens.com/WW/view/en/41737766
\2\	System manual Industrial controls – SIRIUS innovations	http://support.automation.siemens.com/WW/view/en/39740306
\3\	Siemens A&D Customer Support	http://support.automation.siemens.com

History

Table 5-7 History

Version	Date	Change
V1.0	25.02.2010	First issue
V2.0	25.06.2010	<ul style="list-style-type: none">• Revision of the hardware assembly overview• Update of the motor starter protector order numbers• Revision of the wiring of the main current circuit and of the control current circuit