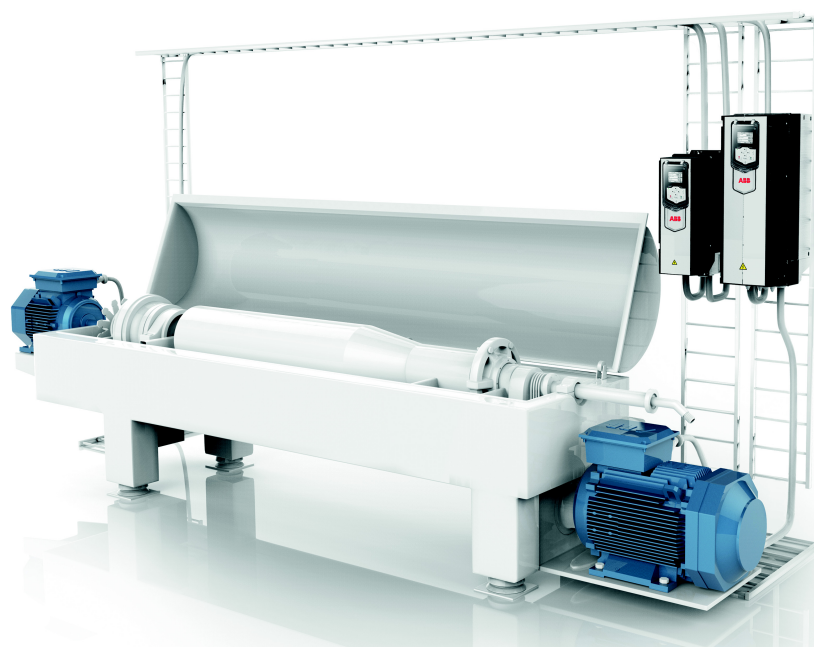

ABB INDUSTRIAL DRIVES

ACS880 Centrifuge Decanter control program (+N5150)

Supplement



List of related manuals

*Lists of hyperlinks to product manuals

	Code
<i>ACS880-01 drives</i>	9AKK105408A7004
<i>ACS880-04 drive modules (200 to 710 kW, 300 to 700 hp)</i>	9AKK105713A4819
<i>ACS880-07 drives (45 to 710 kW, 50 to 700 hp)</i>	9AKK105408A8149
<i>ACS880-07 drives (560 to 2800 kW)</i>	9AKK105713A6663
<i>ACS880-11 drives</i>	9AKK106930A9565
<i>ACS880-14 drive modules (132 to 400 kW, 200 to 450 hp)</i>	9AKK107045A8023
<i>ACS880-17 drives (132 to 400 kW, 200 to 450 hp)</i>	9AKK106930A3466
<i>ACS880-17 drives (160 to 3200 kW)</i>	9AKK106354A1499
<i>ACS880-31 drives</i>	9AKK106930A9564
<i>ACS880-34 drive modules (132 to 400 kW, 200 to 450 hp)</i>	9AKK107045A8025
<i>ACS880-37 drives (132 to 400 kW, 200 to 450 hp)</i>	9AKK106930A3467
<i>ACS880-37 drives (160 to 3200 kW)</i>	9AKK106354A1500

Other drive hardware manuals

<i>ACS880-04XT drive module packages (500 to 1200 kW) hardware manual</i>	3AXD50000025169
<i>ACS880-04 single drive module packages hardware manual</i>	3AUA0000138495
<i>ACS880-07CLC drives hardware manual</i>	3AXD50000131457
<i>ACS880-14 and -34 single drive packages hardware manual</i>	3AXD50000022021
<i>ACS880-104 inverter modules hardware manual</i>	3AUA0000104271
<i>ACS880-104LC inverter modules hardware manual</i>	3AXD50000045610
<i>ACS880-107 inverter units hardware manual</i>	3AUA0000102519

Drive firmware manuals and guides

<i>ACS880 primary control program firmware manual</i>	3AUA0000085967
<i>ACS880 drives with primary control program, quick start-up guide</i>	3AUA0000098062
<i>Adaptive programming application guide</i>	3AXD50000028574
<i>Drive application programming manual (IEC 61131-3)</i>	3AUA0000127808
<i>ACS880 diode supply control program firmware manual</i>	3AUA0000103295
<i>ACS880 IGBT supply control program firmware manual</i>	3AUA0000131562
<i>ACS880 distributed I/O bus supplement</i>	3AXD50000126880

Option manuals and guides

<i>ACX-AP-x assistant control panels user's manual</i>	3AUA0000085685
<i>FDCO-01/02 DDCS communication modules user's manual</i>	3AUA0000114058
<i>Drive composer Start-up and maintenance PC tool user's manual</i>	3AUA0000094606
<i>Manuals and quick guides for I/O extension modules, fieldbus adapters, encoder interfaces, etc.</i>	

You can find manuals and other product documents in PDF format on the Internet. See section *Document library on the Internet* on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

*Available in the Document library.

Supplement

ACS880

Centrifuge Decanter control program (+N5150)

Table of contents



2. Quick start-up guide



Table of contents

1. Introduction

Contents of this chapter	3
Compatibility	3
Licensing	3
Safety	4
Intended audience	4
Contents	4
Related documents	4
Terms and abbreviations	5
Cybersecurity disclaimer	5

2. Quick start-up guide

Contents of this chapter	7
Before you start	7
Safety	7
Centrifuge drive start-up	8
Centrifuge I/O control connections	9
Decanter drive start-up	10
Decanter I/O control connections	11
Optical link for Decanter	12
Parameter settings	12
Decanter scroll fault supervision	14
Decanter connection example	14

3. Centrifuge program features

Contents of this chapter	15
Centrifuge control program	15
Centrifuge operating principle	15
Operating mode	16
Centrifuge operation sequence	16
How to start and stop the Centrifuge	17
How to reset the Centrifuge sequence	17
How to halt the Centrifuge	18
Drive configuration and programming	18
Adaptive programming	18

4. Decanter program features

Contents of this chapter	19
Decanter features	19
Decanter Operation	20
Decanter operating principle	20
Operating mode	20
Decanter control modes	21
Local control	21

Speed reference control	21
Decanter control	21
Decanter process load compensation	22
Torque window control	22
Direct torque compensation	23
Differential speed control	23
Decanter control chain diagram of Scroll drive	24
Decanter examples	25
Back drive, variant A	25
Back drive, variant B	26
Forward drive	27
Decanter jogging	28

5. Signals and parameters

Contents of this chapter	29
Terms and abbreviations	30
Summary of parameter groups	30
Parameters listing	31
09 Centrifuge	31
74 Centrifuge Decanter control	34
75 Centrifuge function	34
77 Centrifuge pattern	35
78 Decanter control	36
79 Decanter jogging	40

6. Fault tracing

About this chapter	43
Warning messages	43
Fault messages	44

Further information

1

Introduction

Contents of this chapter

This chapter contains information on compatibility, safety and intended audience of this manual. It also provides an overview of the contents in this manual.

Compatibility

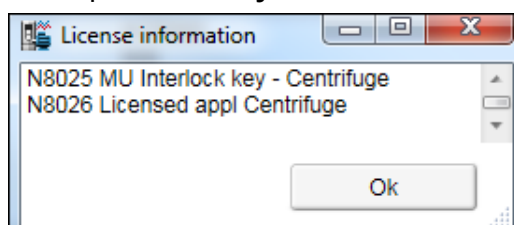
This supplement is compatible with the ACS880 Centrifuge Decanter control program (version 1.10 or later).

Licensing

The Centrifuge Decanter control program (+N5150), version ACDLx v1.10.0.0 or later comes with a license key on the ZMU-02 memory unit. The program activates only after recognizing the key and correspondingly registers itself with the Centrifuge Decanter software.

Device	License key
ZMU-02 memory unit license key	N8025 MU Interlock key – Centrifuge
Centrifuge Decanter software (loading package)	N8026 Licensed appl Centrifuge

You can see the license information in the Drive Composer PC tool or in the ACS-AP-x control panel from **System info** → **Licenses**.



After the program is downloaded to the memory unit with the license key, the program remains there unless you remove it. This makes it possible for you to upgrade the Centrifuge Decanter application later on a separate Centrifuge Decanter loading package.

If the program was loaded to the memory unit without the license key, then the drive indicates a fault 64A5 Licensing fault. See the auxiliary fault code in the Event logger to know the plus code of the missing license, in this case N8015. For further assistance, contact your local ABB representative.

Safety

The complete safety instructions are given in the Hardware or Safety Manual delivered with the drive. Read the safety instructions before attempting any work on the unit.

Read the software function specific warnings and notes before changing the default parameter values. For each function, the warnings and notes are given in the section describing the related user-adjustable parameters.

Intended audience

The reader of this manual is expected to have a basic knowledge of ABB products, terminologies, standard electrical wiring practices, electronic components and electrical schematic symbols.

Contents

This manual consists of the following chapters:

[Introduction](#) (page 3) provides an overview of this manual.

[Quick start-up guide](#) (page 7) provides instructions to start-up a Centrifuge and describes the default control connections for using the Centrifuge and Decanter drive.

[Centrifuge program features](#) (page 15) provides an overview of the core features of the Centrifuge application.

[Decanter program features](#) (page 19) provides an overview of the core features of the Decanter application.

[Signals and parameters](#) (page 29) describes the user adjustable settings of the required parameter groups for operating the Centrifuge and Decanter drive.

[Fault tracing](#) (page 43) lists all the alarm, faults and warning messages related to the Centrifuge Decanter drive and describes the possible cause and corrective actions.

Additional parameter data contains further information on the parameters.

Related documents

See [List of related manuals](#) on page 2 (inside the front cover).

Terms and abbreviations

This manual uses the following terms and abbreviations:

Term/ Abbreviation	Expansion	Definition
AI	Analog input	Interface for analog input signals
AO	Analog output	Interface for analog output signals
B	Boolean	Data type boolean
DDCS	Distributed Drive Communication System	A protocol used in optical fiber communication.
Def	Default value	Default value
DI	Digital input	Interface for digital input signals
DO	Digital output	Interface for digital output signals
FbEq	Fieldbus equivalent	Value on control panel converted to an integer value when communicated over a serial communication link (fieldbus interface)
I	Integer	Data type integer
I/O	Input/Output	Input/Output
Parameter	-	User-adjustable operation instruction to the drive, or signal measured or calculated by the drive
R	Real	Data type real
RO	Relay output	Interface for a digital output signal implemented with a relay.
FDCO-01/02	-	Optional DDCS communication module
Type	-	Data type

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.



2

Quick start-up guide

Contents of this chapter

This chapter provides the instructions to start-up the Centrifuge and Decanter drive. It also illustrates the default control connections for the Centrifuge and Decanter drive.

See,

- [Centrifuge drive start-up](#) (page 8)
- [Decanter drive start-up](#) (page 10)
- [Centrifuge I/O control connections](#) (page 9)
- [Decanter I/O control connections](#) (page 11)

Before you start

Make sure the drive is installed as per the mechanical and electrical instructions described in the *Quick installation guide* and/or *Hardware manual*.

Safety



WARNING! All electrical installation and maintenance work on the drive should be carried out by qualified electricians only.

Never work on the drive, the brake chopper circuit, the motor cable or the motor when power is applied to the drive. Always make sure by measuring that no voltage is actually present.



WARNING! Make sure that the machinery into which the drive with brake control function is integrated fulfills the personnel safety regulations. Note that the frequency converter (a Complete Drive Module or a Basic Drive Module, as defined in IEC 61800-2), is not considered as a safety device mentioned in the European Machinery Directive and related harmonized standards. Thus, the personnel safety of the complete machinery must not be based on a specific frequency converter feature (such as

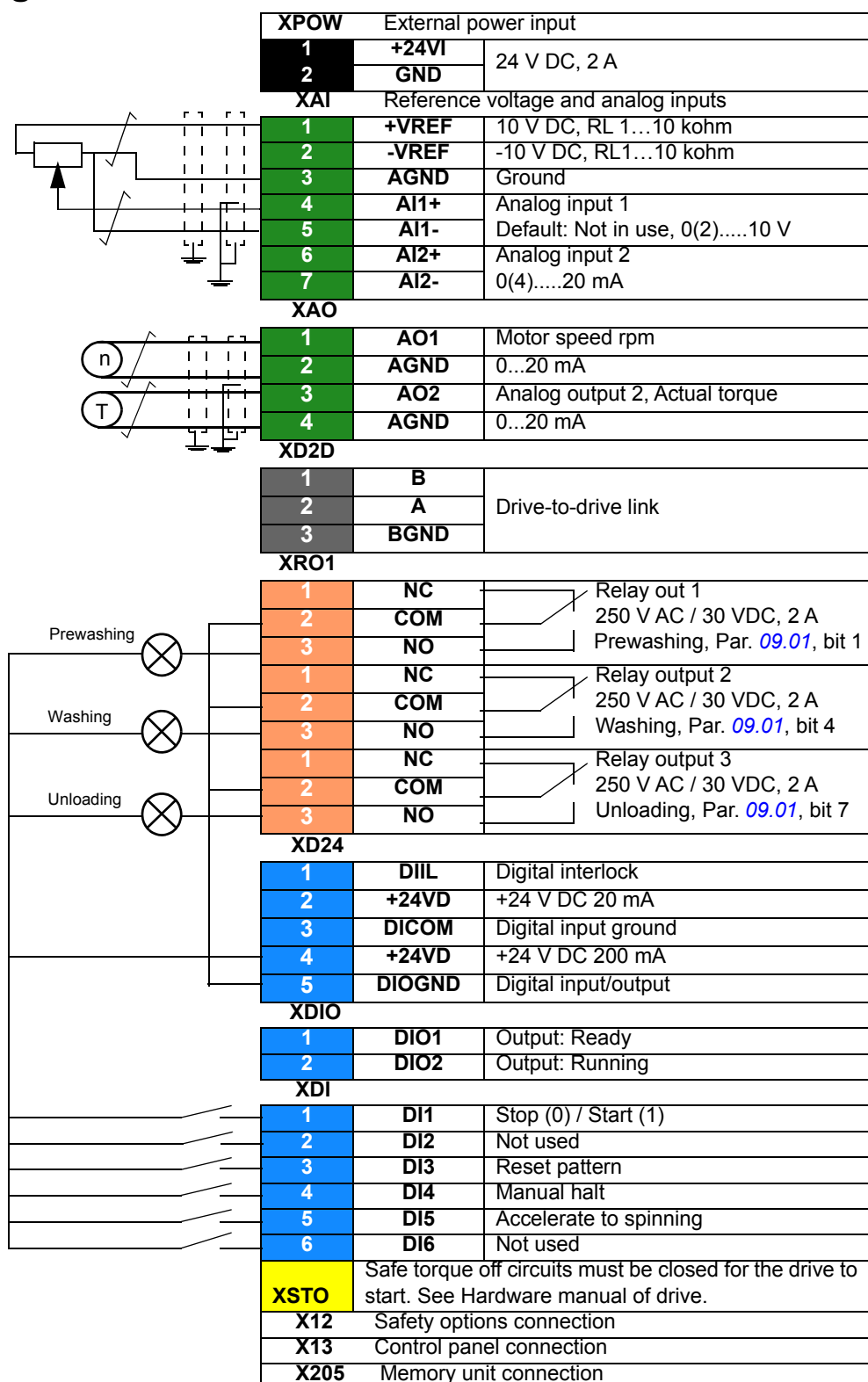
the brake control function), but it has to be implemented as defined in the application specific regulations.

Centrifuge drive start-up

The checklist for Centrifuge drive start-up is given below:

Step	Action
1	Connect digital and analog I/Os according to the wiring diagram shown in section Centrifuge I/O control connections .
2	Perform basic start-up of the drive. See <i>ACS880 primary control program firmware manual (3AUA0000085967[English])</i> .
3	Activate Centrifuge control program with parameter 74.01 Centrifuge/ Decanter function selection .
4	Activate default relay outputs and default actual values on the control panel with parameters 10.24...10.32. See <i>ACS880 primary control program firmware manual (3AUA0000085967[English])</i> .
5	Set speed limits with following parameters: <ul style="list-style-type: none"> • 77.01 Fill speed • 77.02 Spin speed • 77.03 Unload speed • 77.04 Prewashing speed • 77.05 Washing speed.
6	Set acceleration and deceleration ramps with following parameters: <ul style="list-style-type: none"> • 77.06 Acc time to fill speed and • 77.08 Dec time to unload speed
7	Tune other parameters required for controlling the Centrifuge sequence. See parameter group 77 Centrifuge pattern .
8	The drive is ready to run. Perform a test run with the motors de-coupled in the driven machinery. Start the drive locally by following the instructions in section How to start and stop the Centrifuge .

Centrifuge I/O control connections

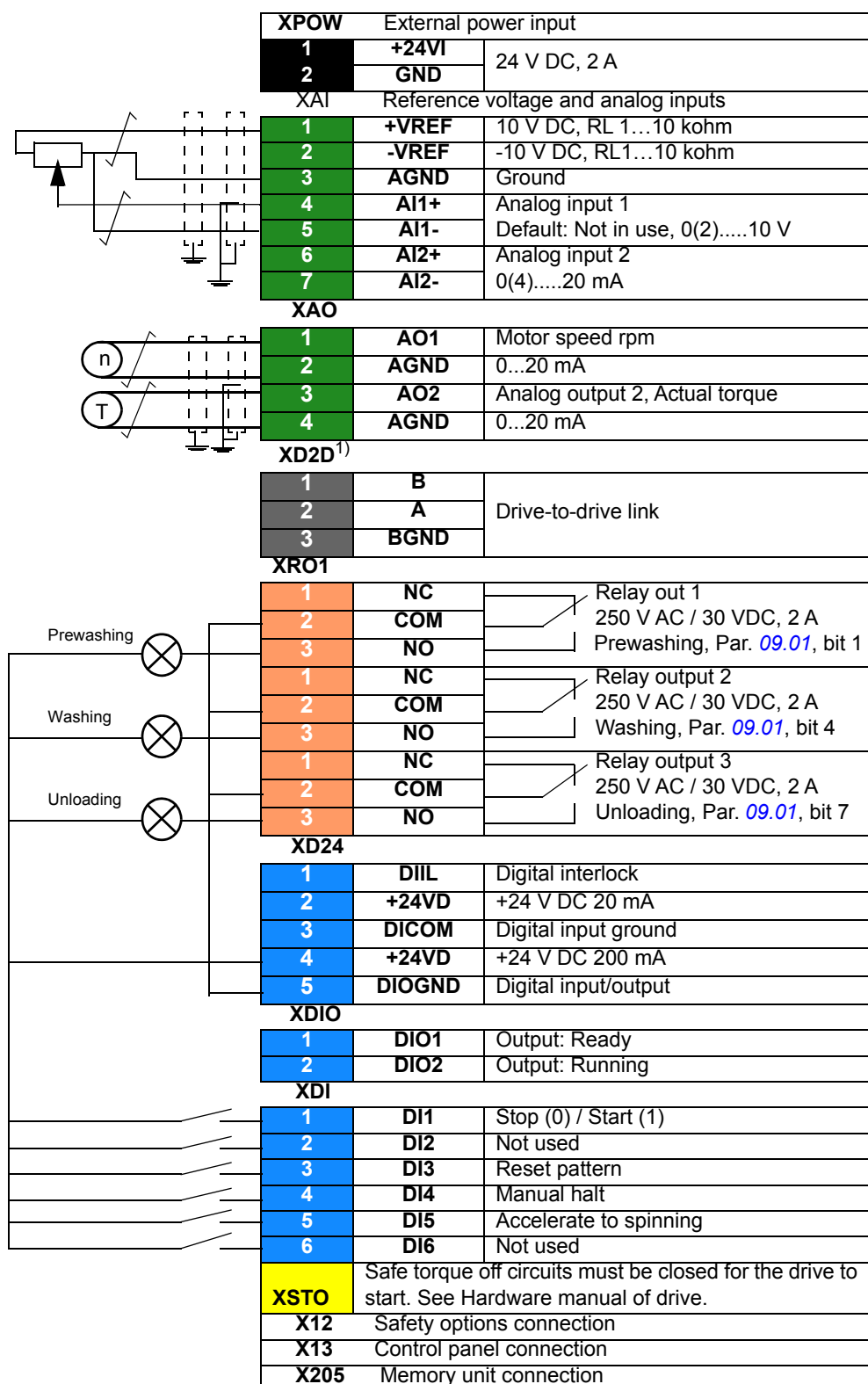


Decanter drive start-up

The checklist for Decanter drive start-up is given below:

Step	Action
1	Connect digital and analog I/Os according to the wiring diagram shown in section Decanter I/O control connections .
2	Perform basic start-up of the drive. See <i>ACS880 primary control program firmware manual (3AUA0000085967[English])</i> .
3	Activate Decanter control program with parameter 74.01 Centrifuge/ Decanter function selection .
4	Activate default relay outputs and default actual values on the control panel with parameters 10.24...10.32. See <i>ACS880 primary control program firmware manual (3AUA0000085967[English])</i> .
5	Activate Bowl drive with following parameters: <ul style="list-style-type: none"> • 78.01 Decanter mode select • 78.07 Bowl belt D1 • 78.08 Bowl belt D2
6	Activate Scroll drive with following parameters: <ul style="list-style-type: none"> • 78.01 Decanter mode select • 78.02 Decanter control selection in scroll • 78.03 Delta speed start/stop • 78.04 Delta speed function • 78.05 Delta speed ref selection • 78.09 Gearbox ratio • 78.10 Scroll belt D3 • 78.11 Scroll belt D4 • 78.23 Acceleration time • 78.24 Deceleration time
7	Activate torque windows with following parameters: <ul style="list-style-type: none"> • 78.12 Torque window sel • 78.13 Torque ref select • 78.15 Torque gain • 78.16 Torque integration time
8	Activate load compensation with following parameters: <ul style="list-style-type: none"> • 78.17 Load compensation gain • 78.18 Load compensation int time • 78.19 Torque to delta speed
9	The drive is ready to run. Perform a test run with the motors de-coupled in the driven machinery.

Decanter I/O control connections



¹⁾ ABB recommends to use a FDCO-01/02 module for creating a master follower link between scroll and bowl.

Optical link for Decanter

To realize the internal drives communication, an optical link is required between the Bowl drive and the Scroll drive. Connect channel 2 of both drives together using a pair of fibre optic cable (2 m to 10 m).

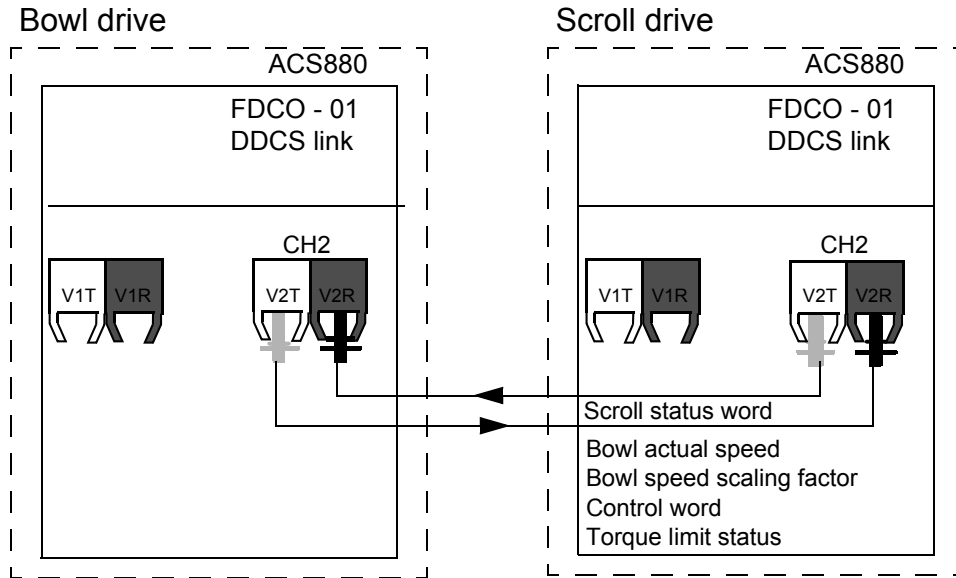


Figure 1. Optical link connection (T = Transmitter, R = Receiver)

Parameter settings

Configure Bowl drive and Scroll drive using the following parameters:

Bowl drive parameters:

- 60.01 M/F communication port (fiber optic channel selection) = Slot 1B. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
- 60.02 M/F node address = 1. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
- 60.12 M/F act1 type = Speed. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
- [74.01 Centrifuge/ Decanter function selection](#) = Decanter
- [78.01 Decanter mode select](#) = Bowl

Scroll drive parameters:

- 60.01 M/F communication port (fiber optic channel selection) = Slot 1B. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
 - 60.02 M/F node address = 2. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
 - 20.01 Ext1 commands = M/f link. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
 - 22.11 Speed ref1 source = M/f reference 1. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
 - *74.01 Centrifuge/ Decanter function selection = Decanter*
 - *78.01 Decanter mode select = Scroll*
 - *78.02 Decanter control selection in scroll = Selected*
 - *78.03 Delta speed start/stop = Bowl drive*
 - *78.25 Scroll ref sel = DDCS*
-

Decanter scroll fault supervision

■ Decanter connection example

The connection illustrated below stops the Bowl drive and the Scroll drive in the event of scroll fault.

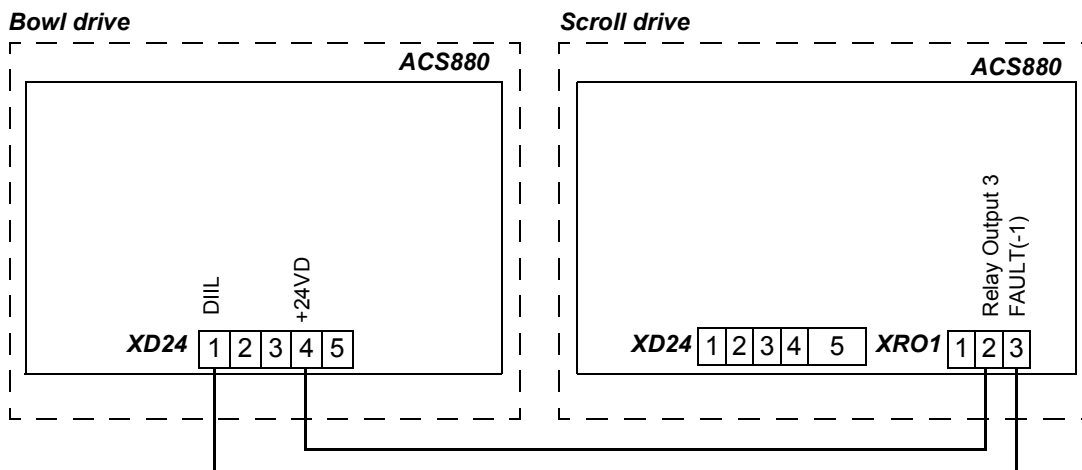


Figure 2. Decanter connection

3

Centrifuge program features

Contents of this chapter

This chapter describes the operational sequence of Centrifuge drive and also includes the important functions within the control program that are specific to the Centrifuge application.

Centrifuge control program

■ Centrifuge operating principle

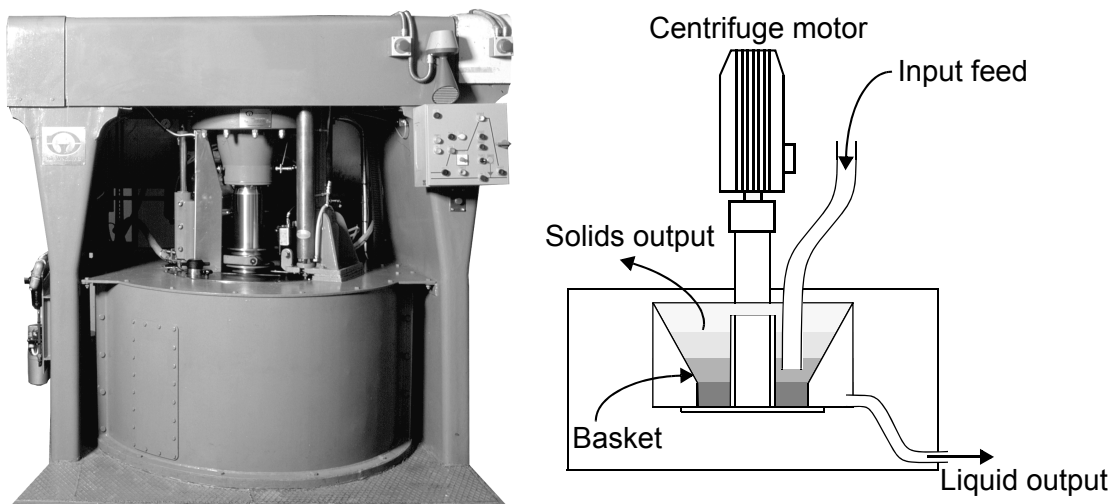


Figure 3. Centrifuge operation

The Centrifuge operation is based on the principle of centrifugal force. The Centrifuge accelerates to a pre determined filling speed and then the feed input is initiated. As the centrifugal force drives the feed through filter media and perforated basket wall, a cake builds up on the filter media. The liquid is removed through an outlet. The retained solid particles are accelerated to spinning speed, after which the centrifuge decelerates to

unloading speed and a discharger removes the product from the basket. An alternative unloading method allows top removal of product in a filter bag.

■ Operating mode

Centrifuge operation can be set with parameter [74.01 Centrifuge/ Decanter function selection](#). For using the Centrifuge, see steps in [Centrifuge drive start-up](#) (page 8).

■ Centrifuge operation sequence

The graph below illustrates the operating sequence of a Centrifuge drive. The corresponding operating stages are listed in the table below this graph.

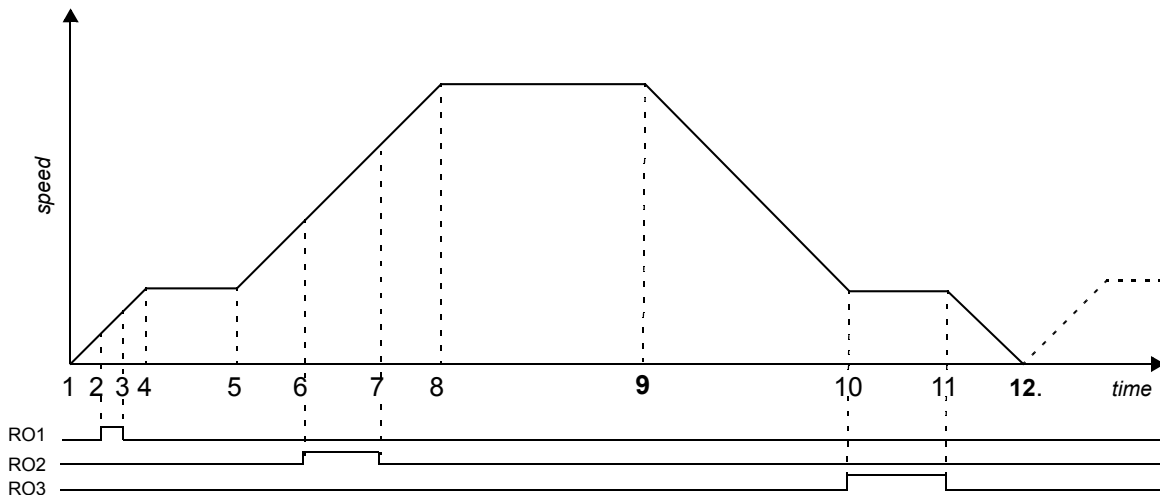


Figure 4. Operation sequence of Centrifuge

The table below lists the different operating stages of Centrifuge drive and points to the related parameter setting.

Stage No.	Stage description	Centrifuge operation	See parameter
1	Drive starts accelerating the Centrifuge to filling speed.	Drive starts accelerating the Centrifuge.	77.06 Acc time to fill speed
2	Drive reaches the pre-washing speed.	Pre-washing counter starts.	77.04 Prewashing speed
3	Counter reaches the set pre-washing time.	Pre-washing is deactivated.	77.10 Prewashing time
4	Drive reaches the filling speed.	Drive shifts to constant speed. The external system starts filling the Centrifuge.	77.01 Fill speed
5	External system stops the Centrifuge filling.	Drive accelerates the Centrifuge to spin speed.	77.07 Acc time to spin speed
6	Drive reaches the washing speed.	Washing counter starts and Relay output RO2 starts the washing operation.	77.05 Washing speed

Stage No.	Stage description	Centrifuge operation	See parameter
7	Counter reaches the set washing time.	Washing stops.	77.11 Washing time
8	Drive reaches the spinning speed.	Drive shifts to constant speed and the spinning time counter starts.	77.02 Spin speed
9	Counter reaches the set spinning time.	Drive shifts to deceleration.	77.12 Spinning time
10	Drive reaches the unloading speed.	Drive shifts to constant speed and unload counter starts.	77.03 Unload speed and 77.08 Dec time to unload speed
11	Counter reaches the set unloading time.	Relay output RO3 de-energises switching off the unloading.	77.13 Unloading time
12	Centrifuge comes to standstill.	See step 1.	77.09 Dec time to zero speed

■ How to start and stop the Centrifuge

The Start command starts the Centrifuge operating sequence or continues the sequence after the Stop command. The Stop command stops the centrifuge at any phase of the sequence.

Note:

- To start the centrifuge after a fault or power switch-off, make sure to give a rising edge of the start signal.
- To start or stop the Centrifuge through I/O controls, select the source of start and stop commands separately for each control location (EXT1 or EXT2) with parameters 20.01...20.10. See *ACS880 primary control program firmware manual (3AUA0000085967[English])*.
- Use the I/O controls only when the drive is in external control mode. The “Local” on the first row of the panel indicates local control. Press LOC/REM key to shift between local control and external control. See *ACS-AP-x assistant control panels user’s manual (3AUA0000085685[English])*.

■ How to reset the Centrifuge sequence

The Centrifuge reset sequence starts the Centrifuge sequence from the start and clears all the actual signals in group [09 Centrifuge](#).

To reset the Centrifuge sequence through I/O controls, stop the drive and set the digital input defined as the source for resetting. See parameter [75.01 Pattern reset selection](#) (page [34](#)).

Note: Check that the selected digital input DI is not used for other purposes.

■ How to halt the Centrifuge

After receiving the Halt signal, the drive immediately shifts to deceleration phase and runs the Centrifuge to standstill along the remaining sequence.

The graph below illustrates two cases on how the sequence continues after the Halt signal.

Halt 1 = Drive receives Halt signal during acceleration phase.

Halt 2 = Drive receives Halt signal during spinning phase.

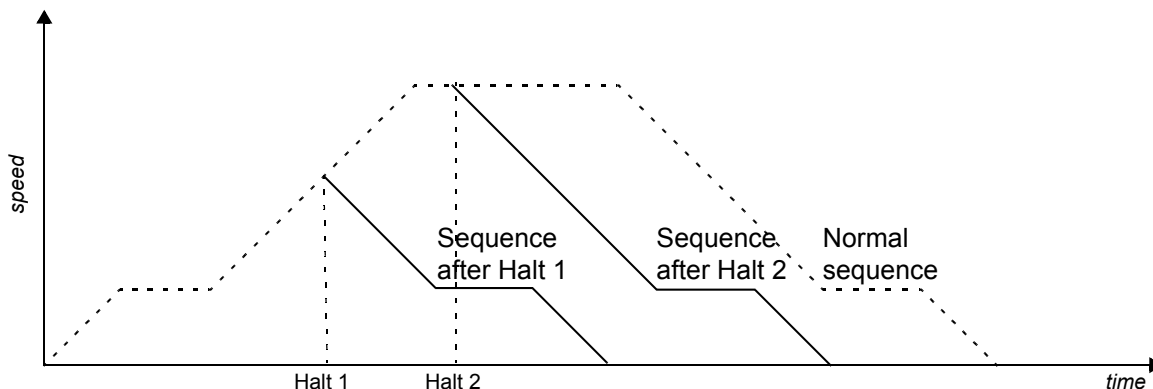


Figure 5. Halt sequence

To halt the centrifuge through I/O control, set the defined digital input as the source for the halt signal. See parameter [75.02 Manual halt](#) (page 34).

Drive configuration and programming

■ Adaptive programming

Conventionally, the user can control the operation of the drive by parameters. However, the standard parameters have a fixed set of choices or a setting range. To further customize the operation of the drive, an adaptive program can be constructed out of a set of function blocks.

The Drive composer pro PC tool (version 1.10 or later, available separately) has an Adaptive programming feature with a graphical user interface for building the custom program. The function blocks include the usual arithmetic and logical functions, as well as e.g. selection, comparison and timer blocks. The program can contain a maximum of 30 blocks. The adaptive program is executed on a 10 ms time level.

For more information, see

- *ACS880 primary control program firmware manual (3AUA0000085967[English])*
and
- *Adaptive programming application guide (3AXD50000028574 [English]).*



Decanter program features

Contents of this chapter

This chapter describes the operational sequence of the Decanter drive and also includes the important functions within the control program that are specific to the Decanter application.

Decanter features

The main features of Decanter drive are:

- Accurate speed and torque control without pulse encoder feedback.
 - Direct communication between Bowl drive and Scroll drive (DDCS optical link).
 - Automatic scaling of process speed based on gearbox and belt ratio values.
 - Speed difference control of Scroll drive.
 - Process load compensation to optimize production.
 - Jogging function.
 - Speed difference supervision.
 - Multifunction reference and control selections through conventional I/Os or fieldbus.
-

Decanter Operation

■ Decanter operating principle

The Decanter control fulfills the common requirement of two-shaft decaners, where the machinery consists of a bowl and a scroll (screw conveyer).

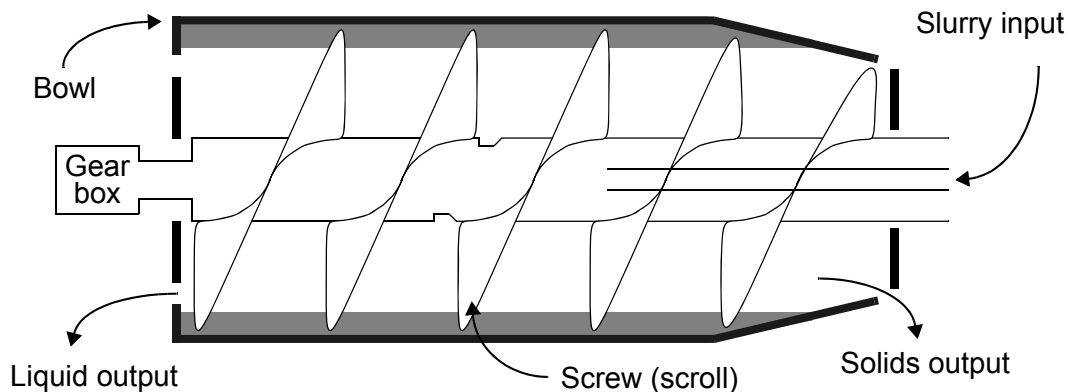


Figure 6. Two-shaft Decanter

A two-shaft Decanter operates on the principle of sedimentation. The slurry (input product) is fed through a fixed central pipe into the distributor located in the scroll. Thereafter the product is accelerated through the spiral gravity separator to the bowl. This means that solid particles heavier than the liquid will settle out. Centrifugal force speeds up the separation process.

The bowl speed is the master speed of separation. The speed difference (delta speed) between the bowl and the scroll influences directly to remove the solid particles. The master speed (bowl actual speed) is sent from the Bowl drive through the DDCS link to the Scroll drive. The Scroll drive does the necessary scaling based on the gearbox and belt gear parameters.

The process load compensation function (Torque window control and Direct torque compensation) supervises the actual torque of the Scroll drive. When necessary the function corrects the delta speed reference. The delta speed reference is subtracted from (or added to) the master speed and used as the speed reference of the follower (scroll).

■ Operating mode

Decanter control can be set with parameter [74.01 Centrifuge/ Decanter function selection](#). For using the Decanter, see steps in [Decanter drive start-up](#) (page 10) and [Decanter examples](#) (page 25).

Decanter control modes

The three basic control modes of Decanter are: Local control, Speed reference control and Decanter control.

■ Local control

This mode is selected using the LOC/REM key on the panel. The “Local” is visible on the first row of the panel display. In local control mode, standard reference is available. The motor runs directly with the given speed reference when the decanter is not active.

■ Speed reference control

This mode is active when Local and Decanter controls are not active. Speed reference selection and Start/Stop commands are defined in parameter groups 20 and 22. Speed reference control functions the same way as EXT1 command in the standard control program. Typically, Bowl drive is in speed reference mode.

■ Decanter control

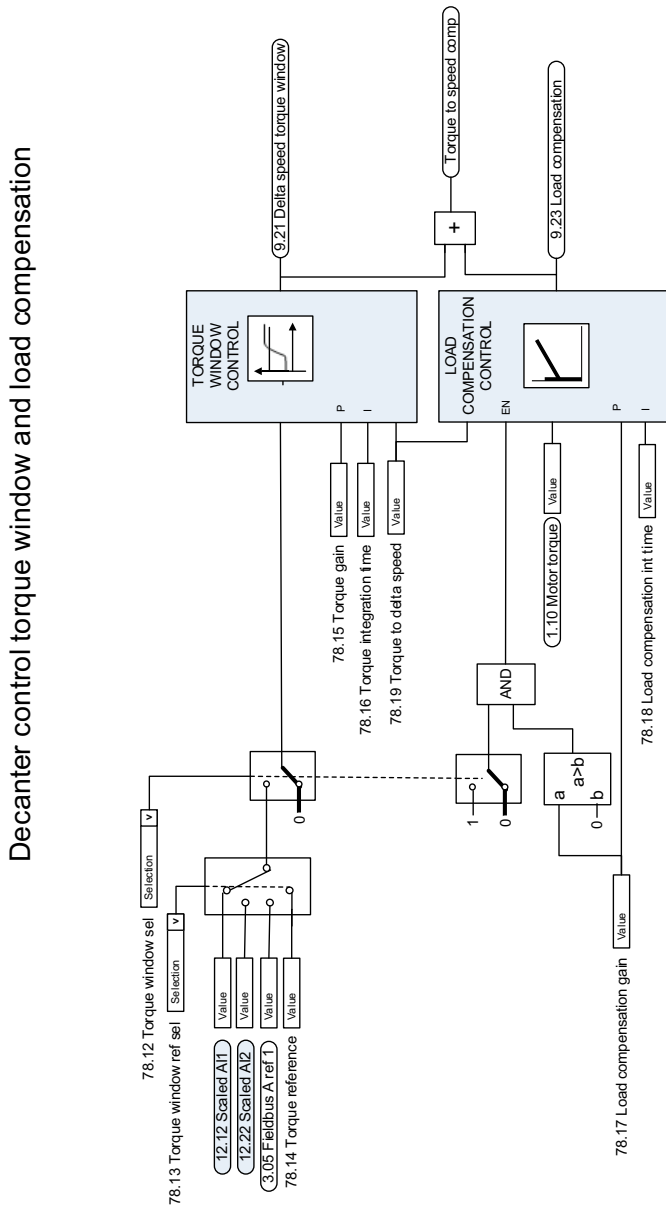
This mode is activated when local control is not active and the signal is selected in parameter [78.02 Decanter control selection in scroll](#). Typically, Scroll drive is in the Decanter control mode. See parameter group [78 Decanter control](#).

The following Scroll drive functions can be activated only when the Decanter control is selected:

- Differential speed function, see parameters [78.03...78.06](#).
 - Torque window function, see parameters [78.12...78.21](#).
 - Jogging function, see parameter [79.01](#).
-

Decanter process load compensation

The load compensation of Scroll drive enables compensating the process load variations of a Decanter. This means that, it is possible to influence the quality of the end product automatically through a differential speed correction. See the below chain diagram and parameters [78.17 Load compensation gain](#) and [78.18 Load compensation int time](#).



■ Torque window control

The operating principle of the Torque window control is based on the window control of the actual torque. The control is activated when the actual torque of the scroll drive exceeds the given reference.

Differential speed correction can be adjusted with separate integrator, gain and scaling factors of the Torque window control using following parameters:

[78.12 Torque window sel](#)

[78.13 Torque ref select](#)

[78.14 Torque reference](#)

[78.15 Torque gain](#)

[78.16 Torque integration time](#)

[78.19 Torque to delta speed](#)

See also [Decanter control chain diagram of Scroll drive](#) on page 24.

■ Direct torque compensation

The operating principle of the direct torque compensation is based on actual torque compensation of the Scroll drive. The control is activated by setting the gain greater than zero. The control is active with all actual torque values. Direct torque compensation can be adjusted with separate integrator and gain. Use the Torque window control scaling.

Differential speed control

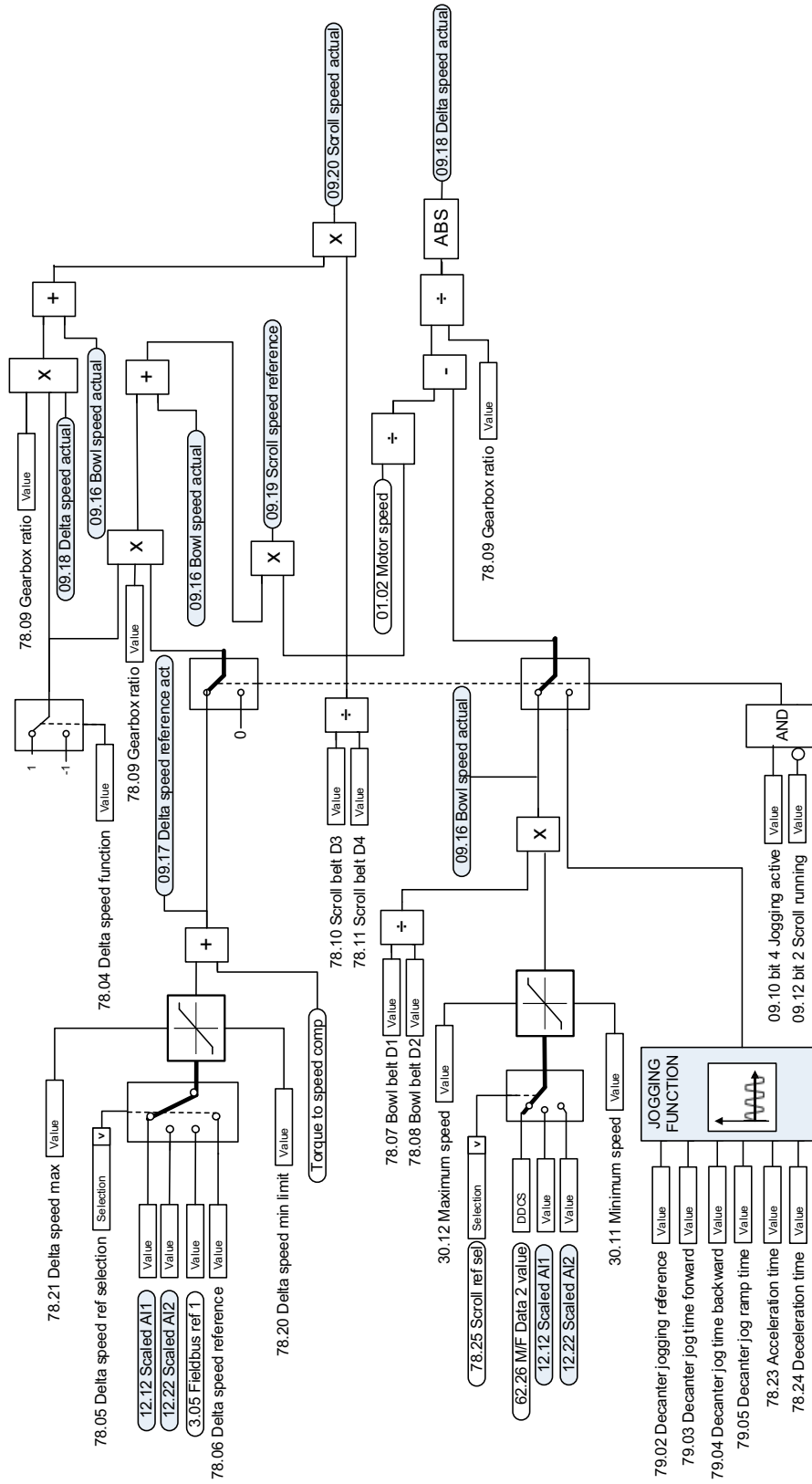
Differential or delta speed control calculates the speed difference between the Bowl and Scroll drive.

See parameters:

- [78.03 Delta speed start/stop](#)
 - [78.04 Delta speed function](#)
 - [78.05 Delta speed ref selection](#)
 - [78.06 Delta speed reference](#)
 - [78.20 Delta speed min limit](#)
 - [78.21 Delta speed max limit](#)
-

■ Decanter control chain diagram of Scroll drive

Decanter control speed- and delta speed reference chain of scroll drive



Decanter examples

The below examples depict the mechanical and electrical configuration of a Back drive and Forward drive in a Decanter/Centrifuge application.

■ Back drive, variant A

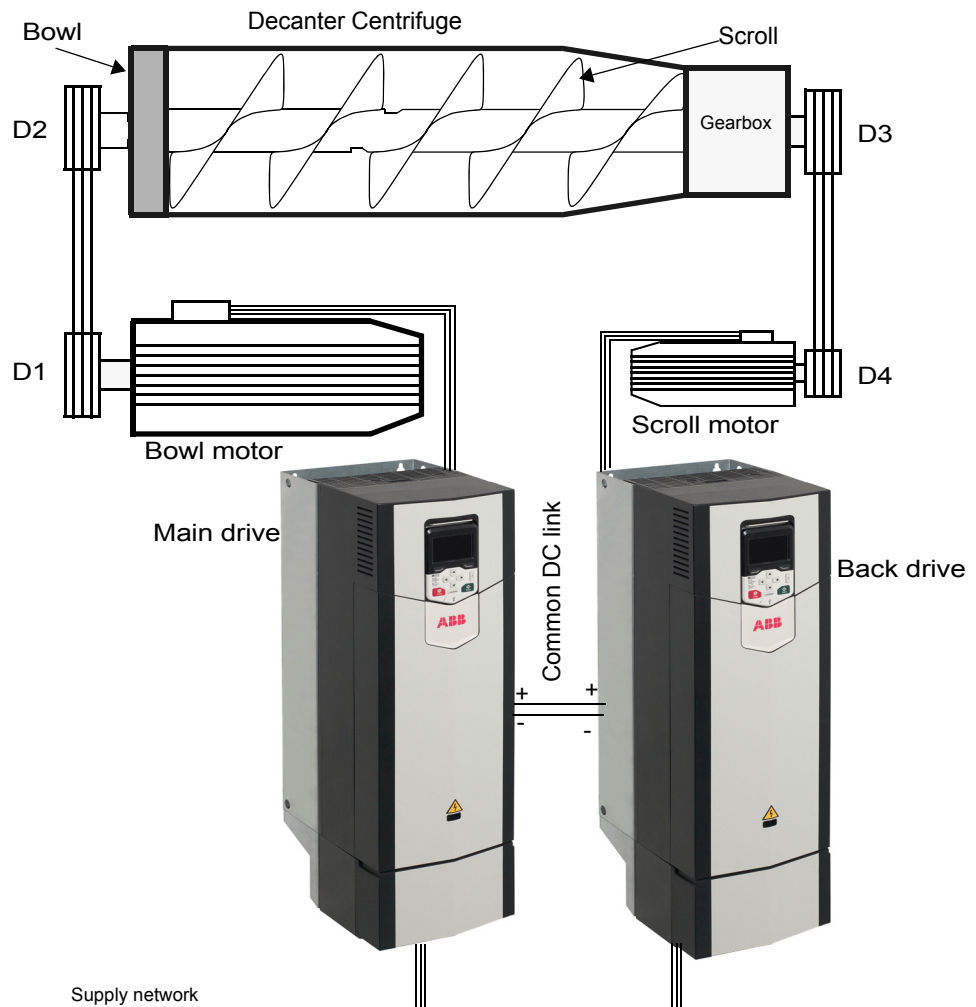


Figure 7. Back drive, variant A decanter centrifuge

If Bowl motor is rotating in the forward direction, the Scroll motor must be rotating in the reverse direction. This can be achieved by setting the below listed parameters in the parameter group [78 Decanter control](#). D1, D2, D3 and D4 are Bowl and Scroll drives as represented in the above figure. The communication between the Scroll drive and Bowl drive is maintained through DDCS (M/F) link.



WARNING! Incorrect values may disturb the decanter operation resulting in damages.

Bowl and scroll motors are mounted in opposite directions. Set one of the belt roller diameter D3 or D4 to negative value.

Bowl drive parameter settings:

78.01 Decanter mode select = Bowl

78.07 Bowl belt D1 = Value of D1

78.08 Bowl belt D2 = Value of D2

Scroll drive parameter settings:

78.01 Decanter mode select = Scroll

78.04 Delta speed function = Backward drive

78.07 Bowl belt D1 = Value of D1

78.08 Bowl belt D2 = Value of D2

78.09 Gearbox ratio = Gearbox ratio

78.10 Scroll belt D3 = -1 x value of D3

78.11 Scroll belt D4 = Value of D4

■ **Back drive, variant B**

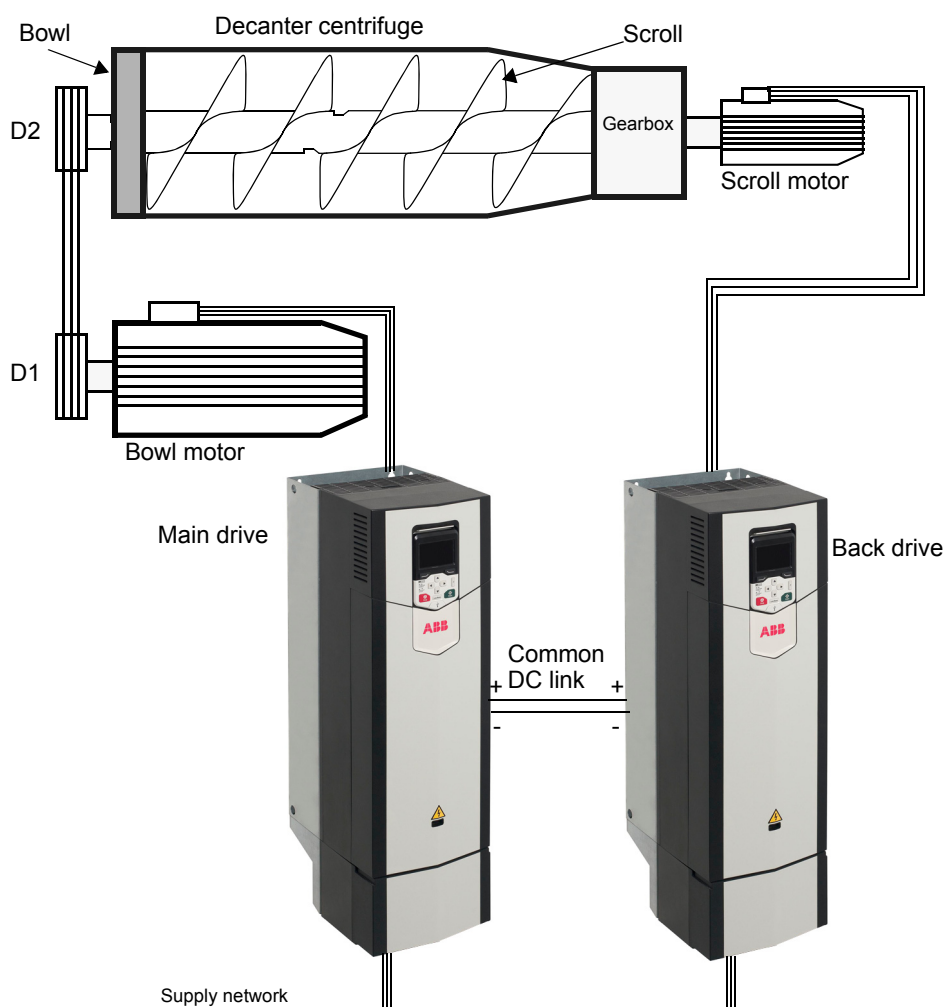


Figure 8. Back drive, variant B decanter centrifuge

If Bowl motor is rotating in the forward direction, the Scroll motor must also be rotating in the forward direction. This can be achieved by setting the below listed parameters in Group [78 Decanter control](#). D1 and D2 are Bowl drives as represented in the above figure.

Since Scroll motor is directly coupled to gearbox, parameters corresponding to D3 and D4 (belt roller diameter) must be set to 1. The communication between Scroll drive and Bowl drive is maintained through DDCS (M/F) link.

Bowl drive parameter settings:

78.01 Decanter mode select = Bowl

78.07 Bowl belt D1 = Value of D1

78.08 Bowl belt D2 = Value of D2

Scroll drive parameter settings:

78.01 Decanter mode select = Scroll

78.04 Delta speed function = Backward drive

78.07 Bowl belt D1 = Value of D1

78.08 Bowl belt D2 = Value of D2

78.09 Gearbox ratio = Gearbox ratio

78.10 Scroll belt D3 = Value of D3 = 1

78.11 Scroll belt D4 = Value of D4 = 1

■ **Forward drive**

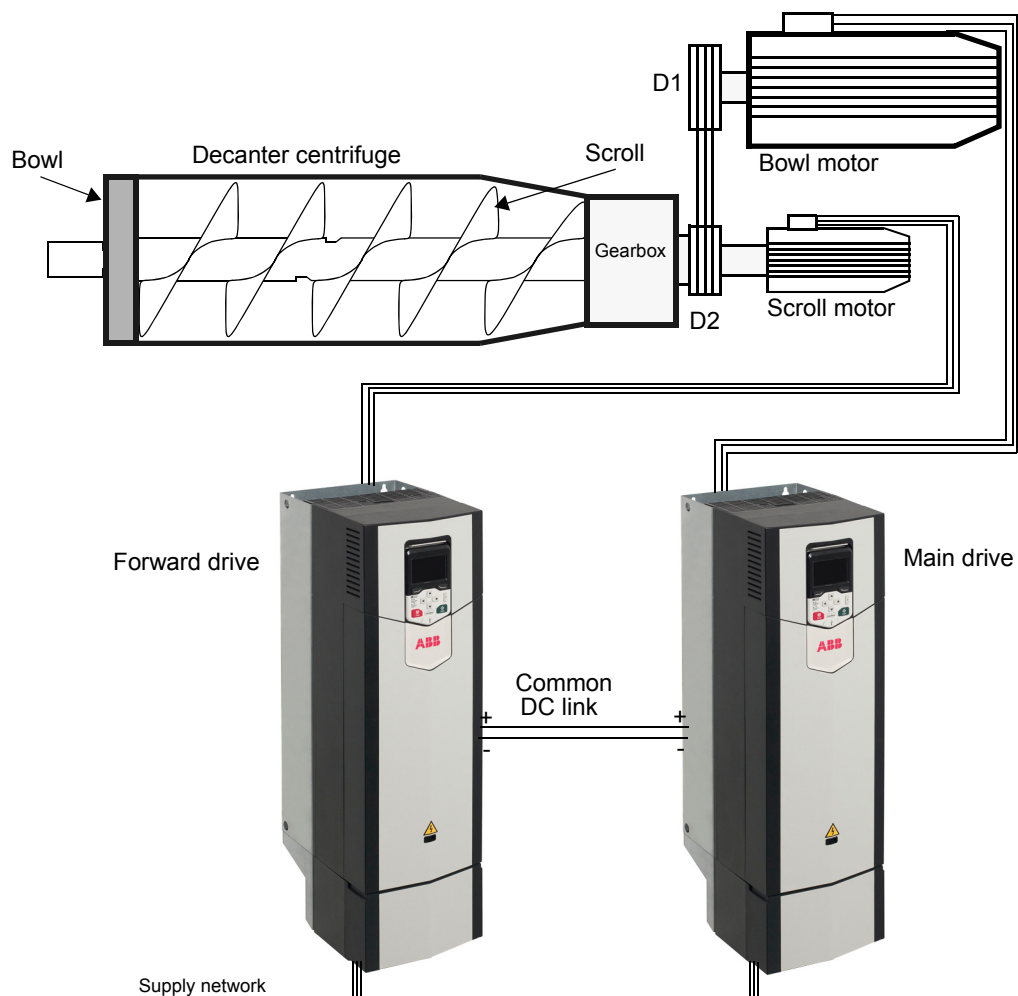


Figure 9. Forward drive decanter centrifuge

If Bowl motor is rotating in the forward direction, Scroll motor must also be rotating in the forward direction. This can be achieved by setting the parameters in Group [78 Decanter control](#). D1 and D2 are Bowl and Scroll motor drives as represented in the above figure. Since Scroll motor is directly coupled to gearbox, the parameters corresponding to D3 and D4 (belt roller diameter) must be set to 1. The communication between Scroll drive and Bowl drive is maintained through DDCS (M/F) link.

Bowl drive parameter settings:

[78.01 Decanter mode select](#) = Bowl

[78.07 Bowl belt D1](#) = Value of D1

[78.08 Bowl belt D2](#) = Value of D2

Scroll drive parameter settings:

[78.01 Decanter mode select](#) = Scroll

[78.04 Delta speed function](#) = Forward drive

[78.07 Bowl belt D1](#) = Value of D1

[78.08 Bowl belt D2](#) = Value of D2

[78.09 Gearbox ratio](#) = Gearbox ratio

[78.10 Scroll belt D3](#) = Value of D3 = 1

[78.11 Scroll belt D4](#) = Value of D4 = 1

Decanter jogging

The Decanter jogging function enables to run the scroll drive separately at the preset speed. This function is used during servicing or commissioning, mainly to remove any material blocked in the decanter. Jogging overrides the delta speed reference.

See parameter group [79 Decanter jogging](#).



5

Signals and parameters

Contents of this chapter

This chapter describes the actual signals and user-adjustable parameters specific to the Centrifuge and Decanter control program. Refer these parameters in addition to the actual signals and parameters described in the *ACS880 primary control program firmware manual (3AUA0000085967[English])*.

Terms and abbreviations

Term	Definition
Actual signal	Type of <i>parameter</i> that is the result of a measurement or calculation by the drive, or contains status information. Most actual signals are read-only, but some (especially counter-type actual signals) can be reset.
Bit pointer setting	<p>A parameter setting that points to the value of a bit in another parameter (usually an actual signal), or that can be fixed to 0 (FALSE) or 1 (TRUE).</p> <p>When adjusting a bit pointer setting on the optional control panel, “Const” is selected in order to fix the value to 0 (displayed as “C.False”) or 1 (“C.True”). “Pointer” is selected to define a source from another parameter.</p> <p>A pointer value is given in the format P.xx.yy.zz, where xx = parameter group, yy = parameter index, zz = bit number.</p> <p>Pointing to a non existing bit will be interpreted as 0 (FALSE).</p> <p>In addition to the “Const” and “Pointer” selections, bit pointer settings may also have other pre-selected settings.</p>
Def	(In the following table, shown on the same row as the parameter name) The default value of a <i>parameter</i> .
FbEq16	(In the following table, shown on the same row as the parameter range, or for each selection) 16-bit fieldbus equivalent: The scaling between the value shown on the panel and the integer used in communication when a 16-bit value is selected for transmission to an external system. A dash (-) indicates that the parameter is not accessible in 16-bit format.
Other	<p>The value is taken from another parameter.</p> <p>Choosing “Other” displays a parameter list in which the user can specify the source parameter.</p> <p>Note: The source parameter must be a 32-bit real (floating point) number. To use a 16-bit integer (for example, received from an external device in data sets) as the source, use data storage parameters 47.01...47.08.</p>
Other [bit]	<p>The value is taken from a specific bit in another parameter.</p> <p>Choosing “Other” displays a parameter list in which the user can specify the source parameter and bit.</p>
Parameter	Either a user-adjustable operating instruction for the drive, or an <i>actual signal</i> .
p.u.	Per unit

Summary of parameter groups

Parameter group	Description	See page
<i>09 Centrifuge</i>	<i>Centrifuge and Decanter actual signals.</i>	<i>31</i>
<i>74 Centrifuge Decanter control</i>	<i>Selecting Centrifuge or Decanter control.</i>	<i>34</i>
<i>75 Centrifuge function</i>	<i>Settings for Centrifuge operation sequence control.</i>	<i>34</i>
<i>77 Centrifuge pattern</i>	<i>Settings for controlling speed, acceleration and time behavior of Centrifuge.</i>	<i>35</i>
<i>78 Decanter control</i>	<i>Decanter operation parameters.</i>	<i>36</i>
<i>79 Decanter jogging</i>	<i>Decanter jogging control parameters.</i>	<i>40</i>

Parameters listing

Actual signals																																							
No.	Name/Value	Description	Def / FbEq16																																				
09 Centrifuge		Centrifuge and Decanter actual signals. All parameters in this group are read-only unless otherwise specified.																																					
09.01	Centrifuge status word	Status bit signals of Centrifuge.	-																																				
		<table border="1"> <thead> <tr> <th>Bit</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Accelerating to fill speed</td> <td>1 = Accelerating to filling speed. See parameter 77.01 Fill speed.</td> </tr> <tr> <td>1</td> <td>Pre wash</td> <td>1 = Sequence is at pre-washing stage.</td> </tr> <tr> <td>2</td> <td>Filling</td> <td>1 = Sequence is at filling stage.</td> </tr> <tr> <td>3</td> <td>Accelerating to spin speed</td> <td>1 = Accelerating to spinning speed. See parameter 77.02 Spin speed.</td> </tr> <tr> <td>4</td> <td>Washing</td> <td>1 = Sequence is at washing stage that is speed is more than the value in parameter 77.05 Washing speed.</td> </tr> <tr> <td>5</td> <td>Spinning</td> <td>1 = Sequence is at spinning stage.</td> </tr> <tr> <td>6</td> <td>Decelerating to unload speed</td> <td>1 = Decelerating to unloading speed. See parameter 77.03 Unload speed.</td> </tr> <tr> <td>7</td> <td>Unloading</td> <td>1 = Sequence is at unloading speed.</td> </tr> <tr> <td>8</td> <td>Decelerating to stop</td> <td>1 = Deceleration to stop after unloading.</td> </tr> <tr> <td>9</td> <td>Manual halt active</td> <td>1 = Manual halt is active.</td> </tr> <tr> <td>10...15</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>	Bit	Name	Description	0	Accelerating to fill speed	1 = Accelerating to filling speed. See parameter 77.01 Fill speed .	1	Pre wash	1 = Sequence is at pre-washing stage.	2	Filling	1 = Sequence is at filling stage.	3	Accelerating to spin speed	1 = Accelerating to spinning speed. See parameter 77.02 Spin speed .	4	Washing	1 = Sequence is at washing stage that is speed is more than the value in parameter 77.05 Washing speed .	5	Spinning	1 = Sequence is at spinning stage.	6	Decelerating to unload speed	1 = Decelerating to unloading speed. See parameter 77.03 Unload speed .	7	Unloading	1 = Sequence is at unloading speed.	8	Decelerating to stop	1 = Deceleration to stop after unloading.	9	Manual halt active	1 = Manual halt is active.	10...15	Reserved		
Bit	Name	Description																																					
0	Accelerating to fill speed	1 = Accelerating to filling speed. See parameter 77.01 Fill speed .																																					
1	Pre wash	1 = Sequence is at pre-washing stage.																																					
2	Filling	1 = Sequence is at filling stage.																																					
3	Accelerating to spin speed	1 = Accelerating to spinning speed. See parameter 77.02 Spin speed .																																					
4	Washing	1 = Sequence is at washing stage that is speed is more than the value in parameter 77.05 Washing speed .																																					
5	Spinning	1 = Sequence is at spinning stage.																																					
6	Decelerating to unload speed	1 = Decelerating to unloading speed. See parameter 77.03 Unload speed .																																					
7	Unloading	1 = Sequence is at unloading speed.																																					
8	Decelerating to stop	1 = Deceleration to stop after unloading.																																					
9	Manual halt active	1 = Manual halt is active.																																					
10...15	Reserved																																						
	0000h...FFFFh	Centrifuge status word.	1 = 1																																				
09.02	Centrifuge stage	Shows actual stage of Centrifuge sequence. See section Centrifuge operation sequence on page 16.	<i>Stopped</i>																																				
	Stopped	Drive is not running.	0																																				
	Accelerating to fill speed	Drive is accelerating to the filling speed. See parameter 77.07 Acc time to fill speed .	1																																				
	Pre wash	Drive is at pre-wash speed. See parameter 77.04 Prewashing speed .	2																																				
	Filling	Drive is at filling speed. See parameter 77.01 Fill speed .	3																																				
	Accelerating to spin speed	Drive is accelerating to spinning speed. See parameter 77.07 Acc time to spin speed .	4																																				
	Washing	Drive is at washing speed. See parameter 77.05 Washing speed .	5																																				
	Spinning	Drive is at spinning speed. See parameter 77.02 Spin speed .	6																																				
	Decelerating to unload speed	Drive is decelerating to unload speed. See parameter 77.08 Dec time to unload speed .	7																																				
	Unloading	Drive is at unload speed. See parameter 77.03 Unload speed .	8																																				
	Decelerating to stop	Decelerating to stop after discharge. See parameter 77.09 Dec time to zero speed .	9																																				

Actual signals																														
No.	Name/Value	Description	<i>Def / FbEq16</i>																											
	Manual halt	Manual halt is active.	10																											
09.03	Centrifuge reference	Shows final reference at different stages.	-																											
	0...18000 rpm	Centrifuge reference speed.	1 = 1 rpm																											
09.04	Elapsed time	Shows the completed sequence time from the start command.	-																											
	0...32767 s	Sequence completion time in seconds.	1 = 1 s																											
09.05	Remaining time	Shows the calculated value based on machine parameters, section time and speed values.	-																											
	0...32767 s	Remaining time in seconds.	1 = 1 s																											
09.10	Decanter status word	Decanter status word. Bit representation of scroll status information.	-																											
<table border="1"> <thead> <tr> <th>Bit</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Speed over limit</td> <td>1 = Speed over limit reached.</td> </tr> <tr> <td>1</td> <td>Torque over limit 1</td> <td>1 = Torque over limit 1 reached.</td> </tr> <tr> <td>2</td> <td>Torque over limit 2</td> <td>1 = Torque over limit 2 reached.</td> </tr> <tr> <td>3</td> <td>D Speed reference limit</td> <td>1 = Delta speed reference limit reached.</td> </tr> <tr> <td>4</td> <td>Jogging active</td> <td>1 = Jogging function is active.</td> </tr> <tr> <td>5</td> <td>Clean-up function is active</td> <td>1 = Clean-up and DC under voltage controller functions are active.</td> </tr> <tr> <td>6</td> <td>Speed reference above 90% of limit</td> <td>1 = Speed reference is above 90% of final speed reference.</td> </tr> <tr> <td>7...15</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>				Bit	Name	Description	0	Speed over limit	1 = Speed over limit reached.	1	Torque over limit 1	1 = Torque over limit 1 reached.	2	Torque over limit 2	1 = Torque over limit 2 reached.	3	D Speed reference limit	1 = Delta speed reference limit reached.	4	Jogging active	1 = Jogging function is active.	5	Clean-up function is active	1 = Clean-up and DC under voltage controller functions are active.	6	Speed reference above 90% of limit	1 = Speed reference is above 90% of final speed reference.	7...15	Reserved	
Bit	Name	Description																												
0	Speed over limit	1 = Speed over limit reached.																												
1	Torque over limit 1	1 = Torque over limit 1 reached.																												
2	Torque over limit 2	1 = Torque over limit 2 reached.																												
3	D Speed reference limit	1 = Delta speed reference limit reached.																												
4	Jogging active	1 = Jogging function is active.																												
5	Clean-up function is active	1 = Clean-up and DC under voltage controller functions are active.																												
6	Speed reference above 90% of limit	1 = Speed reference is above 90% of final speed reference.																												
7...15	Reserved																													
	0000h...FFFFh	Decanter status word.	1 = 1																											
09.11	Bowl status word	Bowl status word.	-																											
<table border="1"> <thead> <tr> <th>Bit</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Ready</td> <td>Bowl drive is ready to start.</td> </tr> <tr> <td>1</td> <td>Modulating</td> <td>Bowl drive is modulating.</td> </tr> <tr> <td>2</td> <td>Started</td> <td>Bowl drive started.</td> </tr> <tr> <td>3</td> <td>Remote</td> <td>Bowl drive is in remote control location.</td> </tr> <tr> <td>4</td> <td>Tripped</td> <td>Bowl drive tripped due to fault.</td> </tr> <tr> <td>5</td> <td>Emg stop off</td> <td>Bowl drive stopped due to emergency.</td> </tr> <tr> <td>6...15</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>				Bit	Name	Description	0	Ready	Bowl drive is ready to start.	1	Modulating	Bowl drive is modulating.	2	Started	Bowl drive started.	3	Remote	Bowl drive is in remote control location.	4	Tripped	Bowl drive tripped due to fault.	5	Emg stop off	Bowl drive stopped due to emergency.	6...15	Reserved				
Bit	Name	Description																												
0	Ready	Bowl drive is ready to start.																												
1	Modulating	Bowl drive is modulating.																												
2	Started	Bowl drive started.																												
3	Remote	Bowl drive is in remote control location.																												
4	Tripped	Bowl drive tripped due to fault.																												
5	Emg stop off	Bowl drive stopped due to emergency.																												
6...15	Reserved																													
	0000h...FFFFh	Bowl status word.	1 = 1																											

Actual signals																											
No.	Name/Value	Description	Def / FbEq16																								
9.12	Scroll status word	Scroll status word.	-																								
		<table border="1"> <thead> <tr> <th>Bit</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Scroll Ready</td> <td>Scroll drive is ready to start</td> </tr> <tr> <td>1</td> <td>Scroll Modulating</td> <td>Scroll drive is modulating.</td> </tr> <tr> <td>2</td> <td>Scroll Start</td> <td>Scroll drive started.</td> </tr> <tr> <td>3</td> <td>Scroll Remote</td> <td>Scroll drive is in remote control location.</td> </tr> <tr> <td>4</td> <td>Scroll Tripped</td> <td>Scroll drive tripped due to fault.</td> </tr> <tr> <td>5</td> <td>Scroll E-Stop</td> <td>Scroll drive stopped due to emergency.</td> </tr> <tr> <td>6...15</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>	Bit	Name	Description	0	Scroll Ready	Scroll drive is ready to start	1	Scroll Modulating	Scroll drive is modulating.	2	Scroll Start	Scroll drive started.	3	Scroll Remote	Scroll drive is in remote control location.	4	Scroll Tripped	Scroll drive tripped due to fault.	5	Scroll E-Stop	Scroll drive stopped due to emergency.	6...15	Reserved		
Bit	Name	Description																									
0	Scroll Ready	Scroll drive is ready to start																									
1	Scroll Modulating	Scroll drive is modulating.																									
2	Scroll Start	Scroll drive started.																									
3	Scroll Remote	Scroll drive is in remote control location.																									
4	Scroll Tripped	Scroll drive tripped due to fault.																									
5	Scroll E-Stop	Scroll drive stopped due to emergency.																									
6...15	Reserved																										
	0000h...FFFFh	Scroll status word.	1 = 1																								
09.16	Bowl speed actual	Shows actual bowl speed sent to scroll.	-																								
	-18000.0... 18000.0 rpm	Actual bowl speed.	1 = 1 rpm																								
09.17	Delta speed reference act	Shows differential (delta) speed reference	-																								
	-1500.0... 1500.0 rpm	Delta speed reference.	1 = 1 rpm																								
09.18	Delta speed actual	Defines actual differential (delta) speed.	-																								
	-1500.0... 1500.0 rpm	Actual delta speed.	1 = 1 rpm/																								
09.19	Scroll speed reference	Displays scroll speed reference. Note: Applicable only when drive is selected as scroll drive for Decanter.	-																								
	-18000.0... 18000.0 rpm	Scroll speed reference.	1 = 1 rpm/																								
09.20	Scroll speed actual	Displays actual scroll speed reference Note: Applicable only when drive is selected as scroll drive for Decanter.	-																								
	-18000.0... 18000.0 rpm	Actual scroll speed reference.	1 = 1 rpm																								
09.21	Delta speed torque window	Defines torque window correction function for speed reference.	-																								
	-1500.0... 1500.0 rpm	Torque window delta speed.	1 = 1 rpm																								
09.23	Load compensation	Defines the correction value for adjusting speed in scroll drive.	-																								
	-1500.0... 1500.0 rpm	Speed correction in scroll drive.	1 = 1 rpm																								

Parameters			
No	Name/Value	Description	Def / FbEq16
74 Centrifuge Decanter control		Selecting Centrifuge or Decanter control.	
74.01	Centrifuge/ Decanter function selection	Selects Centrifuge or Decanter function.	<i>Centrifuge</i>
	Not selected	Not selected.	0
	Decanter	Decanter function is selected for drive operation. Note: Drive operates based on the setting in parameter 78.01 Decanter mode select .	1
	Centrifuge	Centrifuge function is selected for drive operation. See parameter group 75 Centrifuge function .	2
75 Centrifuge function		Settings for Centrifuge operation sequence control.	
75.01	Pattern reset selection	Resets the centrifuge sequence. Note: The drive must be stopped before reset is possible.	<i>DI3</i>
	Not selected	Not selected.	0
	Reset now	Reset.	1
	DI1	Reset through DI1.	2
	DI2	Reset through DI2.	3
	DI3	Reset through DI3.	4
	DI4	Reset through DI4.	5
	DI5	Reset through DI5.	6
	DI6	Reset through DI6.	7
	<i>Other</i>	See Terms and abbreviations on page 30	-
75.02	Manual halt	Shifts Centrifuge application to deceleration mode.	<i>DI4</i>
	Not selected	Not selected.	0
	Selected	Selected	1
	DI1	Halt through DI1.	2
	DI2	Halt through DI2.	3
	DI3	Halt through DI3.	4
	DI4	Halt through DI4.	5
	DI5	Halt through DI5.	6
	DI6	Halt through DI6.	7

Parameters			
No	Name/Value	Description	Def IFbEq16
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
75.03	Accelerate to spin selection	Selects the source for acceleration start command.	<i>DI5</i>
	Not selected	Not selected.	0
	Selected	Selected	1
	DI1	Acceleration command through DI1.	2
	DI2	Acceleration command through DI2.	3
	DI3	Acceleration command through DI3.	4
	DI4	Acceleration command through DI4.	5
	DI5	Acceleration command through DI5.	6
	DI6	Acceleration command through DI6.	7
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
77 Centrifuge pattern		Settings for controlling speed, acceleration and time behavior of Centrifuge.	
77.01	Fill speed	Defines filling speed.	70.0 rpm
	0.0...30000.0 rpm	Filling speed.	10 = 1 rpm
77.02	Spin speed	Defines spinning speed.	1000.0 rpm
	0.0...30000.0 rpm	Spinning speed.	10 = 1 rpm
77.03	Unload speed	Defines unloading speed.	30.0 rpm
	0.0...30000.0 rpm	Unloading speed.	10 = 1 rpm
77.04	Prewashing speed	Defines pre washing speed	30.0 rpm
	0.0...30000.0 rpm	Pre washing speed.	10 = 1 rpm
77.05	Washing speed	Defines washing speed.	600.0 rpm
	0.0...30000.0 rpm	Washing speed.	10 = 1 rpm
77.06	Acc time to fill speed	Defines acceleration time from zero to filling speed.	20 s
	0...3000 s	Acceleration time to fill speed in seconds.	1 = 1 s
77.07	Acc time to spin speed	Defines acceleration time from filling speed to spinning speed.	40 s
	0...3000 s	Acceleration time to spin speed in seconds.	1 = 1 s
77.08	Dec time to unload speed	Defines deceleration time from spinning speed to unloading speed.	20 s
	0...3000 s	Deceleration time to unload speed in seconds.	1 = 1 s

Parameters			
No	Name/Value	Description	Def / FbEq16
77.09	Dec time to zero speed	Defines deceleration time from unload speed to stop at zero speed.	20 s
	0...3000 s	Deceleration time to zero speed in seconds.	1 = 1 s
77.10	Prewashing time	Defines pre-washing time.	10 s
	0...3000 s	Pre-washing time in seconds.	1 = 1 s
77.11	Washing time	Defines washing time.	10 s
	0...3000 s	Washing time in seconds.	1 = 1 s
77.12	Spinning time	Defines spinning time.	30 s
	0...3000 s	Spinning time in seconds.	1 = 1 s
77.13	Unloading time	Defines unloading time.	10 s
	0...3000 s	Unloading time in seconds.	1 = 1 s
78 Decanter control		Decanter operation parameters.	
78.01	Decanter mode select	Selects Decanter mode and activates internal DDCS communication.	<i>Not selected</i>
	Not selected	Not selected.	0
	Bowl	Drive operates as Bowl drive.	1
	Scroll	Drive operates as Scroll drive.	2
78.02	Decanter control selection in scroll	Selects the source for Decanter control in Scroll drive.	<i>Not selected</i>
	Not selected	Not selected.	0
	Selected	Selected.	1
	DI1	Activate Decanter control through DI1.	2
	DI2	Activate Decanter control through DI2.	3
	DI3	Activate Decanter control through DI3.	4
	DI4	Activate Decanter control through DI4.	5
	DI5	Activate Decanter control through DI5.	6
	DI6	Activate Decanter control through DI6	7
	Comm CW	Fieldbus communication control word.	8
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.03	Delta speed start/stop	Selects the source to start/stop Decanter control.	<i>Not selected</i>
	Not selected	Not selected.	0
	Selected	Selected	1
	DI1	Start Decanter through DI1.	2

Parameters			
No	Name/Value	Description	<i>Def IFbEq16</i>
	DI2	Start Decanter through DI2.	3
	DI3	Start Decanter through DI3.	4
	DI4	Start Decanter through DI4.	5
	DI5	Start Decanter through DI5.	6
	DI6	Start Decanter through DI6.	7
	Comm CW	Fieldbus communication control word.	8
	Bowl drive	The scroll reads the control word Start/Stop command from the bowl.	9
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.04	Delta speed function	Selects differential speed direction (only in scroll drive).	<i>Forward drive</i>
	Forward drive	Forward drive. Scroll speed > Bowl speed.	0
	Backward drive	Backward drive. Scroll speed < Bowl speed.	1
78.05	Delta speed ref selection	Selects differential speed reference (delta speed) of Decanter Control.	<i>AI1 scaled</i>
	Zero	Zero	0
	AI1 scaled	Analog input 1 scaled.	1
	AI2 scaled	Analog input 2 scaled.	2
	Comm ref 1	Fieldbus communication reference 1.	3
	D Speed ref	Differential speed reference. See <i>78.06 Delta speed reference</i> .	4
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.06	Delta speed reference	Defines differential speed (delta speed).	0.00 rpm
	0...1500.00 rpm	Differential speed.	-
78.07	Bowl belt D1	Defines mechanical drive factor of bowl motor belt roller D1.	1.00
	-1000.00...1000.00	Bowl belt D1 mechanical drive factor.	-
78.08	Bowl belt D2	Defines mechanical drive factor of bowl motor belt roller D2.	1.00
	-1000.00...1000.00	Bowl belt D2 mechanical drive factor.	-
78.09	Gearbox ratio	Defines gearbox ratio of Decanter.	1.00
	-1000.00...1000.00	Decanter gearbox ratio.	-
78.10	Scroll belt D3	Defines mechanical drive factor of scroll motor belt roller D3.	1.00
	-1000.00...1000.00	Scroll belt D3 mechanical drive factor.	-

Parameters			
No	Name/Value	Description	Def IFbEq16
78.11	Scroll belt D4	Defines mechanical drive factor of scroll motor belt roller D4.	1.00
	-1000.00...1000.00	Scroll belt D4 mechanical drive factor.	-
78.12	Torque window sel	Activates torque window control and load compensation function.	<i>Not selected</i>
	Not selected	Not selected.	0
	Selected	Torque window control activated.	1
	DI1	Activate torque window control though DI1.	2
	DI2	Activate torque window control though DI2.	3
	DI3	Activate torque window control though DI3	4
	DI4	Activate torque window control though DI4	5
	DI5	Activate torque window control though DI5	6
	DI6	Activate torque window control though DI6	7
	Comm CW	Fieldbus communication control word.	8
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.13	Torque ref select	Defines the limit source of the Torque window control.	<i>Zero</i>
	Zero	Zero	0
	AI1 scaled	Analog input 1 scaled.	1
	AI2 scaled	Analog input 2 scaled.	2
	Comm ref 1	Fieldbus communication reference 1.	3
	D Torque ref	Value from parameter <i>78.14 Torque reference</i> .	4
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.14	Torque reference	Defines the limit for torque window control.	0.0%
	0.0...300.0%	Torque reference.	-
78.15	Torque gain	Defines torque window control proportional gain.	5.0
	0.0...100.0	Torque gain.	-
78.16	Torque integration time	Defines torque window control integration time. 0 = Integrator is disabled.	1.0 s
	0.0...3000.0 s	Torque integration time in seconds.	-
78.17	Load compensation gain	Defines load compensation function proportional gain.	0.0
	0.0...100.0	Load compensation gain.	-

Parameters			
No	Name/Value	Description	Def IFbEq16
78.18	Load compensation int time	Defines load compensation function integration time. 0 = Load compensation is disabled.	0.0 s
	0.0...3000.0 s	Load compensation integration time in seconds.	-
78.19	Torque to delta speed	Defines direct torque compensation proportional gain. 0 = Direct torque compensations is disabled.	1.0 rpm
	0.0...1500.0 rpm	Torque to differential speed.	-
78.20	Delta speed min limit	Defines minimum differential speed (delta speed).	0.0 rpm
	0.0...1500.0 rpm	Minimum differential speed.	-
78.21	Delta speed max limit	Defines maximum differential speed (delta speed).	1500.0 rpm
	0.0...1500.0 rpm	Maximum differential speed.	-
78.22	Clean-up select	Selects the source to activate Clean-up function. The function delays the Stop command for 200 ms. The Scroll drive remains running if the DC undervoltage controller of the Bowl drive is active even if the Start command is not active. 0 = Clean-up function is not active 1 = Clean-up function is active.	<i>Not selected</i>
	Not selected	Not selected.	0
	Selected	Selected	1
	DI1	Activate Clean-up function through DI1.	2
	DI2	Activate Clean-up function through DI2.	3
	DI3	Activate Clean-up function through DI3.	4
	DI4	Activate Clean-up function through DI4.	5
	DI5	Activate Clean-up function through DI5.	6
	DI6	Activate Clean-up function through DI6.	7
	Comm CW	Fieldbus communication control word.	8
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
78.23	Acceleration time	Defines acceleration time for decanter.	20 s
	0...3000 s	Acceleration time in seconds.	-
78.24	Deceleration time	Defines deceleration time for decanter.	20 s
	0...3000 s	Deceleration time in seconds.	-
78.25	Scroll ref sel	Selects input of actual Bowl motor speed in Scroll drive. Speed is used in Scroll drive as decanter controls the master speed reference.	<i>DDCS</i>
	Zero	Zero	0

Parameters			
No	Name/Value	Description	Def IFbEq16
	DDCS	The actual bowl motor speed will be read from the DDCS link.	1
	AI1 scaled	Analog input 1 scaled. The actual bowl speed motor speed will be read from the analogue input AI1.	2
	AI2 scaled	Analog input 2 scaled. The actual bowl speed motor speed will be read from the analogue input. AI2.	3
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
79 Decanter jogging		Decanter jogging control parameters.	
79.01	Decanter jog select	Selects Jogging function. Jogging can be activated when Decanter control is on and Scroll drive is not yet running. If Jogging function is selected when Scroll drive is running, the function is activated only after Scroll drive is stopped and started again. Drive starts to follow jogging reference when Jogging function is active and when Start command is given.	<i>Not selected</i>
	Not selected	Not selected.	0
	Selected	Selected.	1
	DI1	Activate Jogging function through DI1.	2
	DI2	Activate Jogging function through DI2.	3
	DI3	Activate Jogging function through DI3.	4
	DI4	Activate Jogging function through DI4.	5
	DI5	Activate Jogging function through DI5.	6
	DI6	Activate Jogging function through DI6.	7
	Comm CW	Fieldbus communication control word.	8
	<i>Other</i>	See <i>Terms and abbreviations</i> on page 30	-
79.02	Decanter jogging reference	Defines speed reference for Jogging function. This function is used to remove any material stuck in the centrifuge. Jogging overrides the differential speed (delta speed) reference and can be activated with parameter <i>79.01 Decanter jog select</i> .	300 rpm
	0...3000 rpm	Value range.	1 = 1 rpm
79.03	Decanter jog time forward	Defines time period to jog forwards.	20.0 s
	0...3000.0 s	Jog forward time in seconds.	10 = 1 s
79.04	Decanter jog time backward	Defines time period to jog backwards.	20.0 s
	0...3000.0 s	Jog backward time in seconds.	10 = 1 s
79.05	Decanter jog ramp time	Defines ramping time for jogging.	20.0 s

Parameters			
No	Name/Value	Description	<i>Def IFbEq16</i>
	0...3000.0 s	Decanter jog ramp time.	10 = 1 s

6

Fault tracing

About this chapter

This chapter lists all the warning and fault messages including possible causes and corrective actions for the Centrifuge Decanter drive.

For the complete list of warning and fault messages, see *ACS880 primary control program firmware manual (3AUA0000085967[English])*.

Warning messages

Note: The list also contains events that appear in the Event log.

Code (hex)	Warning	Cause	What to do
E200	Pre wash time too long	Pre wash speed is higher than fill speed.	Decrease pre wash time or prewash speed. See parameters, 77.04 Prewashing speed and 77.10 Prewashing time .
E201	Wash time too long	Wash speed is higher than spin speed.	Decrease wash time or wash speed. See parameters 77.05 Washing speed and 77.11 Washing time .
E202	Speed feedback not inside range	Actual speed is beyond the minimum and maximum speed limits.	Increase the deceleration time from spinning speed to unloading speed or the deceleration time from unload speed to stop at zero speed. See parameters 77.08 Dec time to unload speed and 77.09 Dec time to zero speed .

Code (hex)	Warning	Cause	What to do
E203	Filling stage interrupted	End of fill is triggered before filling stage.	Check the source of activation (End of fill). See parameter 75.03Accelerate to spin selection .
E204	Cycle time exceeds max time	Total machine cycle time is higher than maximum machine time.	Decrease total machine value. See parameters, 77.10 Prewashing time and 77.13 Unloading time .

Fault messages

Code (hex)	Fault	Cause	What to do
D100	Scroll faulted	Fault in Scroll drive.	Check the scroll drive fault.

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to abb.com/searchchannels.

Product training

For information on ABB product training, navigate to new.abb.com/service/training.

Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Navigate to new.abb.com/drives/manuals-feedback-form.

Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at abb.com/drives/documents.



abb.com/drives
abb.com/drivespartners



3AXD50000016078C