ACS800

Hardware Manual
Safety Options +Q950, +Q951, +Q952 and +Q954 for
ACS800-02+C111 Drives (45 to 560 kW)
ACS800-U2 Drives (60 to 600 HP)
ACS800-07 Drives (45 to 2800 kW)
ACS800-U7 Drives (50 to 600 HP)
ACS800-17 Drives (160 to 2500 kW)
ACS800-37 Drives (160 to 2700 kW)

Q950 ≙	Prevention of Unexpected Start
Q951 ≙	Category 0 emergency stop
Q952 ≙	Category 1 emergency stop
Q954 ≙	Earth fault monitoring for IT (ungrounded) systems

ACS800 Single Drive Manuals

HARDWARE MANUALS (appropriate manual is included in the delivery)

ACS800-01/U1 Hardware Manual 0.55 to 110 kW (0.75 to 150 HP) 3AFE64382101 (English)

ACS800-01/U1/04 Marine Supplement 0.55 to 132 kW (0.75 to 150 HP) 3AFE64291275 (English)

ACS800-02/U2 Hardware Manual 90 to 560 kW (125 to 600 HP) 3AFE64567373 (English)

ACS800-11/U11 Hardware Manual 5.5 to110 kW (7.5 to 125 HP) 3AFE68367883 (English)

ACS800-04 Hardware Manual 0.55 to 132 kW 3AFE68372984 (English)

ACS800-04/04M/U4 Hardware Manual 45 to 560 kW (60 to 600 HP) 3AFE64671006 (English)

ACS800-04/04M/U4 Cabinet Installation 45 to 560 kW (60 to 600 HP) 3AFE68360323 (English)

ACS800-07/U7 Hardware Manual 45 to 560 kW (50 to 600 HP) 3AFE64702165 (English)

ACS800-07/U7 Dimensional Drawings 45 to 560 kW (50 to 600 HP) 3AFE64775421

ACS800-07 Hardware Manual 500 to 2800 kW 3AFE64731165 (English)

ACS800-17 Hardware Manual 75 to 1120 kW 3AFE64681338 (English)

- Safety instructions
- Electrical installation planning
- Mechanical and electrical installation
- Motor control and I/O board (RMIO)
- Maintenance
- Technical data
- Dimensional drawings
- Resistor braking

FIRMWARE MANUALS, SUPPLEMENTS AND GUIDES (appropriate documents are included in the delivery)

Standard Application Program Firmware Manual 3AFE64527592 (English)

System Application Program Firmware Manual 3AFE63700177 (English)

Application Program Template Firmware Manual 3AFE64616340 (English)

Master/Follower 3AFE64590430 (English)

PFC Application Program Firmware Manual 3AFE64649337 (English)

Extruder Control Program Supplement 3AFE64648543 (English)

Centrifuge Control Program Supplement 3AFE64667246 (English)

Traverse Control Program Supplement 3AFE64618334 (English)

Crane Control Program Firmware Manual 3BSE11179 (English)

Adaptive Programming Application Guide 3AFE64527274 (English)

OPTION MANUALS (delivered with optional equipment)

Fieldbus Adapters, I/O Extension Modules etc.

Safety Options +Q950, +Q951,+Q952 and +Q954 for
ACS800-02+C111 Drives (45 to 560 kW)
ACS800-U2 Drives (60 to 600 HP)
ACS800-07 Drives (45 to 2800 kW)
ACS800-U7 Drives (50 to 600 HP)
ACS800-17 Drives (160 to 2500 kW)
ACS800-37 Drives (160 to 2700 kW)

Hardware Manual

3AFE68578027 Rev A EN
EFFECTIVE: 21.6.2005

Table of contents

ACS800 Single Drive Manuals 2

Table of contents

About this manual

What this chapter contains 9
Target audience 9
Safety 10
ACS800-02, ACS800-U2 10
ACS800-07, ACS800-U7 10
ACS800-17 10
ACS800-37 10
Units with earth fault monitoring for IT (ungrounded) systems (+Q954) 10
Finding the instructions of a specific drive type 10
Contents 11
Literature references 11

Prevention of Unexpected Start for ACS800-07/U7/17/37 (+Q950)

What this chapter contains 13
To which drives this chapter applies 13
Description 13
Applicable standards 13
Wiring 14
Use 14
Circuit diagram 15

Category 0 emergency stop for ACS800-02/U2/07/U7/17/37 (+Q951, R6, R6i, R7, R7i, R8)

What this chapter contains 17
To which drives this chapter applies 17
Description 17
Category 0 definition 17
Implementation of category 0 stop in ACS800 in brief 17
Applicable standards 18
Operation 18
Wiring 18
Start-up 18
Use 19
How to activate the emergency stop 19
How to deactivate the emergency stop 19
Circuit diagram 20

Category 0 emergency stop for ACS800-07/17/37 (+Q951, n×R8i)

What this chapter contains . . . 21
To which drives this chapter applies . . . 21
Description . . . 21
Category 0 definition . . . 21
Implementation of category 0 stop in ACS800 in brief . . . 21
Applicable standards . . . 22
Operation . . . 22
ACS800-07 units with line contactor . . . 22
ACS800-07 units with air circuit breaker . . . 23
ACS800-17/37 units . . . 24
Wiring . . . 24
Start-up . . . 25
Use . . . 25
How to activate the emergency stop . . . 25
How to deactivate the emergency stop . . . 25
Circuit diagrams . . . 27
ACS800-07 units with line contactor (+F250+Q951) . . . 27
ACS800-17 and ACS800-37 units with line contactor (+F250+Q951) . . . 30
ACS800-07 units with air circuit breaker (+F255+Q951) . . . 34
ACS800-17/37 units with air circuit breaker (+F255+Q951) . . . 38

Category 1 emergency stop for ACS800-07/U7 (+Q952, R6, R7, R8)

What this chapter contains . . . 41
To which drives this chapter applies . . . 41
Description . . . 41
Category 1 definition . . . 41
Implementation of category 1 stop in ACS800 in brief . . . 41
Applicable standards . . . 42
Components of the emergency stop function . . . 42
Operation . . . 43
Wiring . . . 44
Start-up . . . 44
Use . . . 44
How to activate the emergency stop . . . 44
How to deactivate the emergency stop . . . 45
Circuit diagrams . . . 46

Category 1 emergency stop for ACS800-07/17/37 (+Q952, R6i, R7i, n×R8i)

What this chapter contains . . . 51
To which drives this chapter applies . . . 51

Description . . . 52
Category 1 definition . . . 52
Implementation of category 1 stop in ACS800 in brief . . . 52
Applicable standards . . . 52
Components of the emergency stop function . . . 53
Alternative drive configurations . . . 54
ACS800-07 with line contactor . . . 54
ACS800-07 with air circuit breaker . . . 54
ACS800-17 and ACS800-37 frame sizes R6i, R7i and R8i . . . 55
ACS800-17 and ACS800-37 with air circuit breaker (frame sizes 2×R8i and up) . . . 55
Operation . . . 56
Wiring . . . 57
Start-up . . . 57
Use . . . 57
How to activate the emergency stop . . . 57
How to deactivate the emergency stop . . . 58
Circuit diagrams . . . 59
ACS800-07 units with line contactor (+F250+Q952) . . . 59
ACS800-17 and ACS800-37 units with line contactor (+F250+Q952) . . . 65
ACS800-07 units with air circuit breaker (+F255+Q952) . . . 69
ACS800-17 and ACS800-37 units with air circuit breaker (+F255+Q952) . . . 75

Earth fault monitoring in IT (ungrounded) systems (+Q954)

What this chapter contains . . . 83
To which drives this chapter applies . . . 83
Earth fault protection in TN (grounded) systems . . . 83
AC fuses . . . 83
Internal earth fault protection of the ACS800-02/U2/07/U7 . . . 83
Parameter settings . . . 84
Internal earth fault protection of the ACS800-17/37 . . . 85
Parameter settings . . . 85
Earth fault monitoring in IT (ungrounded) systems . . . 85
Applicable standards . . . 86
Safety . . . 86
Twelve-pulse units . . . 86
Description of the +Q954 option . . . 86
Operation principle of the IRDH275 . . . 88
Technical data . . . 89
Bender insulation monitoring device IRDH275-435 . . . 89
Wiring . . . 89
Start-up . . . 89
Settings of the insulation monitoring device . . . 89
ACS800-07 frame sizes n×R8i . . . 89
ACS800-17 and ACS800-37 . . . 89
Functional test before start-up . . . 89
Fault tracing . . . 89
Circuit diagrams . . . 91

About this manual

This manual contains descriptions and installation, use and maintenance instructions for the following safety options:

Drive type	Option code	Description
ACS800-07 ACS800-U7 ACS800-17 ACS800-37	+Q950	Prevention of Unexpected Start
ACS800-02+C111 ACS800-02+C127 ACS800-U2 ACS800-07 ACS800-U7 ACS800-17 ACS800-37	+Q951	Category 0 emergency stop
ACS800-07 ACS800-U7 ACS800-17 ACS800-37	+Q952	Category 1 emergency stop
ACS800-07 ACS800-U7 ACS800-17 ACS800-37	+Q954	Earth fault monitoring for IT (ungrounded) systems

What this chapter contains

The chapter describes the manual in short.

Target audience

The manual is intended for people who plan the installation, install, commission, use and service the safety options of the drive. Read the manual before working on the drive. The reader is expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide. Both SI and imperial units are shown.

Safety

Only qualified specialists are allowed to install, commission and maintain the safety options.

WARNING! Follow the safety instructions when installing, operating and servicing the drive. If ignored, physical injury or death may follow, or damage may occur to the drive, motor or driven equipment. Read the safety instructions before you work on the unit.

ACS800-02, ACS800-U2

Follow the safety instructions given in *ACS800-02/U2 Hardware Manual* [3AFE64567373 (English)].

ACS800-07, ACS800-U7

Follow the safety instructions given in *ACS800-07/U7 (45 to 560 kW) Hardware Manual* [3AFE64702165 (English)] or *ACS800-07 (500 to 2800 kW) Hardware Manual* [3AFE64731165 (English)].

ACS800-17

Follow the safety instructions given in *ACS800-17 Hardware Manual* [3AFE68397260 (English)].

ACS800-37

Follow the safety instructions given in *ACS800-37 Hardware Manual* [3AFE68557925 (English)].

Units with earth fault monitoring for IT (ungrounded) systems (+Q954)

Follow the safety instructions given in *IRDH275 Operating Manual* by Bender (code: TGH1386) in addition to the safety instructions given in the drive hardware manual.

Finding the instructions of a specific drive type

Instructions in this manual are categorized according to the converter module frame size: R6, R6i, R7, R7i, R8 or n×R8i. The frame size is not marked on the drive designation label. To identify the frame size, see the rating tables in the drive hardware manual. As a general rule,

- ACS800-02 and ACS800-U2 units are of frame size R7 or R8
- ACS800-07 units in the power range from 45 to 560 kW and ACS800-U7 units in the power range from 50 to 600 HP are of frame size R6, R7 or R8
- ACS800-07 units in the power range from 500 to 2800 kW are of frame size n×R8i
- ACS800-17 and ACS800-37 units are of frame size R6i, R7i or n×R8i.

Contents

The chapters of this manual are briefly described below.

About this manual describes the manual.

Prevention of Unexpected Start for ACS800-07/U7/17/37 (+Q950) describes the Prevention of Unexpected Start function. The chapter covers applicability, description, wiring, operation and use. An example circuit diagram is included.

Category 0 emergency stop for ACS800-02/U2/07/U7/17/37 (+Q951, R6, R6i, R7, R7i, R8) describes the category 0 emergency stop function. The chapter deals with applicability, wiring, operation and use. Example circuit diagrams are included.

Category 0 emergency stop for ACS800-07/17/37 (+Q951, n×R8i) describes the category 0 emergency stop function. The chapter deals with applicability, wiring, operation and use. Example circuit diagrams are included.

Category 1 emergency stop for ACS800-07/U7 (+Q952, R6, R7, R8) describes the category 1 emergency stop function. The chapter deals with applicability, operation and user settings. Example circuit diagrams are included.

Category 1 emergency stop for ACS800-07/17/37 (+Q952, R6i, R7i, n×R8i) describes the category 1 emergency stop function. The chapter deals with applicability, operation and user settings. Example circuit diagrams are included.

Earth fault monitoring in IT (ungrounded) systems (+Q954) describes earth fault monitoring for IT (ungrounded) systems. The chapter deals with applicability, wiring, operation and use. Example circuit diagrams are included. The chapter also describes the internal earth fault protection of the drive in short.

Literature references

Safety handbook [code: 1 SAC 103 201 H 0201 (English)] by ABB STOTZ-KONTAKT GmbH contains general information on regulations and standards, available on the Internet www.abb.com.

Prevention of Unexpected Start for ACS800-07/U7/17/37 (+Q950)

What this chapter contains

This chapter describes the Prevention of Unexpected Start function (+Q950). The chapter deals with wiring, operation and use. An example circuit diagram is included.

To which drives this chapter applies

The chapter applies to the following drives:

Drive type	Frame sizes	Option code and description
ACS800-07 ACS800-U7	R6, R7, R8 n×R8i	**+Q950** = Prevention of Unexpected Start
ACS800-17 ACS800-37	R6i, R7i, n×R8i	

Description

The Prevention of Unexpected Start function disables the control voltage of the power semiconductors, thus preventing the inverter from generating the AC voltage required to rotate the motor. By using this function, short-time operations (like cleaning) and/or maintenance work on non-electrical parts of the machinery can be performed without switching off the AC power supply to the drive.

The operator activates the Prevention of Unexpected Start function by opening a switch on a control desk. An indicating lamp on the control desk will light, signalling that the prevention is active. The switch can be locked out.

Applicable standards

The Prevention of Unexpected Start function complies with the following standards:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”
- ISO/DIS 14118:2000 “Safety of machinery – Prevention of unexpected start-up”
- EN 1037:1996 “Safety of machinery – Prevention of unexpected start-up”
- EN ISO 12100:2003 “Safety of machinery – Basic concepts, general principles for design”

- EN 954-1:1996 “Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design”
- EN ISO 13849-2:2003 “Safety of machinery – Safety-related parts of control systems – Part 2: Validation”.

Wiring

Install on a control desk near the machinery:

- switching/disconnecting device for the circuitry. “Means shall be provided to prevent inadvertent, and/or mistaken closure of the disconnecting device.” EN 60204-1: 1997.
- indicating lamp; on = starting the drive is prevented, off = drive is operative.

For connections to the drive, see the circuit diagram delivered with the drive.

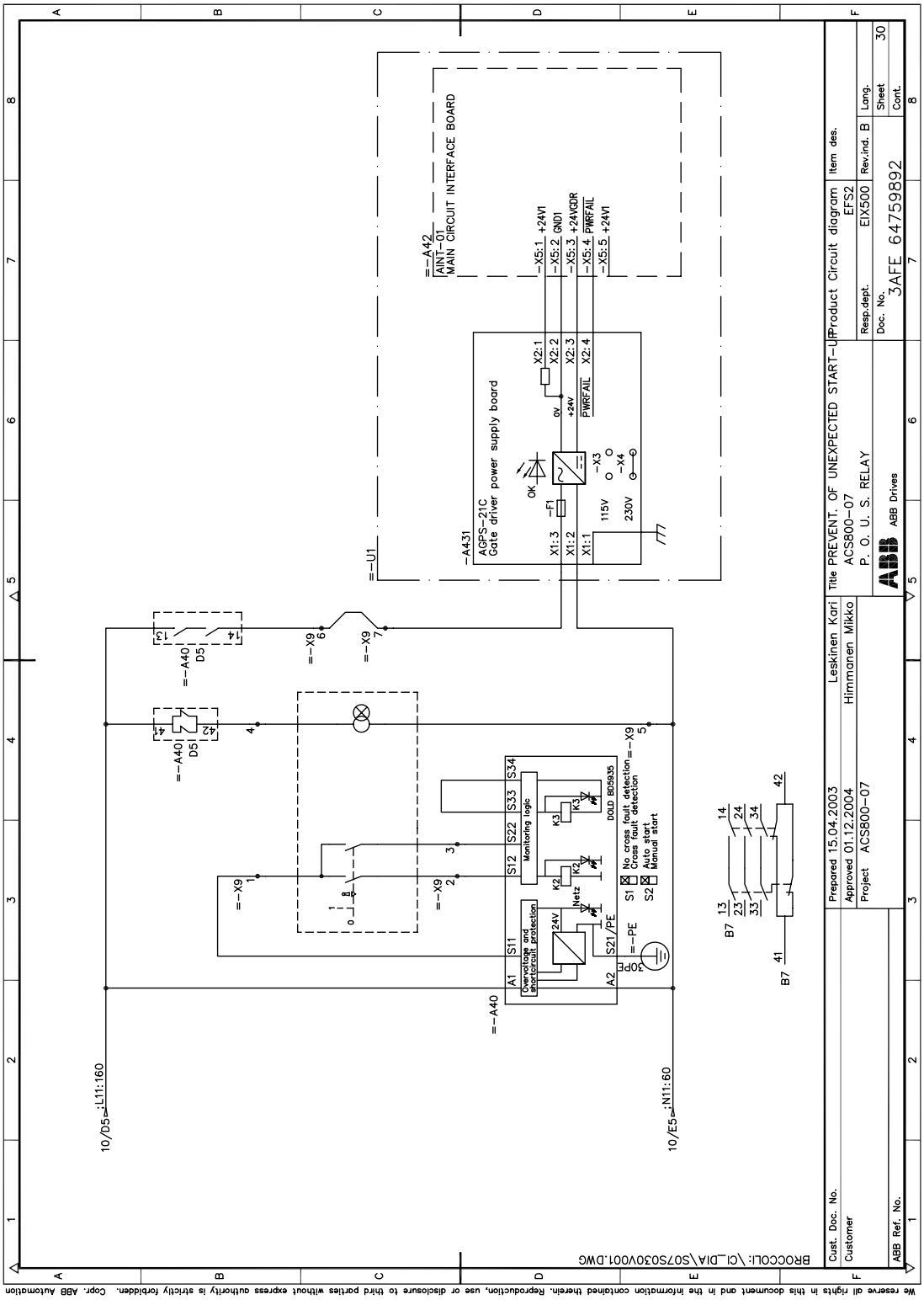
Use

WARNING! The Prevention of Unexpected Start function does not disconnect the voltage of the main and auxiliary circuits from the drive. Therefore maintenance work on electrical parts of the drive or the motor can only be carried out after isolating the drive system from the main supply.

Note: The Prevention of Unexpected Start function is not intended for stopping the drive. If a running drive is stopped by using the Prevention of Unexpected Start function, the drive will cut off the motor supply voltage and the motor will coast to stop.

Circuit diagram

An example circuit diagram of the factory wiring is shown below. See the circuit diagram delivered with the drive for the actual terminal markings.



Category 0 emergency stop for ACS800-02/U2/07/U7/17/37 (+Q951, R6, R6i, R7, R7i, R8)

What this chapter contains

This chapter describes the category 0 emergency stop function (+Q951). The chapter deals with applicability, wiring, operation and use. An example circuit diagram is included.

To which drives this chapter applies

The chapter applies to the following drives:

Drive type	Frame sizes	Option codes and descriptions
ACS800-02+C111 ACS800-02+C127 ACS800-U2	R7, R8	+F250**+Q951** = line contactor + category 0 emergency stop
ACS800-07 ACS800-U7	R6, R7, R8	
ACS800-17 ACS800-37	R6i, R7i	

Description

Category 0 definition

IEC/EN 60204-1 defines category 0 emergency stop as a stop by immediate removal of power to machine actuators.

Implementation of category 0 stop in ACS800 in brief

The category 0 emergency stop opens the line contactor switching off the supply power. The motor coasts to stop.

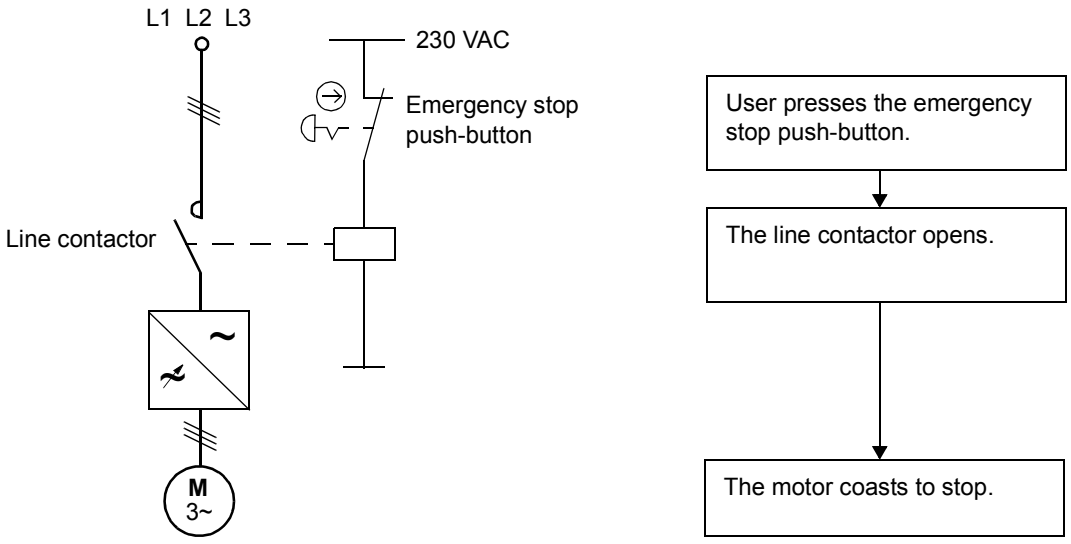
Applicable standards

The emergency stop complies with the following standards:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”.
- EN 418:1992 “Safety of machinery – Emergency stop equipment, functional aspects – Principles for design”
- EN ISO 12100:2003 “Safety of machinery – Basic concepts, general principles for design”
- EN 954-1:1996 “Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design”
- EN ISO 13849-2:2003 “Safety of machinery – Safety-related parts of control systems – Part 2: Validation”.

Operation

The category 0 emergency stop, i.e. immediate removal of power, operates as follows.



Wiring

One emergency stop push-button is installed on the cabinet door and wired to the drive at the factory. Wire the additional emergency stop push-buttons to the appropriate terminal block inside the drive cabinet. See the circuit diagram delivered with the drive.

Start-up

Setting of application program parameters is not needed.

Use

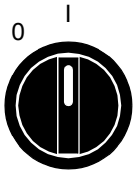
How to activate the emergency stop

Push the emergency stop push-button.	The emergency stop activates and the button locks in the “ON” position.

How to deactivate the emergency stop

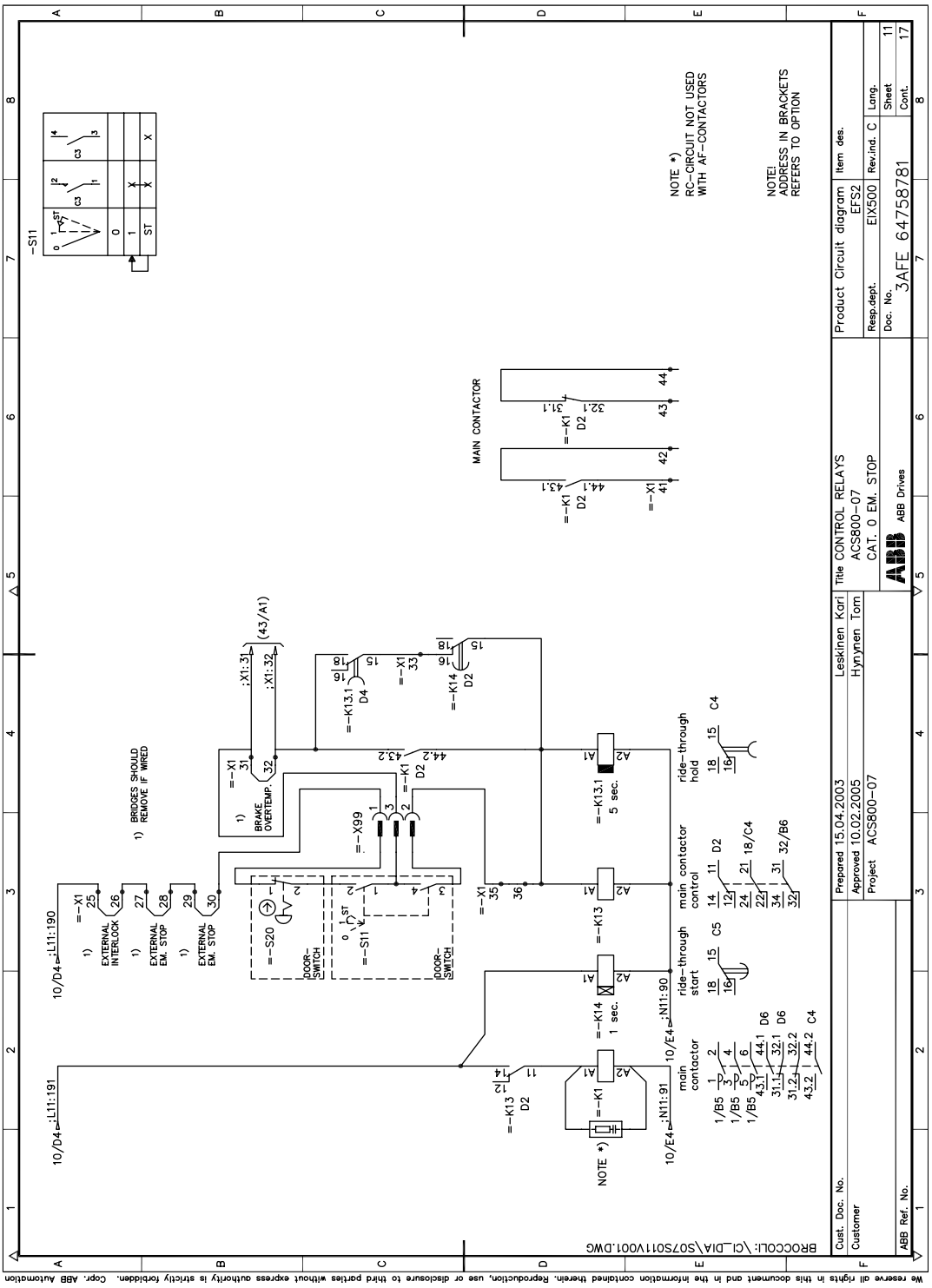
WARNING! Ensure that it is safe to apply input voltage:

- It is safe to start the motor.
- All cabinet doors are closed.

Step	What to do	What happens
1.	Turn the emergency stop push-button clockwise until the button releases.	The emergency stop deactivates.
2.	ACS800-07: Turn the manual operating switch on the front door to position S for 2 seconds.  ACS800-17/37: The manual operating switch on the front door in position I. 	ACS800-07: The line contactor or air circuit breaker closes. The drive and motor become live. ACS800-17/37: The drive is ready to start.
3.	Give the drive a “start” command by the control panel (local control active), I/O or serial communication link (external control active). **Note:** The “start” command has to be removed once before the drive starts (according to IEC/EN 60204-1 a reset shall not initiate a restart).	ACS800-07: The drive starts and accelerates to the speed defined by the active reference. ACS800-17/37: The line contactor or air circuit breaker closes. The line-side converter charges. The motor-side converter and motor become live. The drive starts and accelerates to the speed defined by the active reference.

Circuit diagram

An example circuit diagram of the factory wiring is shown below. See the circuit diagram delivered with the drive for the actual wiring.



Category 0 emergency stop for ACS800-07/17/37 (+Q951, n×R8i)

What this chapter contains

This chapter describes the category 0 emergency stop function (+Q951). The chapter deals with applicability, wiring, operation and use. Example circuit diagrams are included.

To which drives this chapter applies

The chapter applies to the following drives:

Drive type	Frame sizes	Option codes and descriptions
ACS800-07	n×R8i	+F250**+Q951** = line contactor + category 0 emergency stop
		+F255**+Q951** = air circuit breaker + category 0 emergency stop. ACS800-07: available only with 6-pulse input and line fuses.
ACS800-17 ACS800-37	n×R8i	+F250**+Q951** = line contactor + category 0 emergency stop
	2×R8i and up	+F255**+Q951** = air circuit breaker + category 0 emergency stop

Description

Category 0 definition

IEC/EN 60204-1 defines category 0 emergency stop as a stop by immediate removal of power to machine actuators.

Implementation of category 0 stop in ACS800 in brief

Diode Supply System Board (DSSB) supplies ±24 VDC control voltage to the main contactor control circuit. The emergency stop push-buttons are connected to this circuit so that pressing a push-button starts a sequence which opens the line contactors and the motor coasts to stop.

Applicable standards

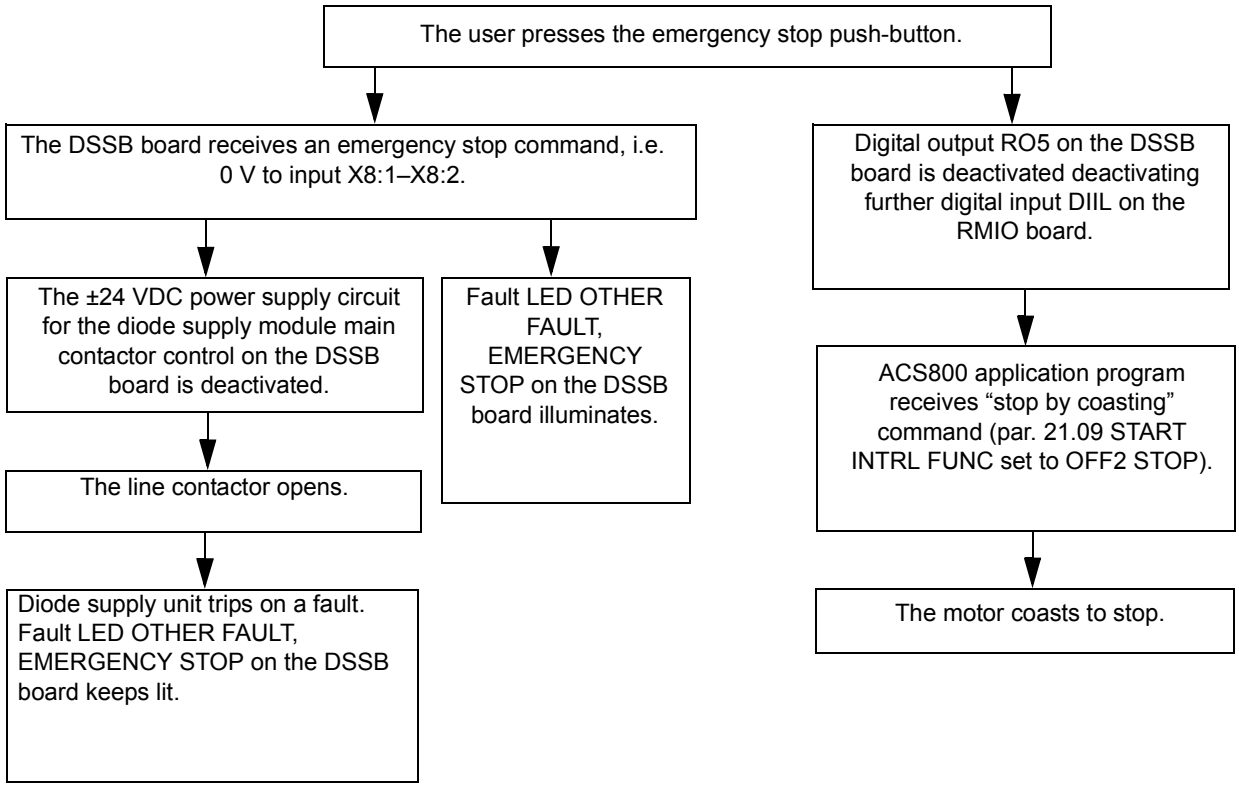
The emergency stop complies with the following standards:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”.
- EN 418:1992 “Safety of machinery – Emergency stop equipment, functional aspects – Principles for design”.
- EN ISO 12100:2003 “Safety of machinery – Basic concepts, general principles for design”
- EN 954-1:1996 “Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design”
- EN ISO 13849-2:2003 “Safety of machinery – Safety-related parts of control systems – Part 2: Validation”.

Operation

ACS800-07 units with line contactor

The category 0 emergency stop, i.e. immediate removal of power, operates as follows.



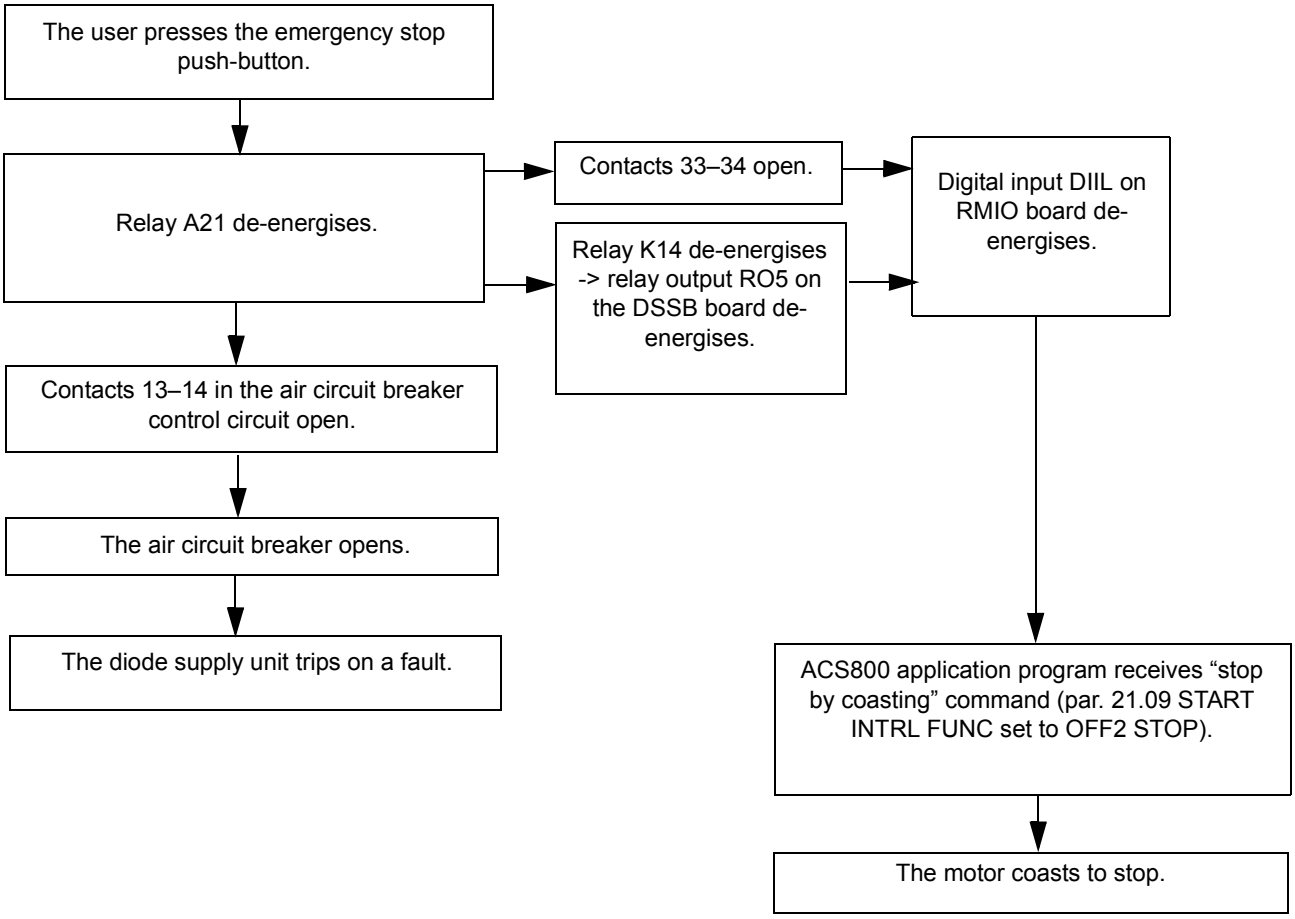
RMIO = motor control and I/O board (control board for the inverter unit)

A21 = safety relay

DSSB = Diode Supply System Board (control board for the rectifier unit)

ACS800-07 units with air circuit breaker

The category 0 emergency stop, i.e. immediate removal of power, operates as follows:



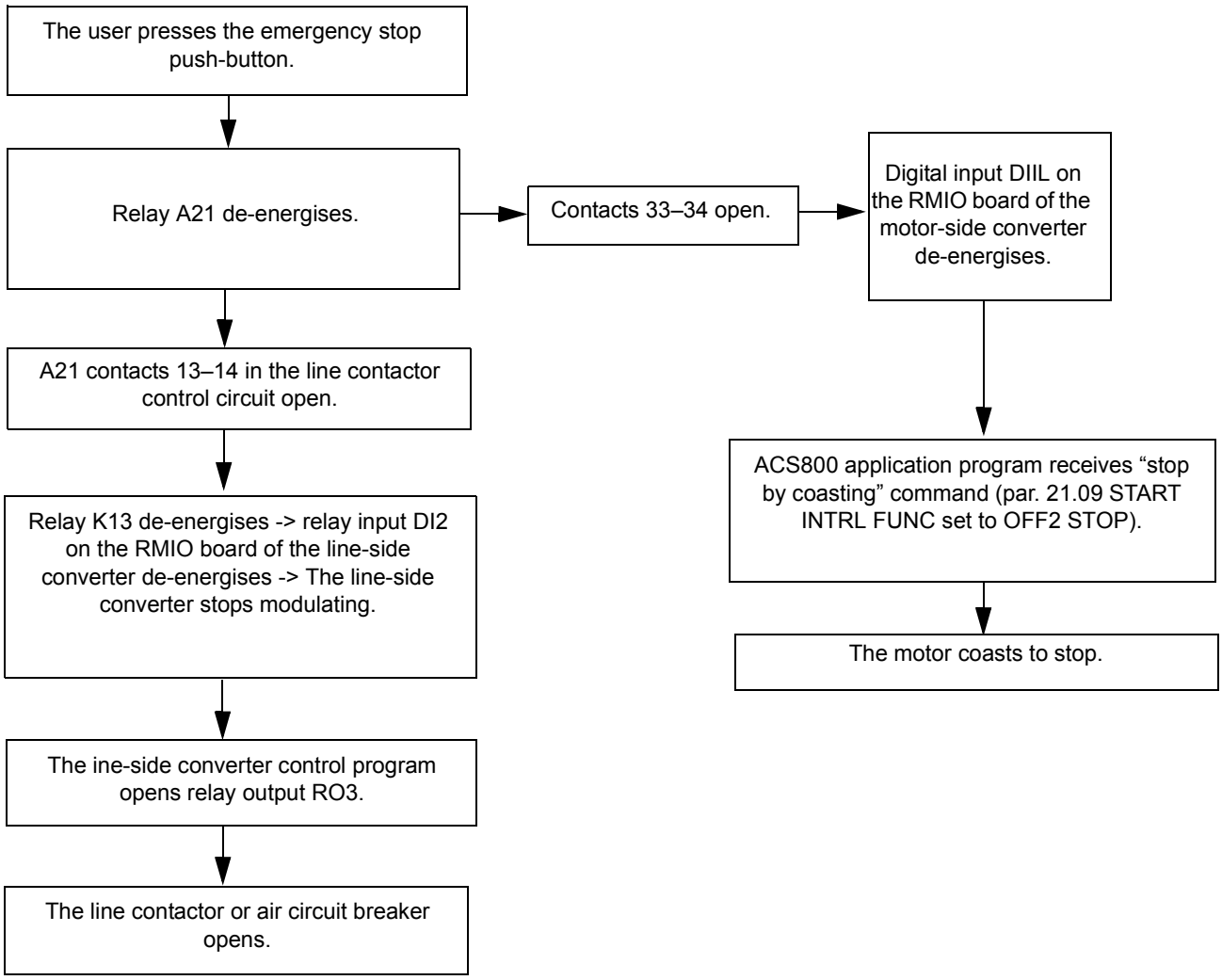
RMIO = motor control and I/O board (ACS800-07: one control board for the inverter unit. ACS800-17/37: one control board for the line-side converter and another for the motor-side converter)

A21 = safety relay

DSSB = Diode Supply System Board (control board for the rectifier unit)

ACS800-17/37 units

The category 0 emergency stop, i.e. immediate removal of power, operates as follows.



RMIO = motor control and I/O board (one control board for the line-side converter and another for the motor-side converter)

A21 = safety relay

Wiring

One emergency stop push-button is installed on the cabinet door and wired to the drive at the factory. Wire the additional emergency stop push-buttons to the appropriate terminal block inside the drive cabinet. See the circuit diagrams delivered with the drive.

Start-up

Setting of application program parameters is not needed. Parameter 21.09 START INTRL FUNC is set to OFF2 STOP at the factory.

Use

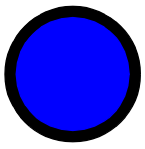
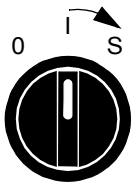
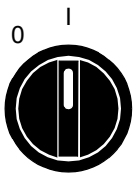
How to activate the emergency stop

Push the emergency stop push-button.	The emergency stop activates and the button locks in the “ON” position.

How to deactivate the emergency stop

WARNING! Ensure that it is safe to apply input voltage:

- It is safe to start the motor.
- All cabinet doors are closed.

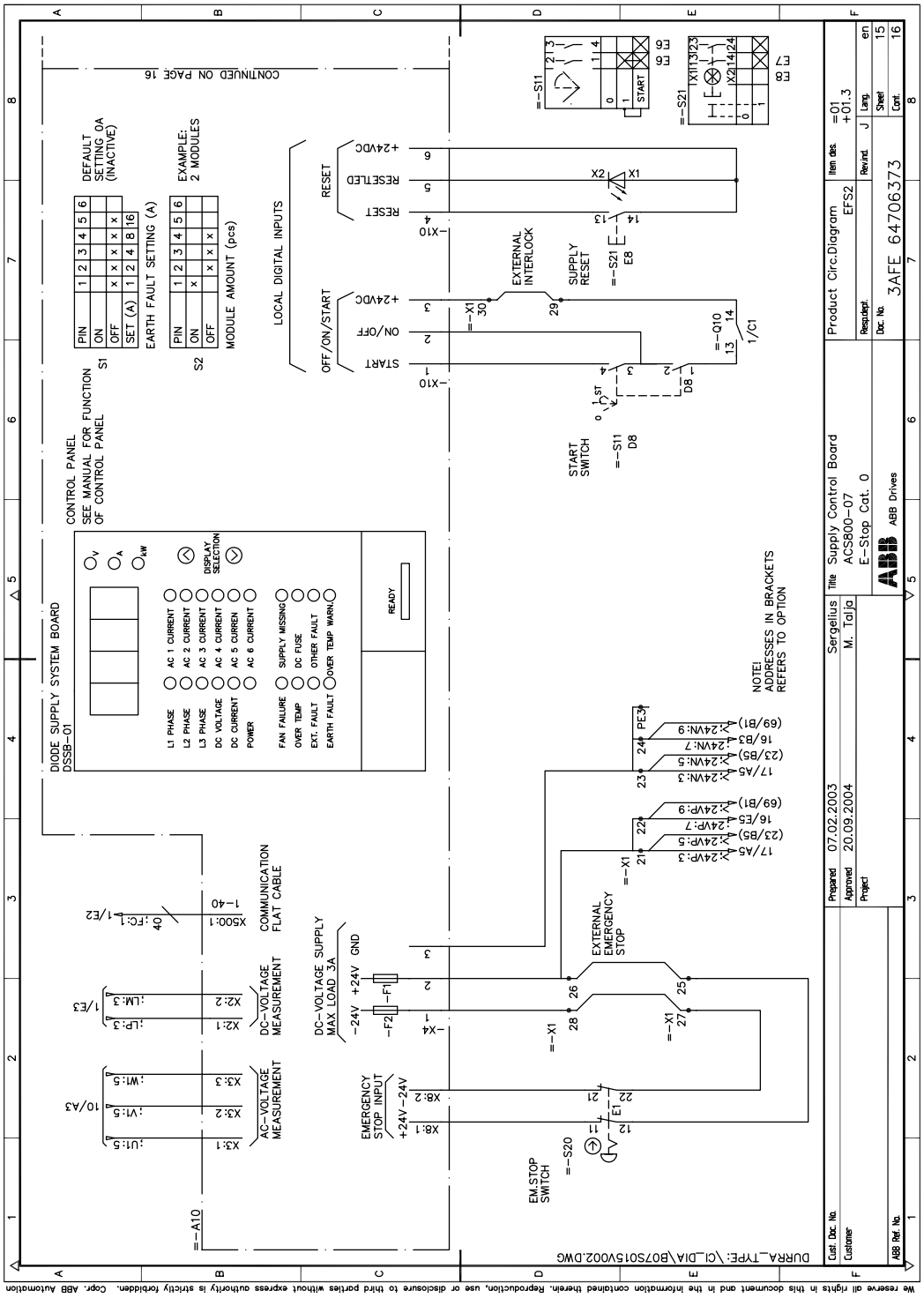
Step	What to do	What happens
1.	Turn the emergency stop push-button clockwise until the button releases.	The emergency stop deactivates.
2.	Press the blue fault reset button on the cabinet door: SUPPLY TRIPPED RESET 	The blue light goes out.
3.	ACS800-07: Turn the manual operating switch on the front door to position S for 2 seconds.  ACS800-17/37: The manual operating switch on the front door in position I. 	ACS800-07: The line contactor or air circuit breaker closes. The drive and motor become live. ACS800-17/37: The drive is ready to start.

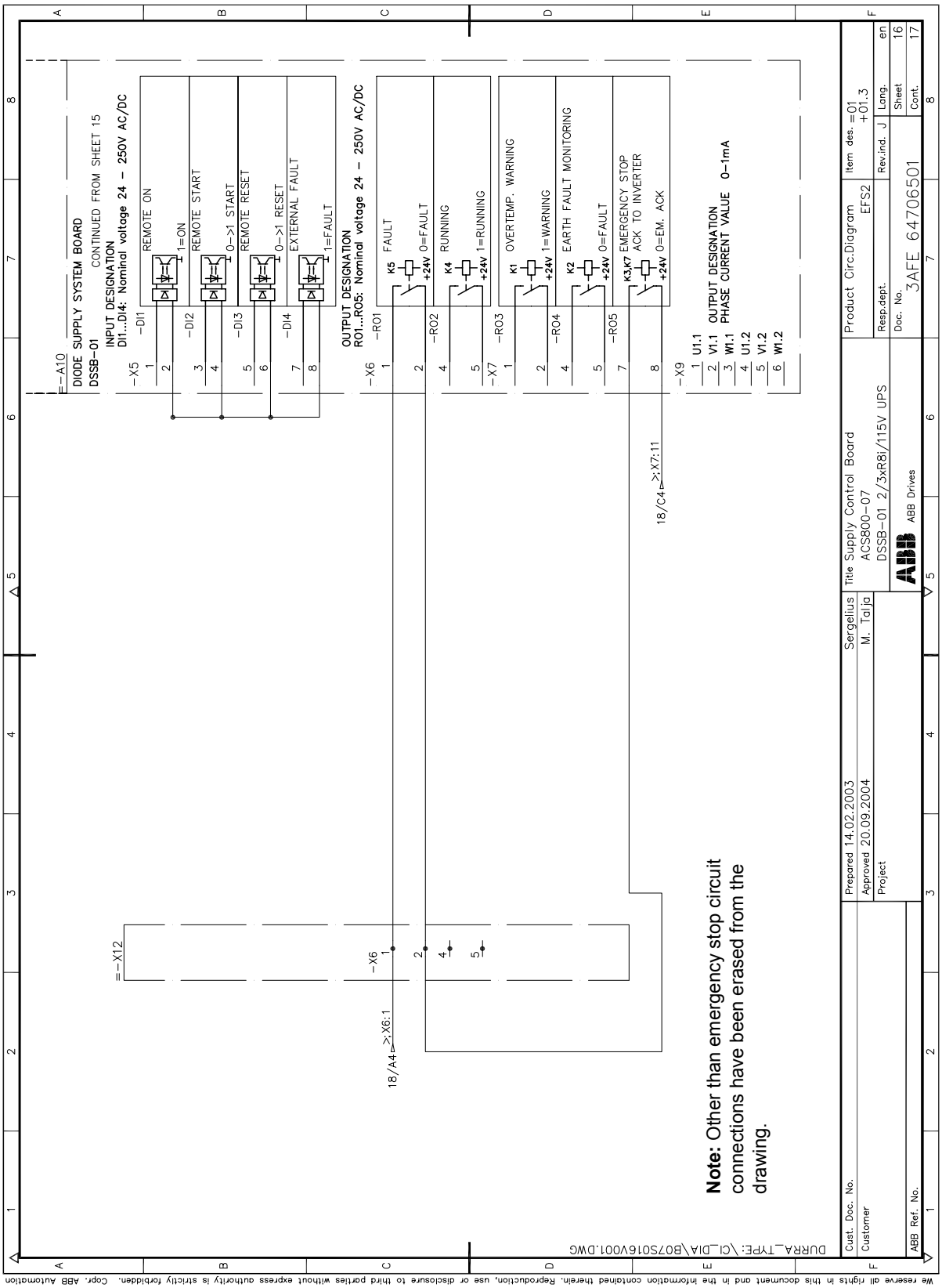
Step	What to do	What happens
4.	Give the drive a “start” command by the control panel (local control active), I/O or serial communication link (external control active). **Note:** The “start” command has to be removed once before the drive starts (according to IEC/EN 60204-1 a reset shall not initiate a restart).	ACS800-07: The drive starts and accelerates to the speed defined by the active reference. ACS800-17/37: The line contactor or air circuit breaker closes. The line-side converter charges. The motor-side converter and motor become live. The drive starts and accelerates to the speed defined by the active reference.

Circuit diagrams

ACS800-07 units with line contactor (+F250+Q951)

Example circuit diagrams of the factory wiring are shown below. See the circuit diagrams delivered with the drive for the actual wiring.




=-A10
DIODE SUPPLY SYSTEM BOARD
DSSB-01
CONTINUED FROM SHEET 15
INPUT DESIGNATION
DI1...DI4: Nominal voltage 24 - 250V AC/DC
-X5
-DI1
REMOTE ON
1=ON
-DI2
REMOTE START
0->1 START
-DI3
REMOTE RESET
0->1 RESET
-DI4
EXTERNAL FAULT
1=FAULT
OUTPUT DESIGNATION
RO1...RO5: Nominal voltage 24 - 250V AC/DC
-X6
-RO1
K5
FAULT
+24V
0=FAULT
-RO2
K4
RUNNING
+24V
1=RUNNING
-X7
-RO3
K1
OVERTEMP. WARNING
+24V
1=WARNING
-RO4
K2
EARTH FAULT MONITORING
+24V
0=FAULT
-RO5
K3,K7
EMERGENCY STOP
ACK TO INVERTER
+24V
0=EM. ACK
-X9
U1.1
V1.1
W1.1
U1.2
V1.2
W1.2
OUTPUT DESIGNATION
PHASE CURRENT VALUE 0-1mA
=-X12
-X6
18/A4
>:X6:1
18/C4
>:X7:11
Note: Other than emergency stop circuit connections have been erased from the drawing.
Prepared 14.02.2003
Sergelius
Approved 20.09.2004
M. Talja
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title Supply Control Board
ACS800-07
DSSB-01 2/3xR8i/115V UPS
ABB Drives
Product Circ.Diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Rev.ind. J
Lang. en
Doc. No. 3AFE 64706501
Sheet 16
Cont. 17
DURRA_TYPE:\CI_DIA\B07S016V001.DWG
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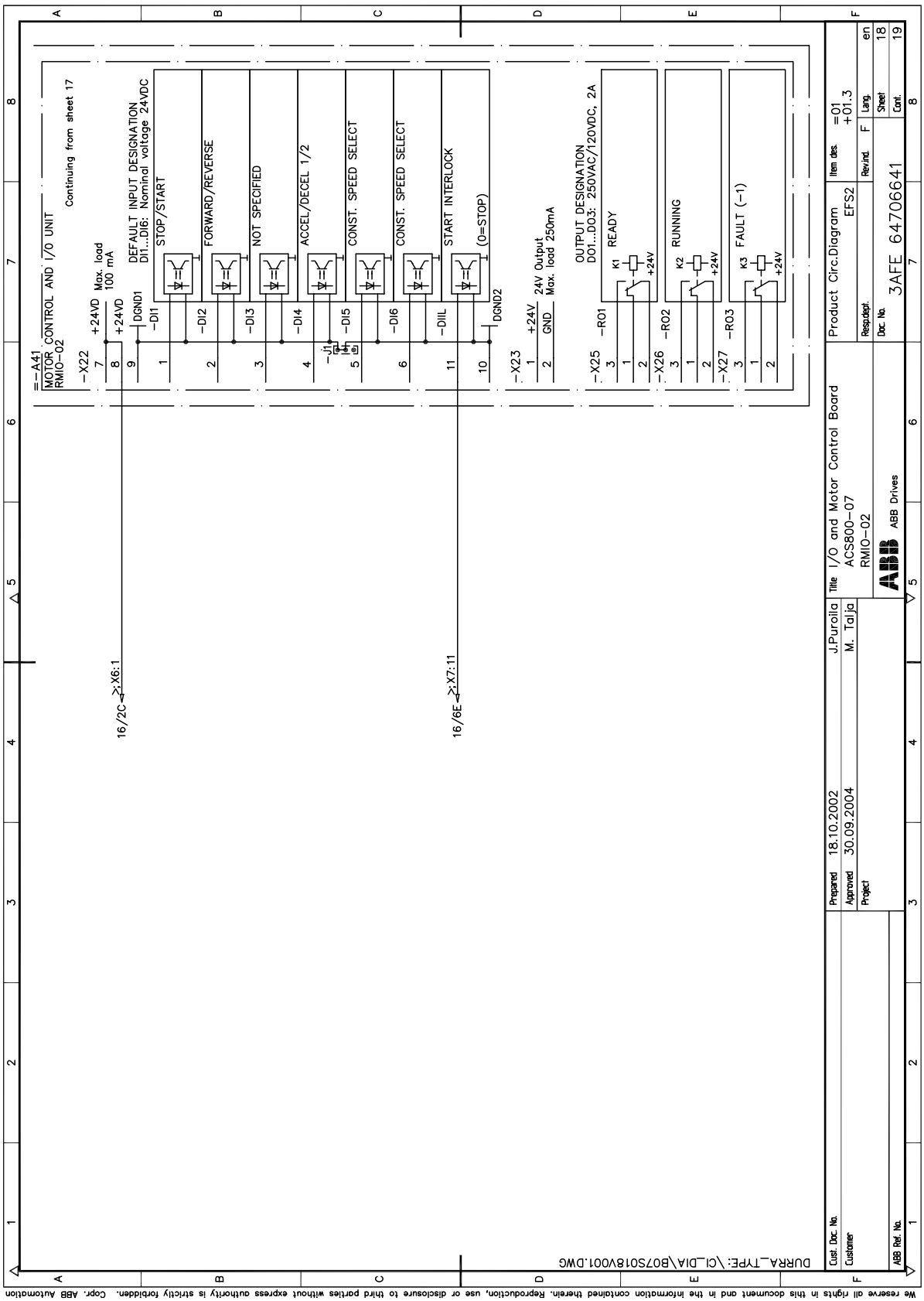
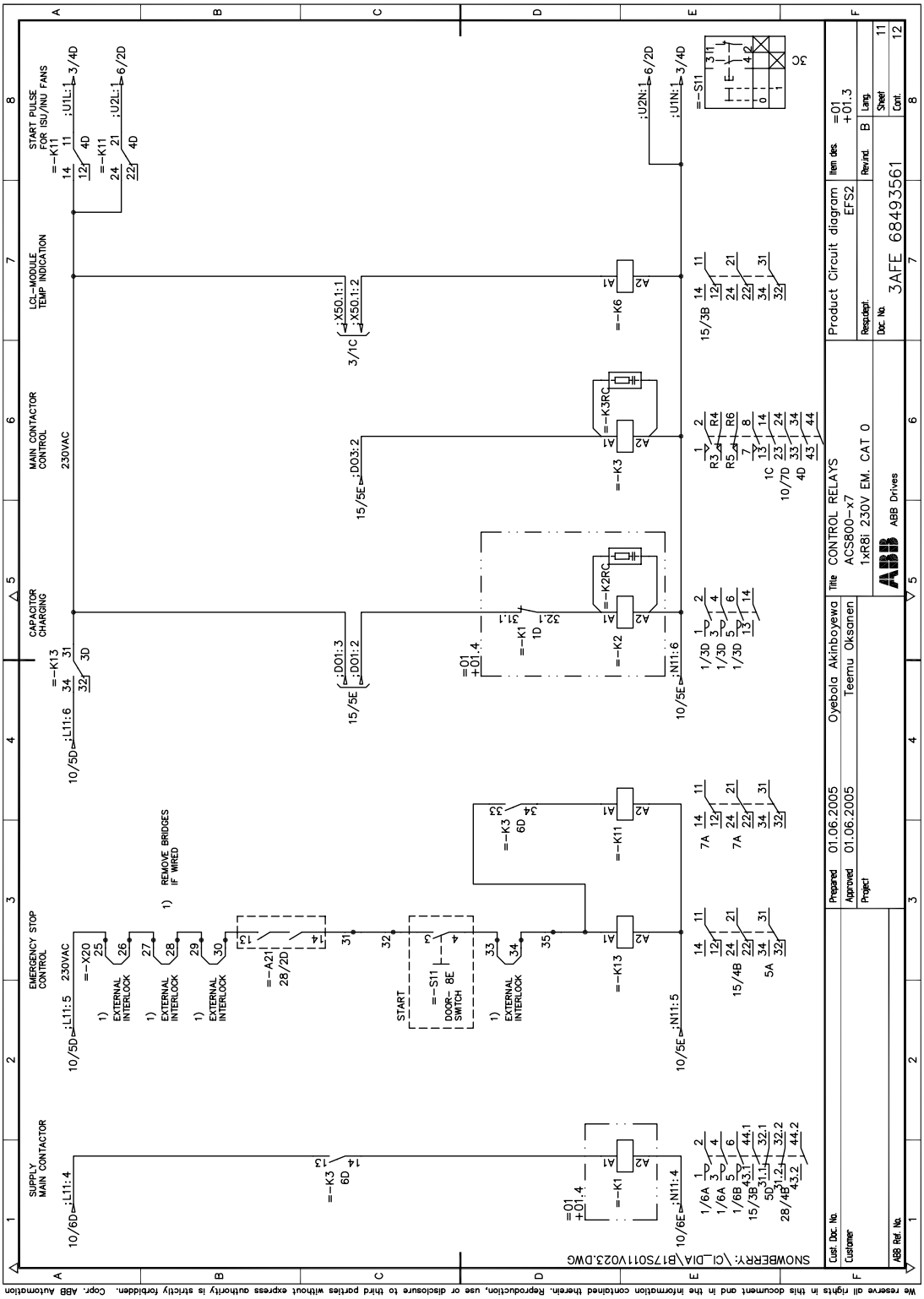
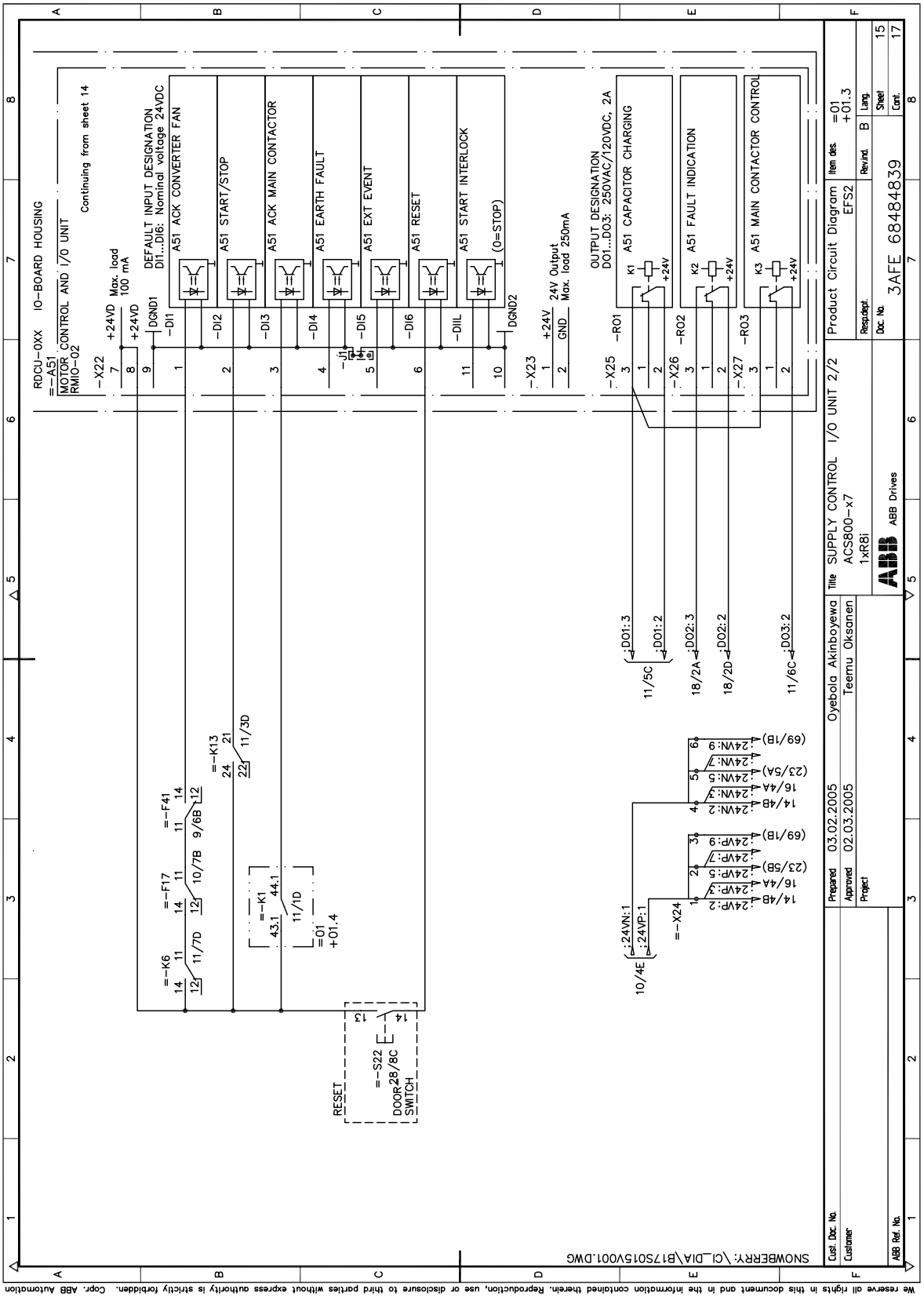
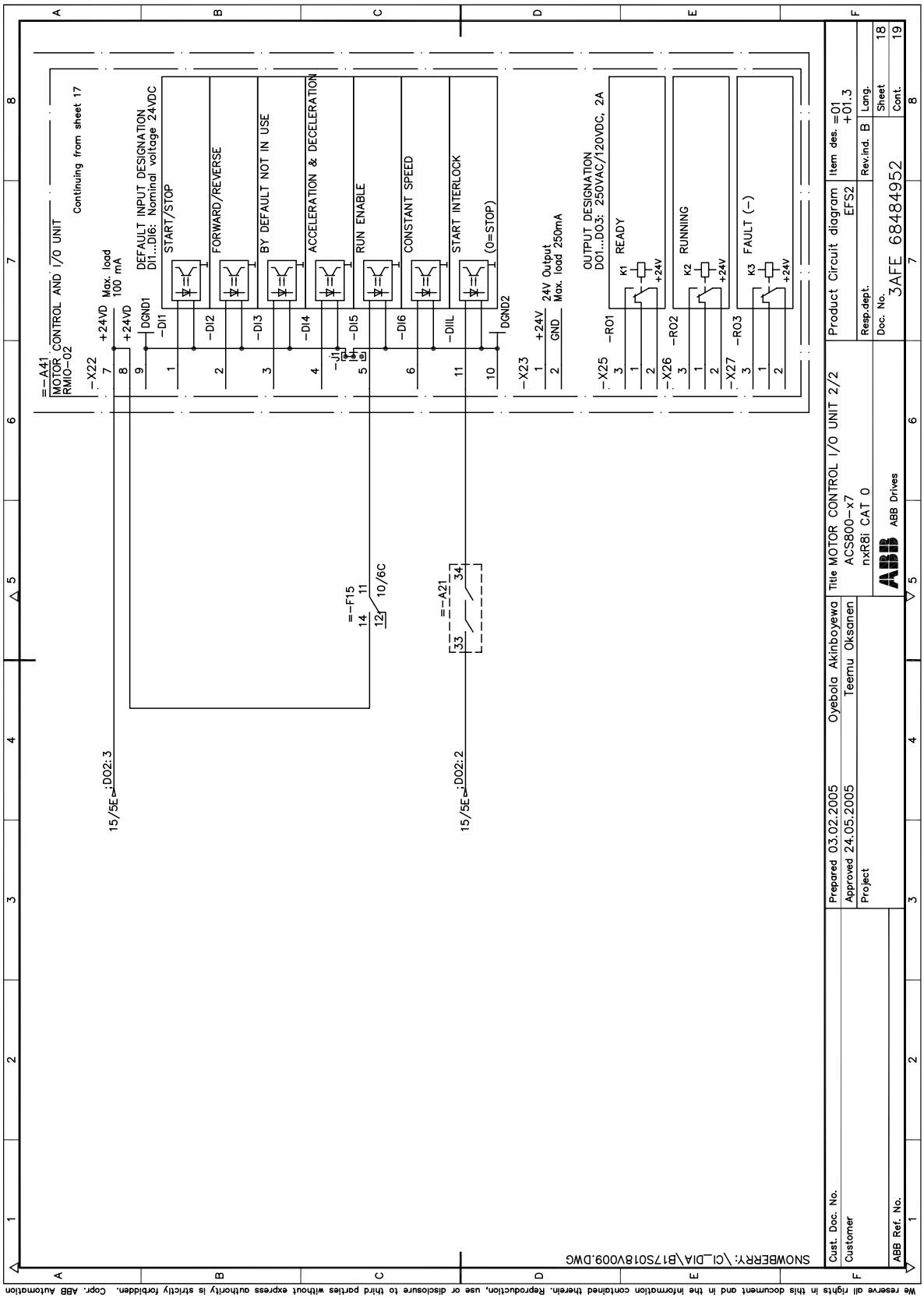


ACS800-17 and ACS800-37 units with line contactor (+F250+Q951)

Example circuit diagrams of the factory wiring are shown below. See the circuit diagrams delivered with the drive for the actual wiring.






=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
+24VD
DGND1
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
Max. load 100 mA
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
START/STOP
FORWARD/REVERSE
BY DEFAULT NOT IN USE
ACCELERATION & DECELERATION
RUN ENABLE
CONSTANT SPEED
START INTERLOCK
(0=STOP)
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
K1
READY
+24V
-X26
-RO2
K2
RUNNING
+24V
-X27
-RO3
K3
FAULT (-)
+24V
=-F15
10/6C
=-A21
15/5E DO2:3
15/5E DO2:2
SNOWBERRY:\CI_DIA\B17501BV009.DWG
Prepared 03.02.2005 Oyebola Akinboyewa
Approved 24.05.2005 Teemu Oksanen
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title MOTOR CONTROL I/O UNIT 2/2
ACS800-x7
nxR8i CAT 0
ABB Drives
Product Circuit diagram
EFS2
Resp.dept.
Doc. No.
3AFE 68484952
Item des. =01
+01.3
Rev.ind. B
Lang.
Sheet 18
Cont. 19
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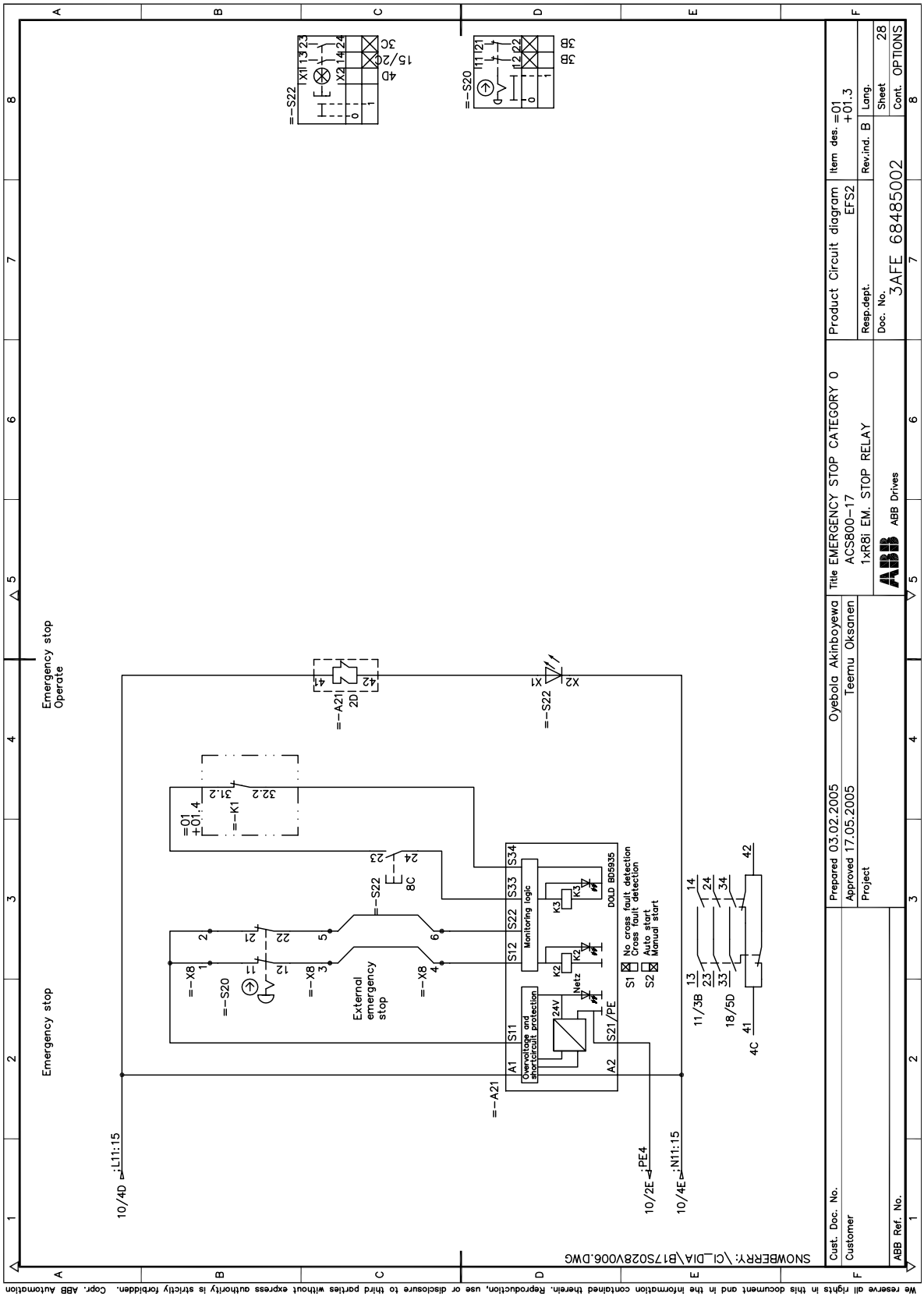
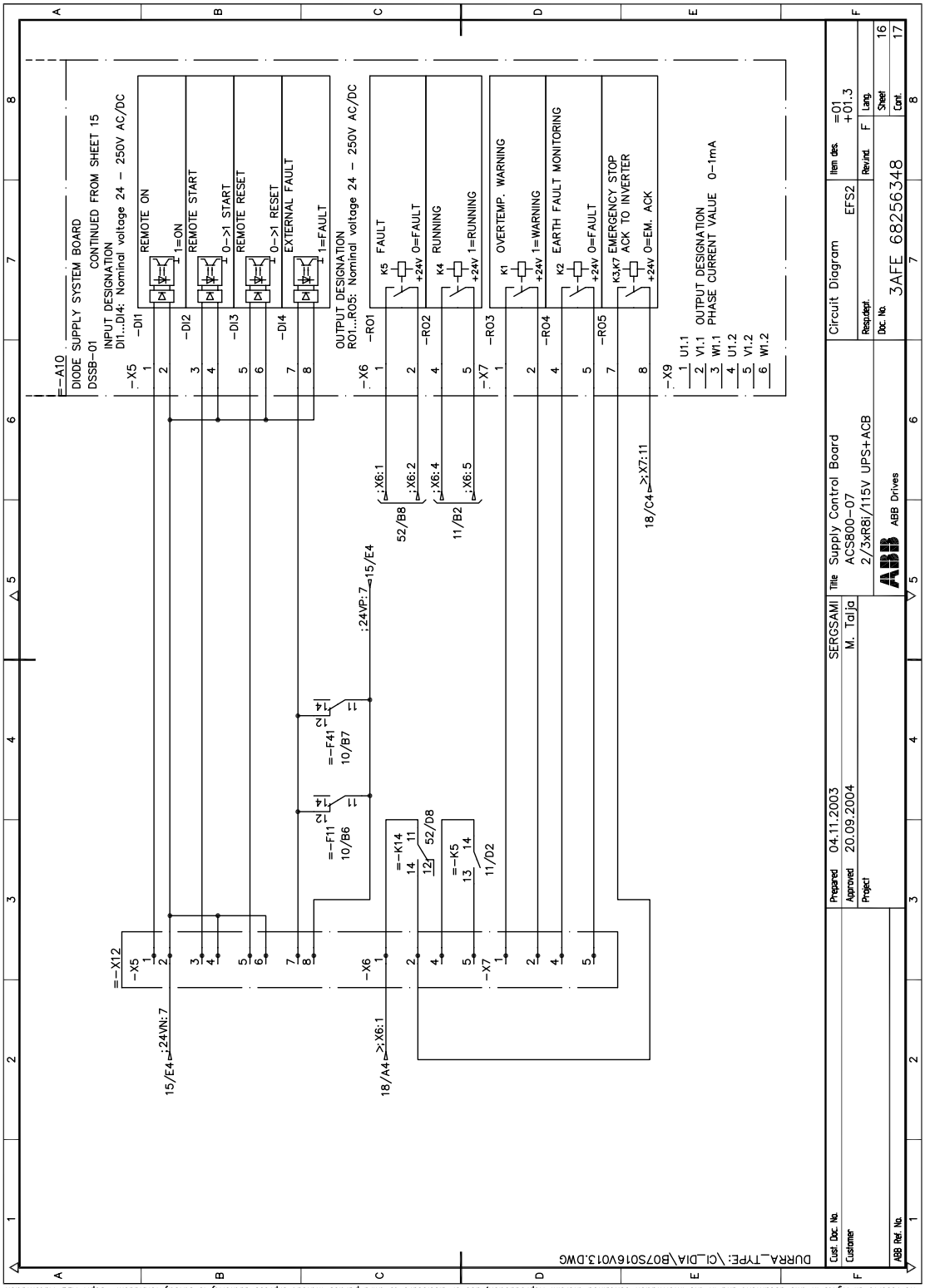
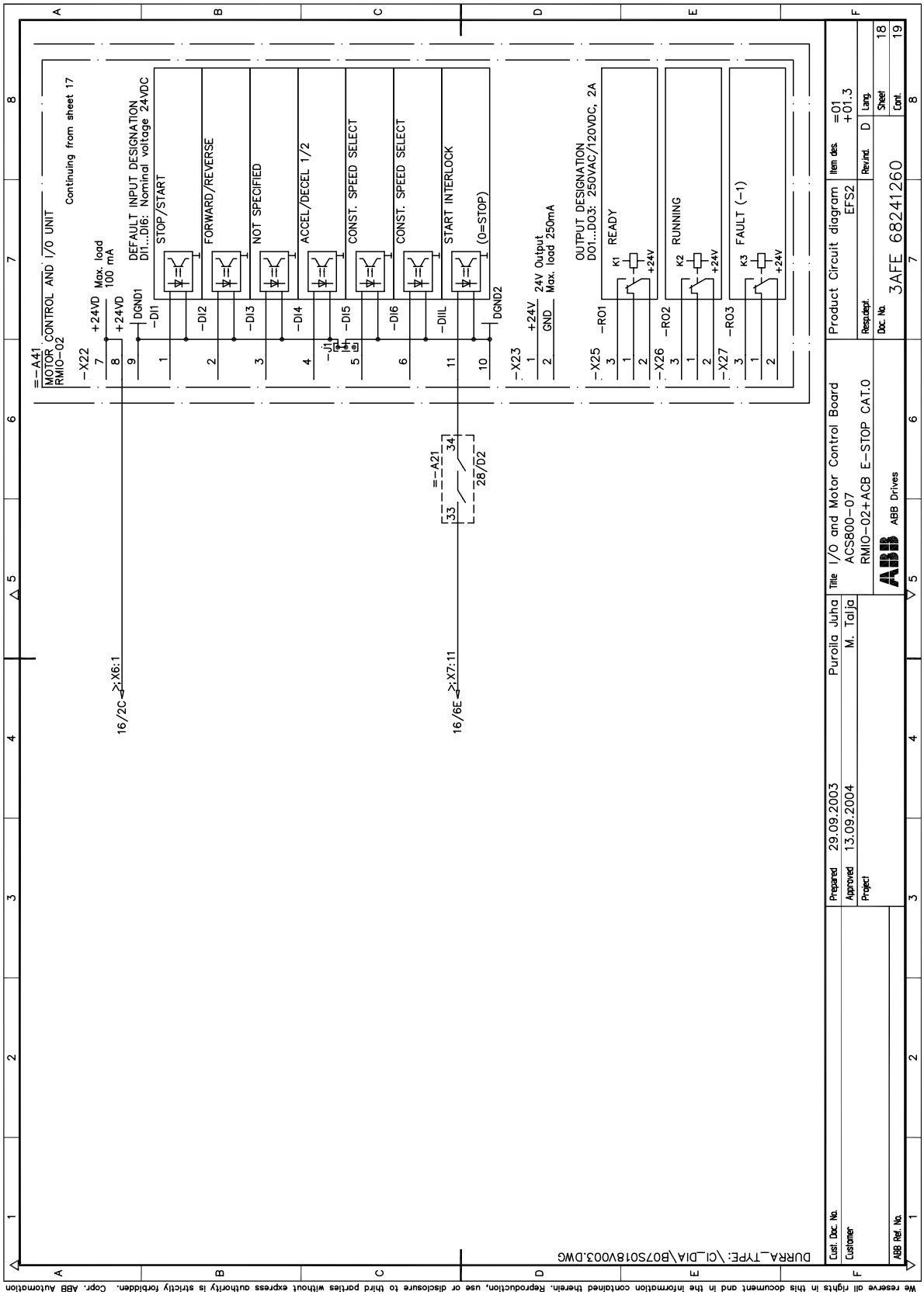


ACS800-07 units with air circuit breaker (+F255+Q951)

Example circuit diagrams of the factory wiring are shown below. See the circuit diagrams delivered with the drive for the actual wiring.




=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
Max. load
100 mA
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
STOP/START
FORWARD/REVERSE
NOT SPECIFIED
ACCEL/DECEL 1/2
CONST. SPEED SELECT
CONST. SPEED SELECT
START INTERLOCK
(0=STOP)
DGND1
DGND2
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
-X23
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
READY
-X26
-RO2
RUNNING
-X27
-RO3
FAULT (-1)
K1
K2
K3
+24V
=-A21
16/2C
16/6E
-X6:1
-X7:11
28/D2
DURRA_TYPE:\CI_DIA\B07S018V003.DWG
Prepared 29.09.2003 Puroila Juha
Approved 13.09.2004 M. Talja
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title I/O and Motor Control Board
ACS800-07
RMIO-02+ACB E-STOP CAT.0
ABB Drives
Product Circuit diagram
EFS2
Item des. =01
+01.3
Revind. D
Lang.
Resp.dept.
Doc. No. 3AFE 68241260
Sheet 18
Cont. 19
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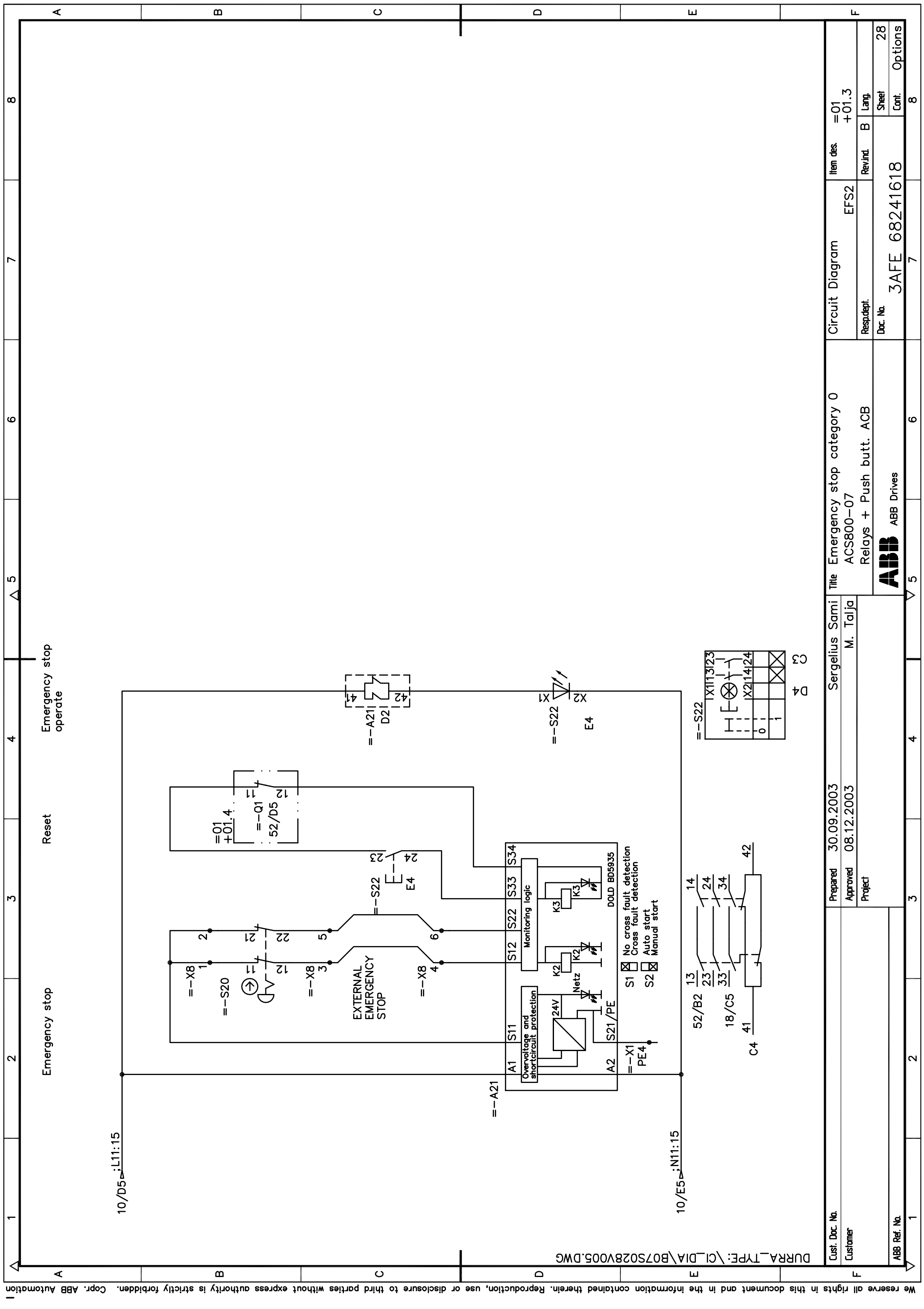
Emergency stop
Reset
Emergency stop operate
10/D5 :L11:15
10/E5 :N11:15
=-X8 1
=-X8 2
=-S20
=-X8 3
EXTERNAL EMERGENCY STOP
=-X8 4
=-S22
E4
=01 +01.4
=-Q1
52/D5
=-A21
D2
X1
X2
A1
S11
S12
S22
S33
S34
Monitoring logic
Overvoltage and shortcircuit protection
24V
Netz
K2
K3
DOLD BD5935
A2
S21/PE
=-X1 PE4
S1 No cross fault detection
Cross fault detection
S2 Auto start
Manual start
52/B2
18/C5
C4
C3
D4
Prepared 30.09.2003
Approved 08.12.2003
Project
Sergelius Sami
M. Talja
Title Emergency stop category 0
ACS800-07
Relays + Push butt. ACB
ABB Drives
Circuit Diagram
EFS2
Item des. =01 +01.3
Rev.ind. B
Doc. No. 3AFE 68241618
Sheet 28
Cont. Options
DURRA_TYPE: \CI_DIA\B07S028V005.DWG
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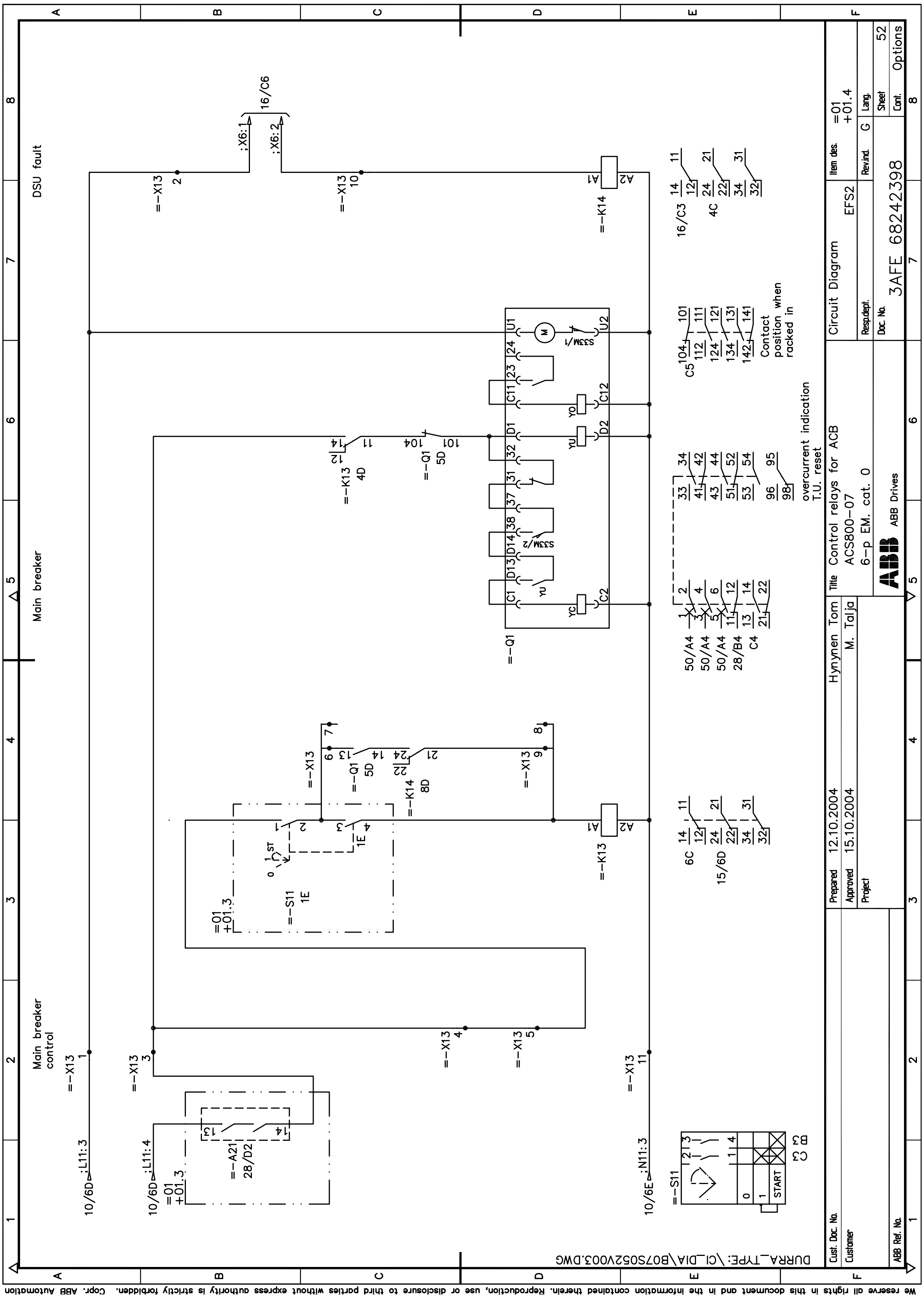
DSU fault
Main breaker
Main breaker control
overcurrent indication
T.U. reset
Contact position when racked in
Circuit Diagram
Control relays for ACB
ACS800-07
6-p EM. cat. 0
ABB Drives
3AFE 68242398
Options
Hynynen Tom
M. Talja
12.10.2004
15.10.2004
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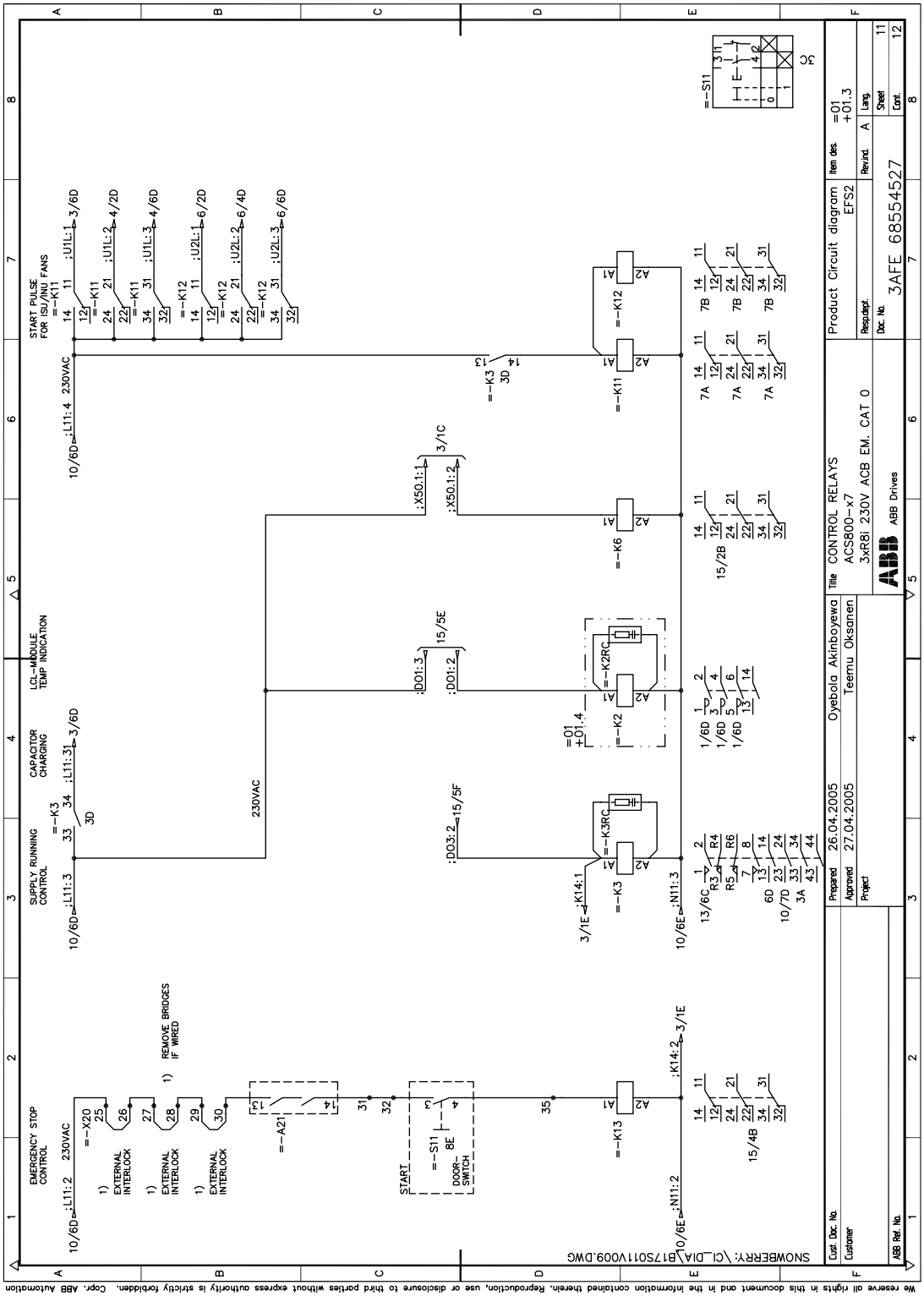
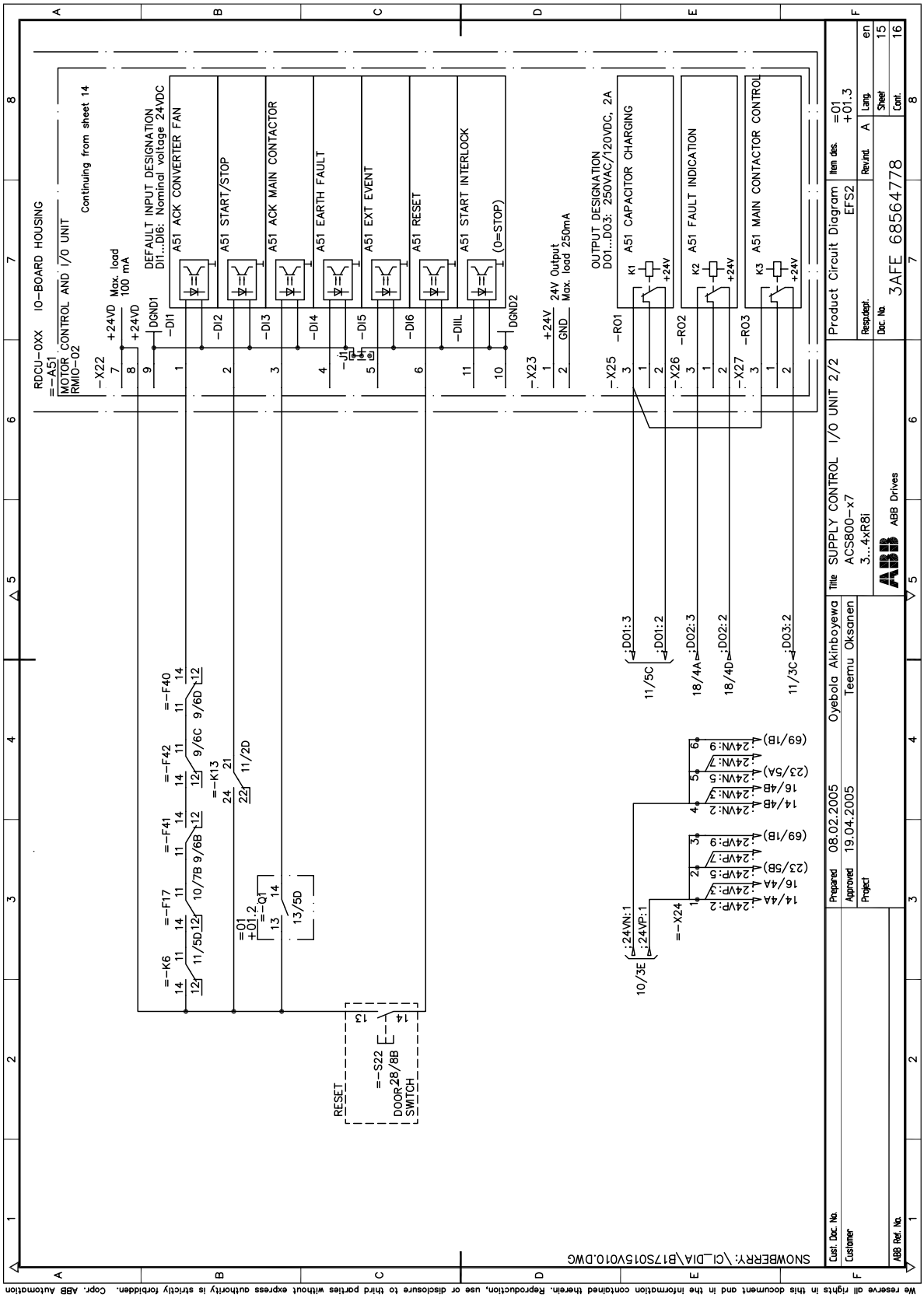
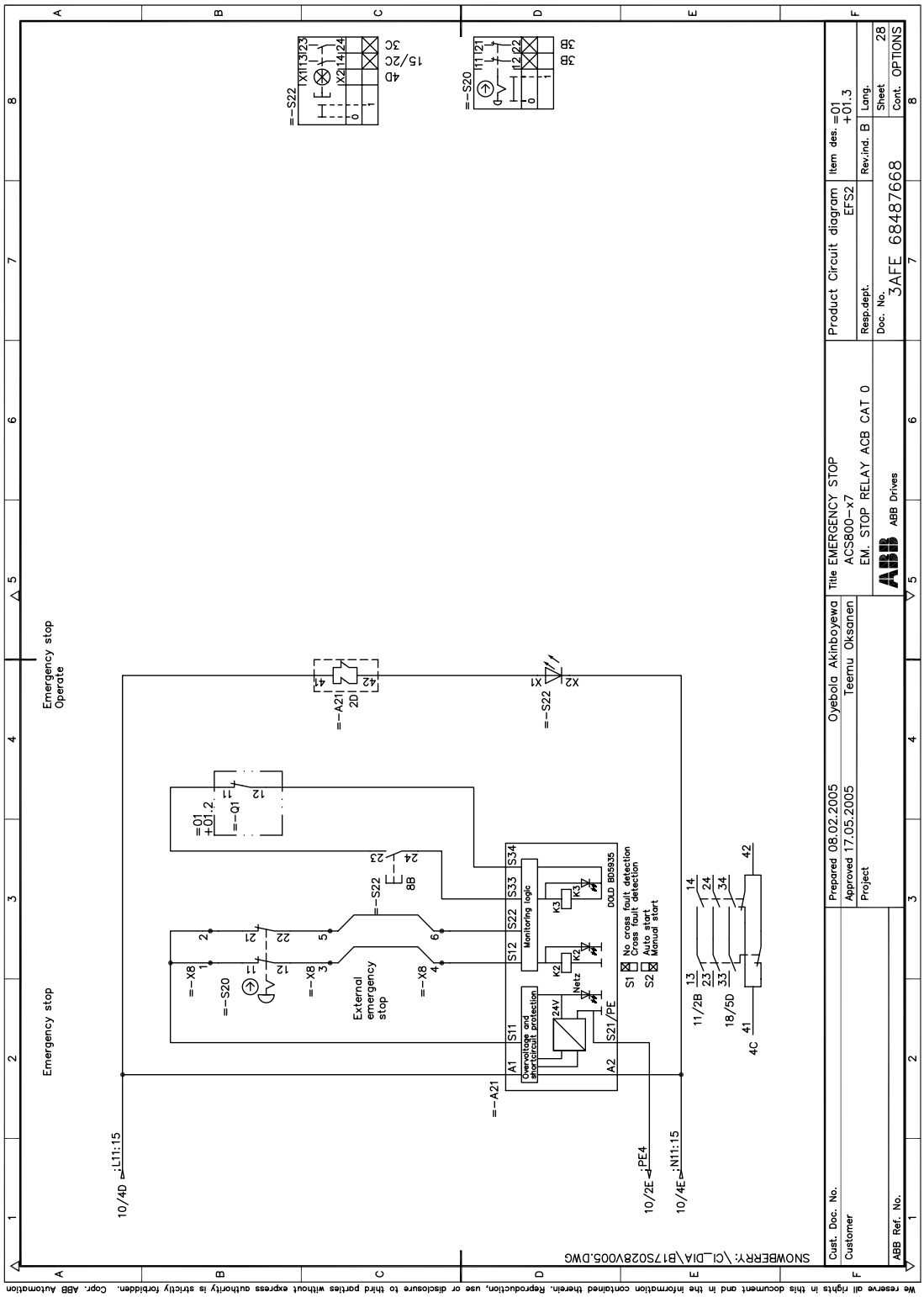
ACS800-17/37 units with air circuit breaker (+F255+Q951)

Example circuit diagrams of the factory wiring are shown below. See the circuit diagrams delivered with the drive for the actual wiring.






Emergency stop
Operate
Emergency stop
External emergency stop
Overvoltage and shortcircuit protection
Monitoring logic
No cross fault detection
Cross fault detection
Auto start
Manual start
DOLD BD5935
Prepared 08.02.2005 Oyebola Akinboyewa
Approved 17.05.2005 Teemu Oksanen
Project
Title EMERGENCY STOP
ACS800-x7
EM. STOP RELAY ACB CAT 0
Product Circuit diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Rev.ind. B
Lang.
Doc. No.
3AFE 68487668
Sheet 28
Cont. OPTIONS
ABB Drives
Cust. Doc. No.
Customer
ABB Ref. No.
SNOWBERRY:\CI_DIA\B17502BV005.DWG
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Category 1 emergency stop for ACS800-07/U7 (+Q952, R6, R7, R8)

What this chapter contains

This chapter describes the category 1 emergency stop function (+Q952). The chapter includes operation, user settings and example circuit diagrams.

To which drives this chapter applies

The chapter applies to the following drives

Drive type	Frame sizes	Option codes and descriptions
ACS800-07 ACS800-U7	R6, R7, R8	+F250**+Q952**+(D150 or D151) = line contactor + category 1 emergency stop + brake chopper (external resistor) or brake chopper and resistor

when equipped with one of the following application programs:

Option code	ACS800 application program
-	Standard
+N651	Master/Follower
+N666	Extruder Control
+N669	Centrifuge Control

The parameter references in the chapter apply to ACS800 Standard Application Program. For the other application programs, check correct parameters.

Description

Category 1 definition

IEC/EN60204-1 defines category 1 emergency stop as a controlled stop with the power to machine actuators available to achieve the stop and then removal of power when the stop is achieved.

Implementation of category 1 stop in ACS800 in brief

After the emergency stop command has been given, the drive first decelerates the motor to a standstill according to a preset ramp time. Then, the main contactor is switched off.

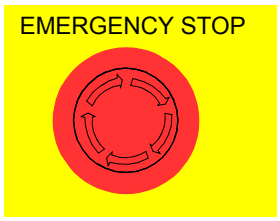
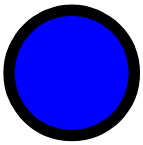
Applicable standards

The emergency stop complies with the following standards:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”
- EN 418:1992 “Safety of machinery – Emergency stop equipment, functional aspects – Principles for design”
- EN ISO 12100:2003 “Safety of machinery – Basic concepts, general principles for design”
- EN 954-1:1996 “Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design”
- EN ISO 13849-2:2003 “Safety of machinery – Safety-related parts of control systems – Part 2: Validation”.

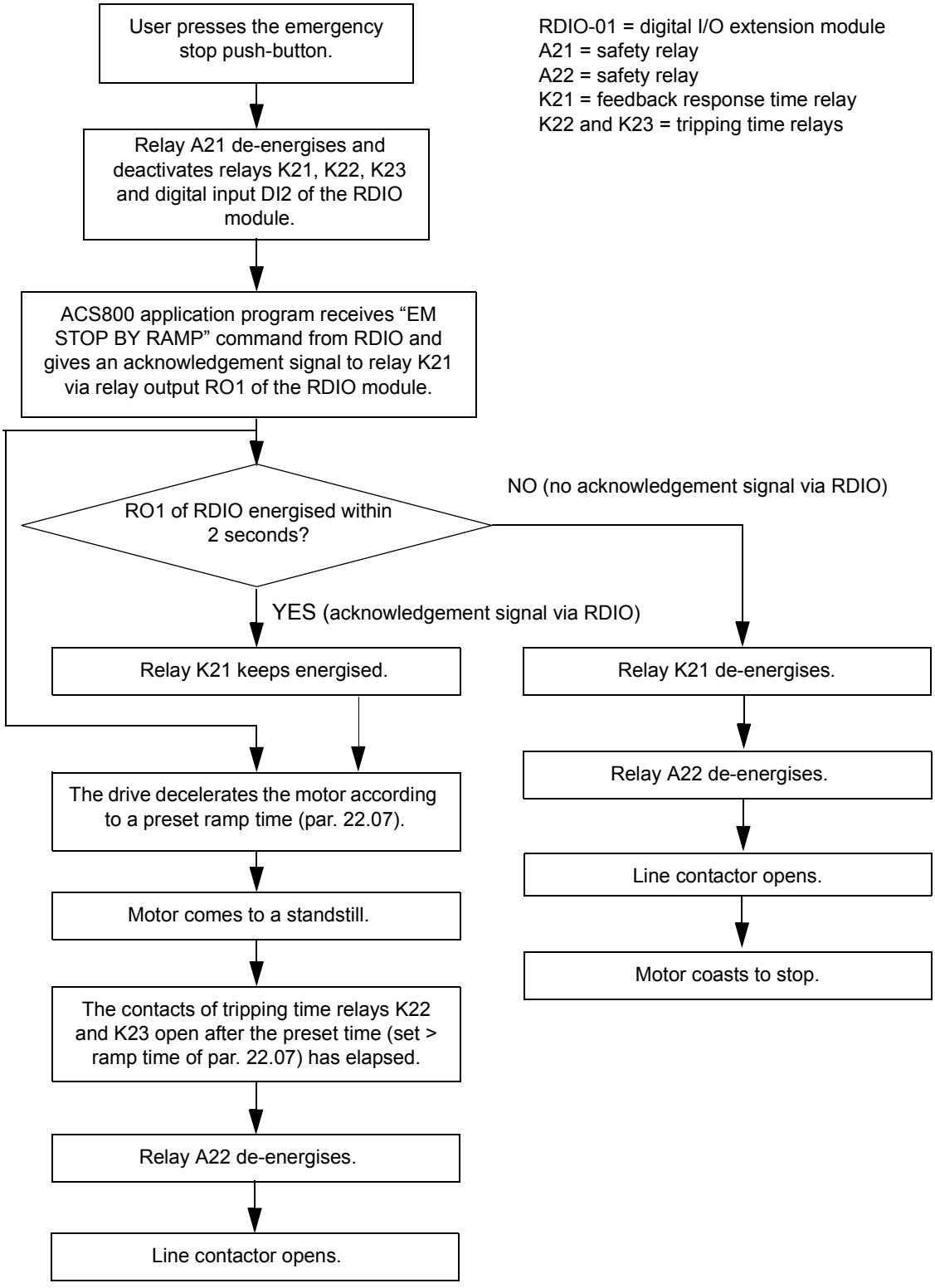
Components of the emergency stop function

The following pieces of equipment are included:

<table>
<tr><td colspan="3">Line contactor</td></tr>
<tr><td rowspan="4">Operating switch
 
</td><td>Position</td><td>Function</td></tr>
<tr><td>0</td><td>Opens the main contactor.</td></tr>
<tr><td>I</td><td>Keeps the main contactor closed.</td></tr>
<tr><td>S</td><td>Closes the main contactor.</td></tr>
<tr><td>Emergency stop push-button
 
</td><td colspan="2">Activates the emergency stop function.</td></tr>
<tr><td>Reset push-button
 
EMERGENCY STOP
RESET</td><td colspan="2">Resets a drive fault. Illuminates in fault situations.</td></tr>
<tr><td colspan="3">Digital I/O Extension Module RDIO-01</td></tr>
<tr><td colspan="3">Safety relays (A21, A22), feedback response time relay (K21) and tripping time relays (K22 and K23)</td></tr>
<tr><td colspan="3">ACS800-07: braking device (a chopper with resistors) if needed to ensure that sufficient braking capacity is available</td></tr>
<tr><td colspan="3">AIMA-01 I/O Module Adapter if option slots 1 and 2 on the RMIO board are reserved.</td></tr>
</table>

Operation

The category 1 emergency stop, i.e. controlled emergency stop, operates as follows.



Wiring

One emergency stop push-button is installed on the cabinet door and wired to the drive at the factory. Wire the additional emergency stop push-buttons to terminal block X8 (terminals 3, 4, 5 and 6) inside the drive cabinet. See the circuit diagram delivered with the drive.

Start-up

Digital I/O Extension Module RDIO-01 is configured as an emergency stop signal interface at the factory. In case optional module slots 1 and 2 on the RMIO board (or RDCU control unit) are reserved, the digital I/O extension module is placed on the I/O Module Adapter AIMA-01.

User settings are listed below.

Set the ramp time by parameter 22.07 EM STOP RAMP TIME according to the application requirements. If the ramp time is changed, check that relays K22 and K23 have slightly longer delay times.
If the AIMA-01 module adapter is in use, check that its node address is the same as in the circuit diagram delivered with the drive. See *AIMA-01 I/O Module Adapter User's Manual* [3AFE64661442 (English)].

Use

How to activate the emergency stop

Push the emergency stop push-button.	The emergency stop activates and the button locks in the "ON" position.

How to deactivate the emergency stop

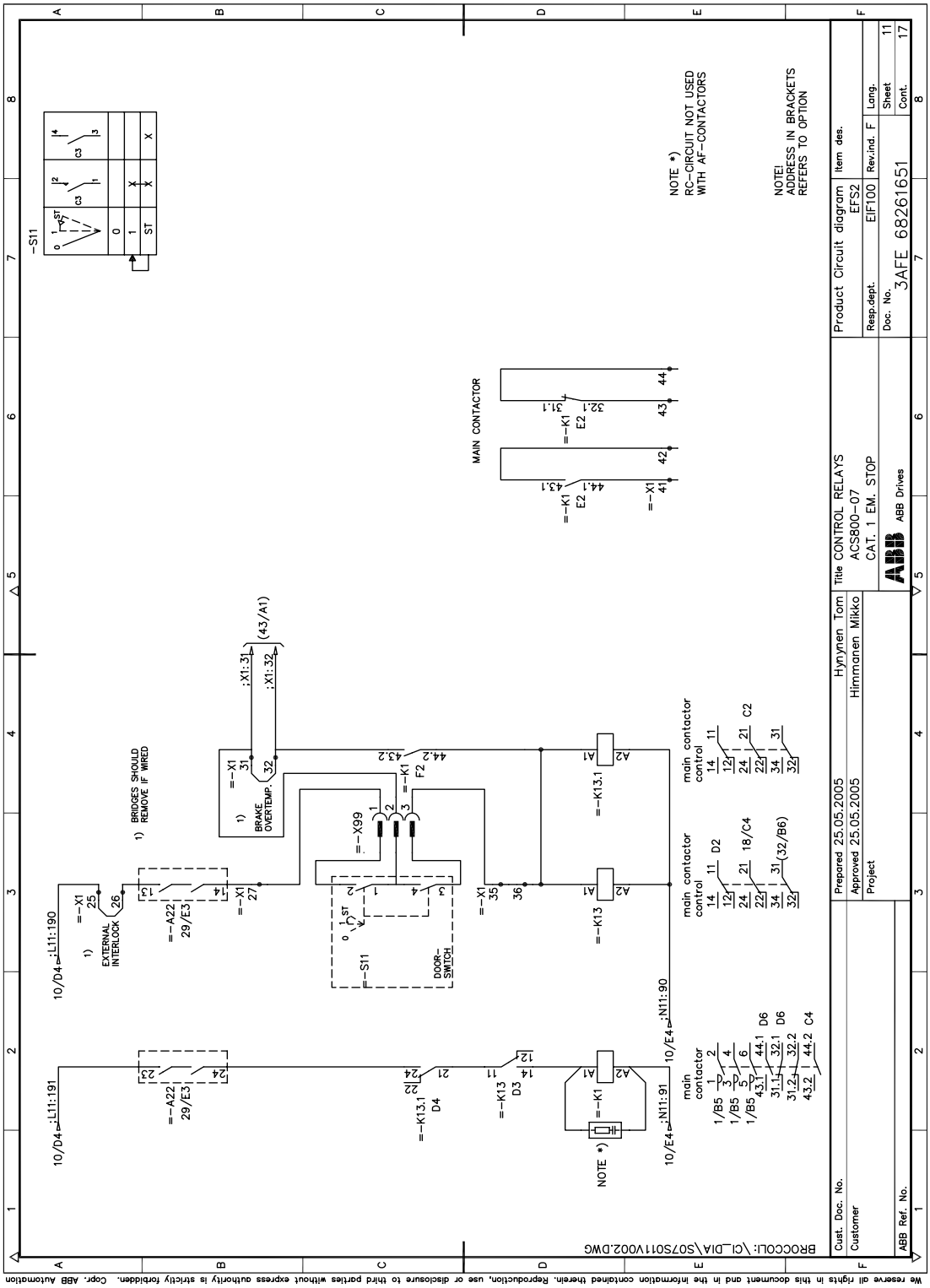
WARNING! Ensure that it is safe to apply input voltage:

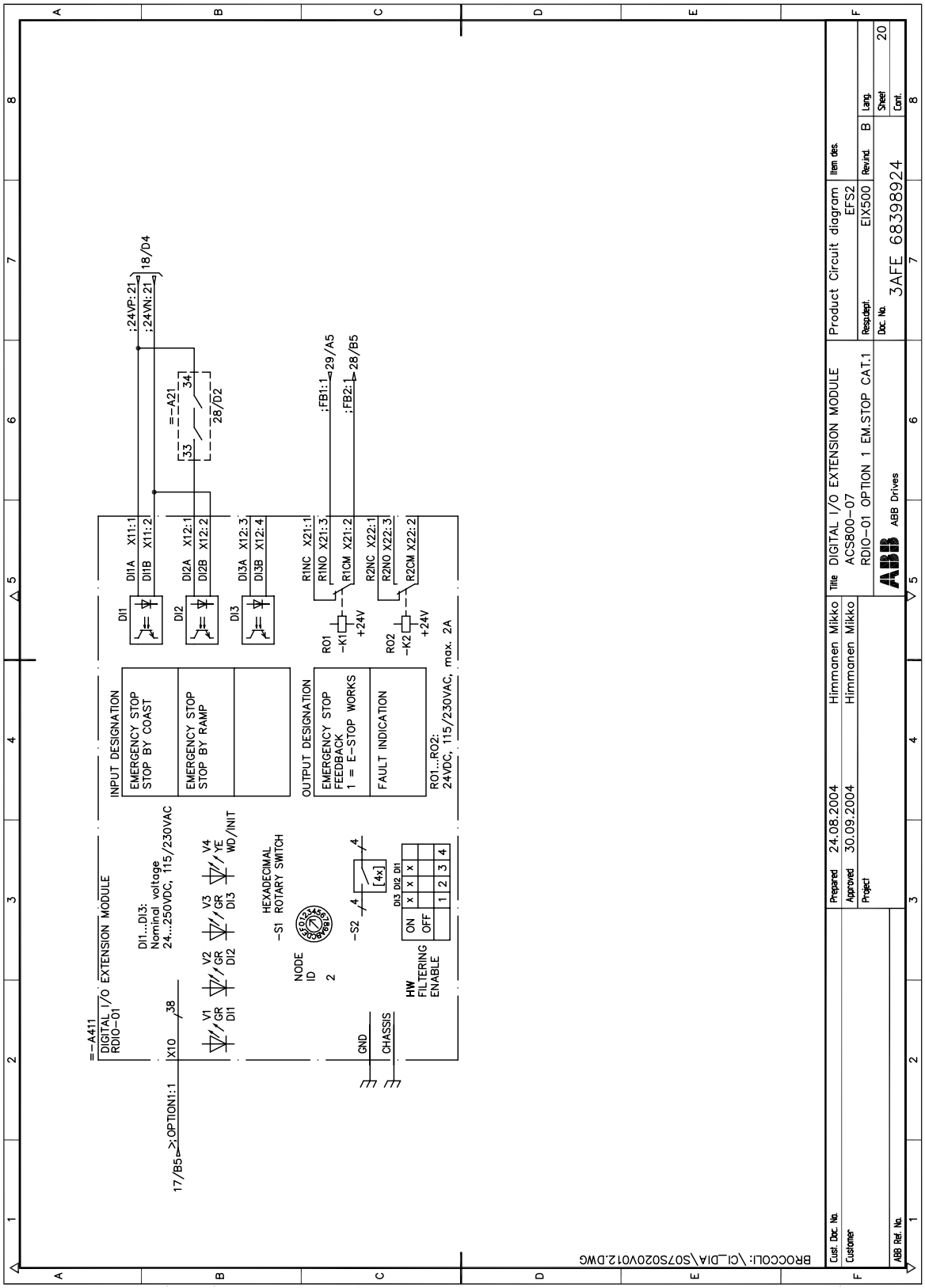
- It is safe to start the motor.
- All cabinet doors are closed.

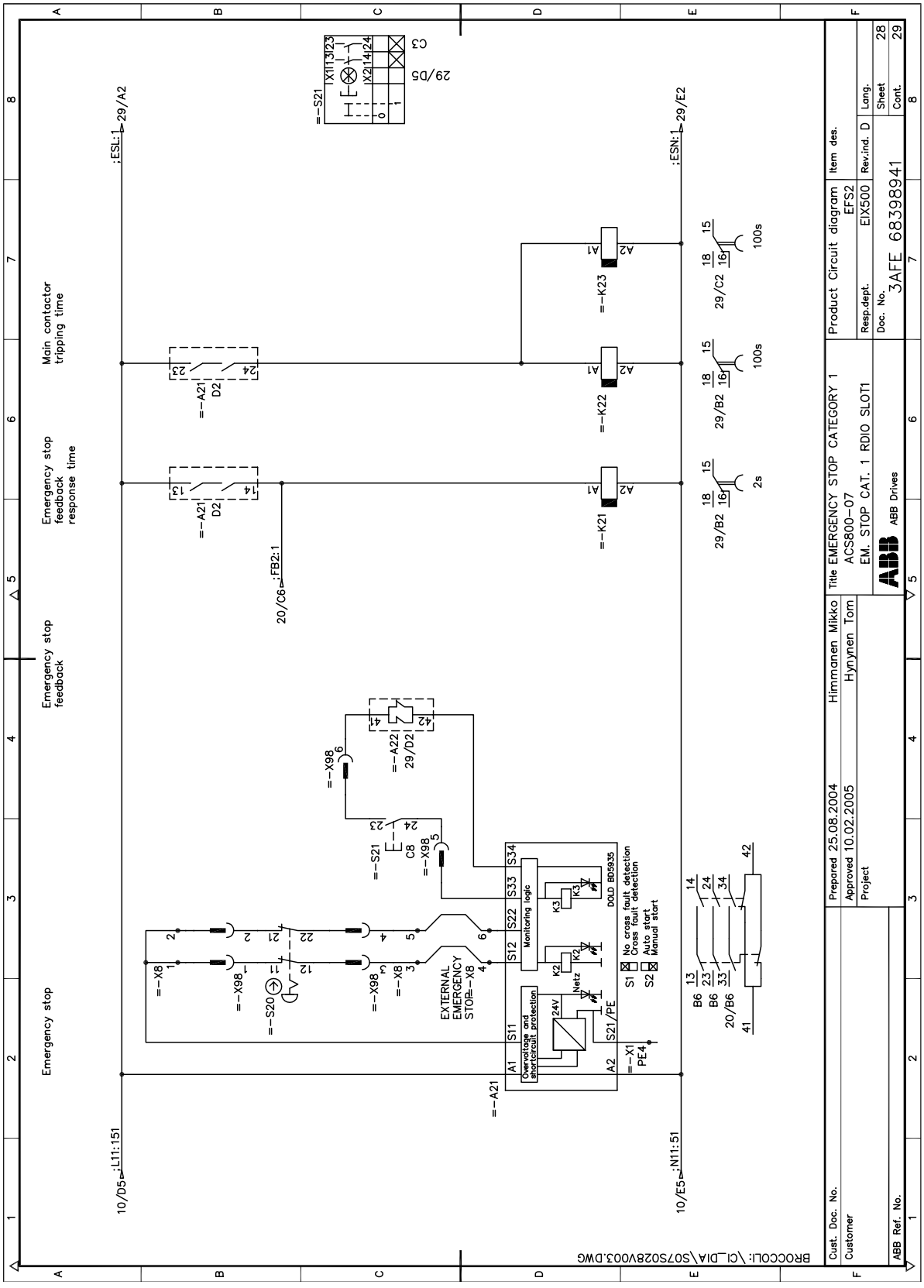
Step	What to do	What happens
1.	Turn the emergency stop push-button clockwise until the button releases.	The emergency stop deactivates.
2.	Press the blue-lit reset button to reset the emergency stop circuit.	The blue light goes out.
3.	Turn the manual operating switch on the front door to position S for 2 seconds.	The line contactor closes. The drive and motor become live.
4.	Give the drive a “start” command by the control panel (local control active), I/O or serial communication link (external control active). **Note:** The “start” command has to be removed once before the drive starts (according to IEC/EN 60204-1 a reset shall not initiate a restart).	The drive starts and accelerates to the speed defined by the active reference.

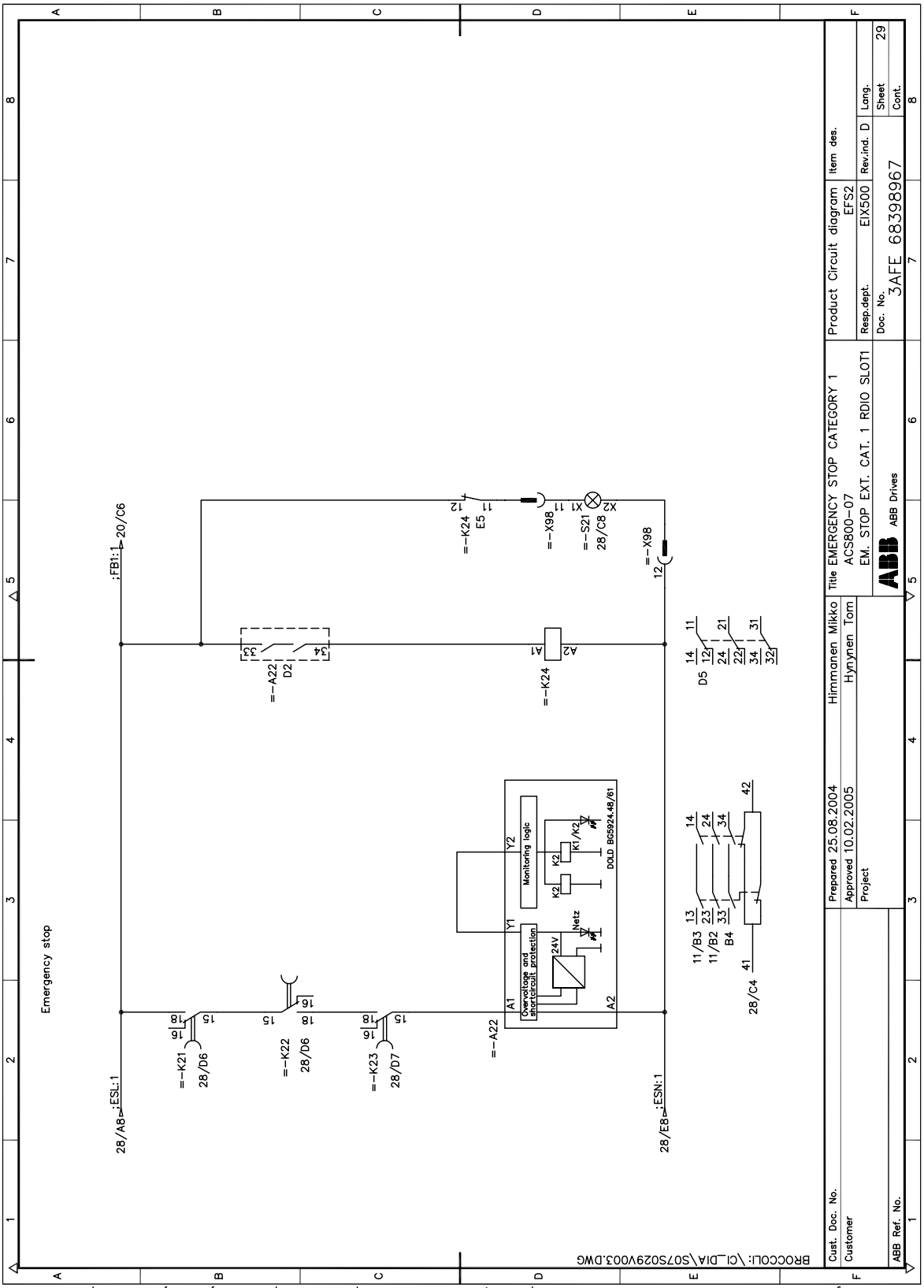
Circuit diagrams

Example circuit diagrams below show the factory wiring. See the circuit diagrams delivered with the drive for the actual wiring.




=-A411
DIGITAL I/O EXTENSION MODULE
RDIO-01
INPUT DESIGNATION
EMERGENCY STOP STOP BY COAST
EMERGENCY STOP STOP BY RAMP
OUTPUT DESIGNATION
EMERGENCY STOP FEEDBACK 1 = E-STOP WORKS
FAULT INDICATION
DI1...DI3: Nominal voltage 24...250VDC, 115/230VAC
HEXADECIMAL ROTARY SWITCH
-S1
NODE ID
HW FILTERING ENABLE
-S2
GND
CHASSIS
RO1...RO2: 24VDC, 115/230VAC, max. 2A
+24V
-K1
-K2
;24VP:21
;24VN:21
18/D4
28/D2
29/A5
28/B5
17/B5
OPTION1:1
X10
38
DI1A X11:1
DI1B X11:2
DI2A X12:1
DI2B X12:2
DI3A X12:3
DI3B X12:4
R1NC X21:1
R1NO X21:3
R1CM X21:2
R2NC X22:1
R2NO X22:3
R2CM X22:2
V1 GR DI1
V2 GR DI2
V3 GR DI3
V4 YE WD/INIT
Prepared 24.08.2004 Himmanen Mikko
Approved 30.09.2004 Himmanen Mikko
Project
Title DIGITAL I/O EXTENSION MODULE
ACS800-07
RDIO-01 OPTION 1 EM.STOP CAT.1
Product Circuit diagram
EFS2
Item des.
Respdept. EIX500
Revind. B
Lang
Sheet 20
Cont.
Doc. No. 3AFE 68398924
ABB Drives
Cust. Doc. No.
Customer
ABB Ref. No.
BROCCOLI:\CI_DIA\S07S020V012.DWG


Emergency stop
Emergency stop feedback
Emergency stop feedback response time
Main contactor tripping time
EXTERNAL EMERGENCY STOP
Monitoring logic
DOLD BD5935
No. cross fault detection
Cross fault detection
Auto start
Manual start
Overvoltage and shortcircuit protection
Netz
24V
Title EMERGENCY STOP CATEGORY 1
ACS800-07
EM. STOP CAT. 1 RDIO SLOT1
Product Circuit diagram
EFS2
Prepared 25.08.2004 Himmanen Mikko
Approved 10.02.2005 Hynynen Tom
Project
Resp.dept. EIX500
Doc. No. 3AFE 68398941
Rev.ind. D
Lang.
Sheet 28
Cont. 29
ABB Drives
Cust. Doc. No.
Customer
ABB Ref. No.
BROCCOLI: \CI_DIA\S07S028V003.DWG



Category 1 emergency stop for ACS800-07/17/37 (+Q952, R6i, R7i, n×R8i)

What this chapter contains

This chapter describes the category 1 emergency stop function (+Q952). The chapter deals with operation and user settings. Example circuit diagrams are included.

To which drives this chapter applies

The chapter applies to the following drives

Drive type	Frame sizes	Option codes and descriptions
ACS800-07	n×R8i	+F250**+Q952**+(D150 or D151) = line contactor + category 1 emergency stop + brake chopper (external resistor) or brake chopper and resistor
		+F250+F253+F260**+Q952**+(D150 or D151) = line contactor + switch disconnector + aR line fuses + category 1 emergency stop + brake chopper (external resistor) or brake chopper and resistor
		+F255+F260**+Q952**+(D150 or D151) = air circuit breaker + aR line fuses + category 1 emergency stop + brake chopper (external resistor) or brake chopper and resistor. Available only with 6-pulse input.
ACS800-17 ACS800-37	R6i, R7i, n×R8i	+F250+F253**+Q952** = line contactor + switch disconnector + category 1 emergency stop
	2×R8i and up	+F255+F260**+Q952** = air circuit breaker + aR line fuses + category 1 emergency stop

when equipped with one of the following application programs:

Option code	ACS800 application program
-	Standard
+N651	Master/Follower
+N666	Extruder Control
+N669	Centrifuge Control

The parameter references in the chapter apply to ACS800 Standard Application Program. For the other application programs, check for correct parameters.

Description

Category 1 definition

IEC/EN 60204-1 defines category 1 emergency stop as a controlled stop with the power to machine actuators available to achieve the stop and then removal of power when the stop is achieved.

Implementation of category 1 stop in ACS800 in brief

After the emergency stop command has been given, the drive first decelerates the motor to a standstill according to a preset ramp time. Then, the line contactor or air circuit breaker is switched off.

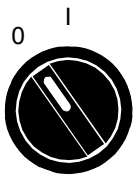
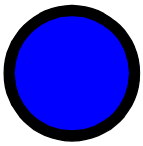
Applicable standards

The emergency stop complies with the following standards:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”
- EN 418:1992 “Safety of machinery – Emergency stop equipment, functional aspects – Principles for design”
- EN ISO 12100:2003 “Safety of machinery – Basic concepts, general principles for design”
- EN 954-1:1996 “Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design”
- EN ISO 13849-2:2003 “Safety of machinery – Safety-related parts of control systems – Part 2: Validation”.

Components of the emergency stop function

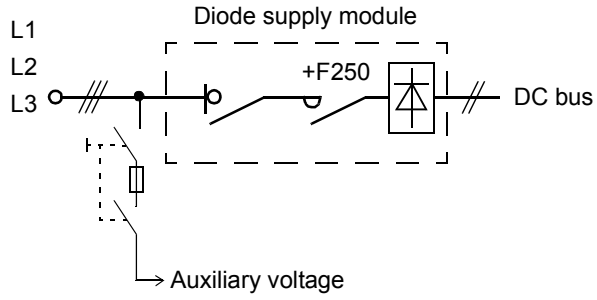
The following pieces of equipment are included:

<table>
<tr><td colspan="3">Line contactor or air circuit breaker. See Alternative drive configurations on page 54.</td></tr>
<tr><td colspan="3">Operating switch</td></tr>
<tr><td>Position</td><td>ACS800-07</td><td>ACS800-17/37</td></tr>
<tr><td></td><td> 
</td><td> 
</td></tr>
<tr><td>0</td><td>The supply rectifier stops and the line contactor or air circuit breaker opens.</td><td>Cooling fans are disabled. (Other auxiliary voltages are on.)</td></tr>
<tr><td>I</td><td>The supply rectifier operates and the inverter(s) are powered if the switch has been turned from position 0 to S for 2 seconds.</td><td>The drive is ready to start.</td></tr>
<tr><td>S</td><td>Turning the operating switch from position 0 to S for 2 seconds starts the supply rectifier and fans.</td><td>-</td></tr>
<tr><td colspan="3">Emergency stop push-button
 
</td></tr>
<tr><td colspan="3">Reset push-button
SUPPLY TRIPPED
RESET
 
Resets a drive fault. Illuminates in fault situations.</td></tr>
<tr><td colspan="3">Digital I/O Extension Module RDIO-01</td></tr>
<tr><td colspan="3">Safety relays (A21, A22), feedback response time relay (K21) and tripping time relays (K22 and K23)</td></tr>
<tr><td colspan="3">ACS800-07: braking device (a chopper with resistors) if needed to ensure that sufficient braking capacity is available</td></tr>
<tr><td colspan="3">AIMA-01 I/O Module Adapter if option slots 1 and 2 on the RMIO board are reserved.</td></tr>
</table>

Alternative drive configurations

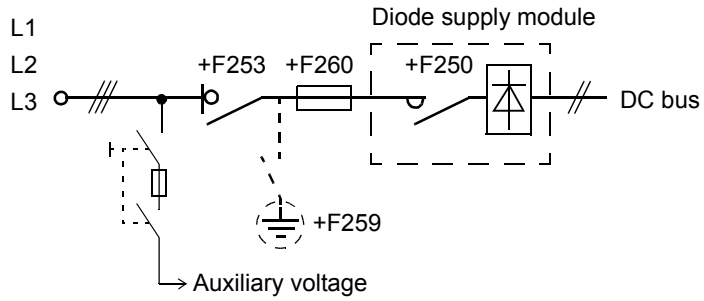
ACS800-07 with line contactor

Alternative 1



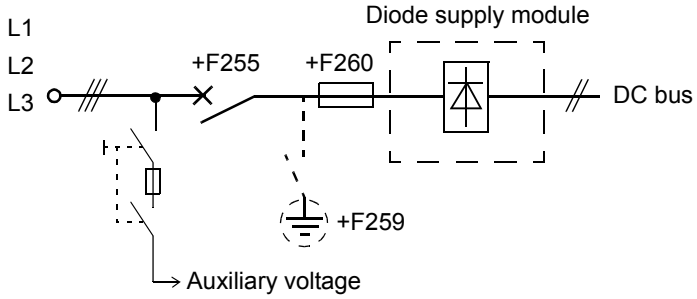
+F250 Line contactor

Alternative 2



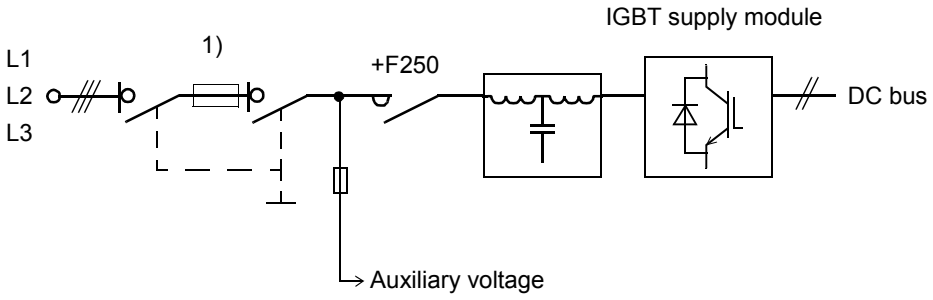
+F250 Line contactor
+F253 Switch-disconnector
+F259 Earthing switch
+F260 aR line fuses

ACS800-07 with air circuit breaker



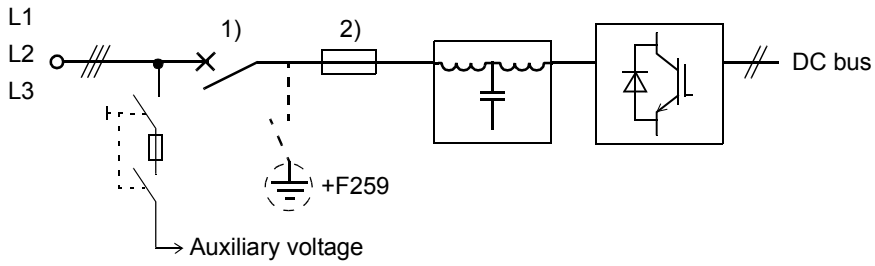
+F255 Air circuit breaker
+F259 Earthing switch
+F260 aR line fuses

ACS800-17 and ACS800-37 frame sizes R6i, R7i and R8i



1) Switch fuse
+F250 Line contactor (optional in frame size R6i)

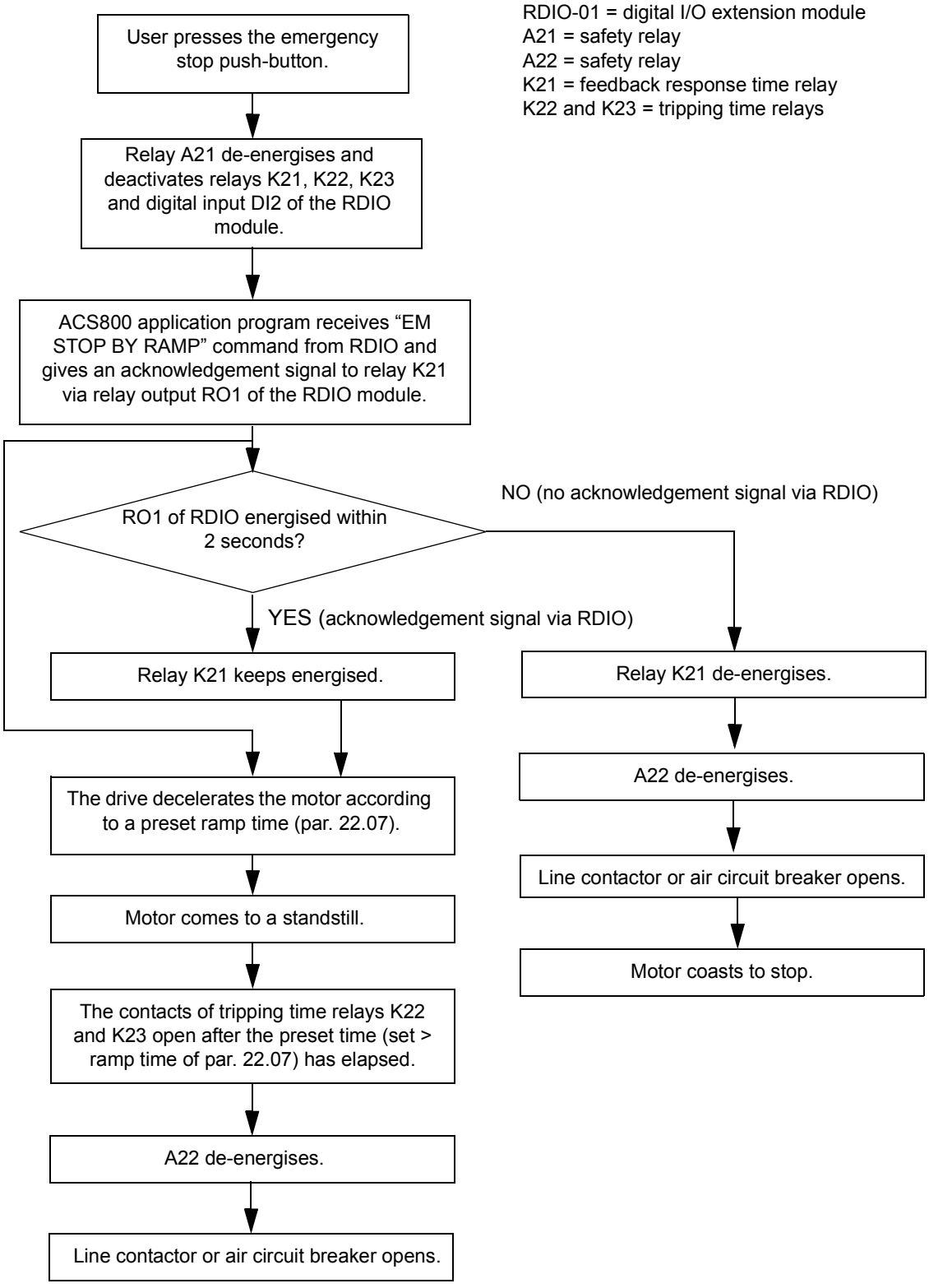
ACS800-17 and ACS800-37 with air circuit breaker (frame sizes 2×R8i and up)



1) Air circuit breaker
+F259 Earthing switch
2) aR line fuses

Operation

The category 1 emergency stop, i.e. controlled emergency stop, operates as follows.



Wiring

One emergency stop push-button is installed on the cabinet door and wired to the drive at the factory. Wire the additional emergency stop push-buttons to terminal block X8 (terminals 3, 4, 5 and 6) inside the drive cabinet. See the circuit diagram delivered with the drive.

Start-up

Digital I/O Extension Module RDIO-01 is configured as an emergency stop signal interface at the factory. In case optional module slots 1 and 2 on the RMIO board (or RDCU control unit) are reserved, the digital I/O extension module is placed on the I/O Module Adapter AIMA-01.

User settings are listed below.

Set the ramp time by parameter 22.07 EM STOP RAMP TIME according to the application requirements. If the ramp time is changed, check that relays K22 and K23 have slightly longer delay times.
If the AIMA-01 module adapter is in use, check that its node address is the same as in the circuit diagram delivered with the drive. See *AIMA-01 I/O Module Adapter User's Manual* [3AFE64661442 (English)].

Use

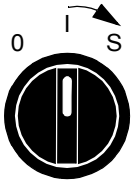
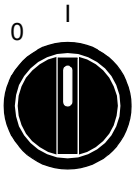
How to activate the emergency stop

Push the emergency stop push-button.	The emergency stop activates and the button locks in the "ON" position.

How to deactivate the emergency stop

WARNING! Ensure that it is safe to apply input voltage:

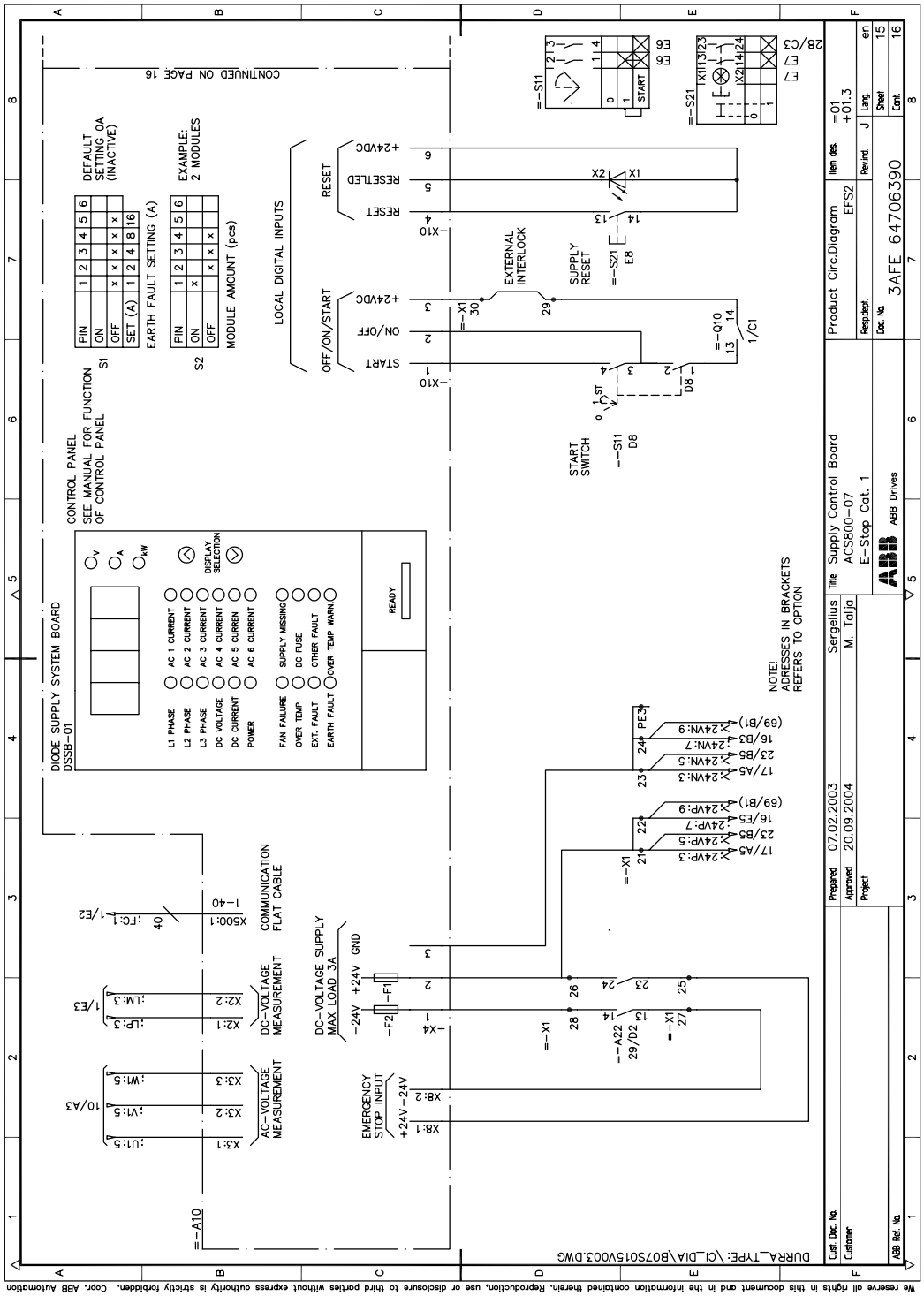
- It is safe to start the motor.
- All cabinet doors are closed.

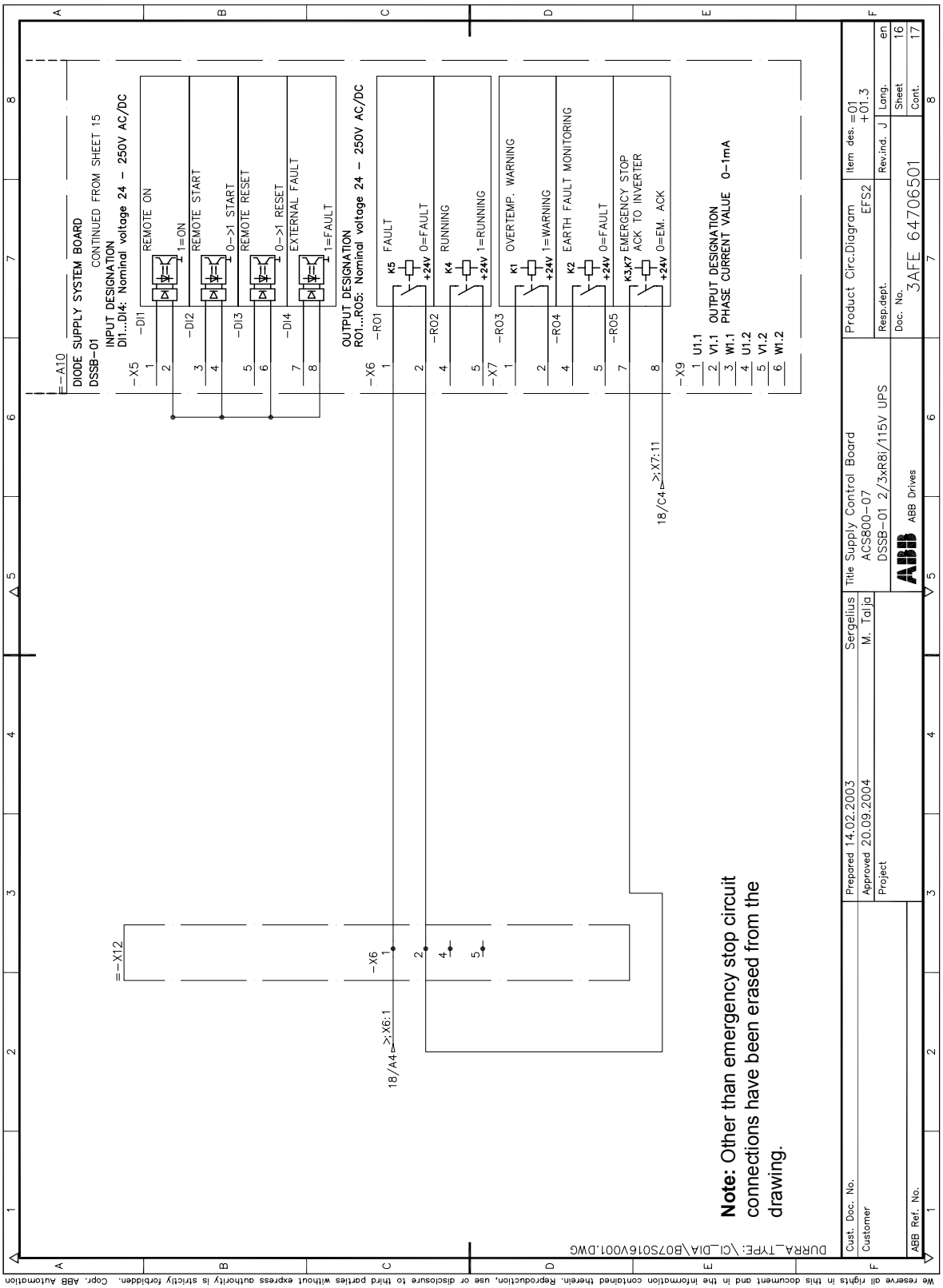
Step	What to do	What happens
1.	Turn the emergency stop push-button clockwise until the button releases.	The emergency stop deactivates.
2.	Press the blue-lit reset button to reset the emergency stop circuit.	The blue light goes out.
3.	ACS800-07: Turn the manual operating switch on the front door to position S for 2 seconds.  ACS800-17/37: The manual operating switch on the front door in position I. 	ACS800-07: The line contactor or air circuit breaker closes. The drive and motor become live. ACS800-17/37: The drive is ready to start.
4.	Give the drive a “start” command by the control panel (local control active), I/O or serial communication link (external control active). **Note:** The “start” command has to be removed once before the drive starts (according to IEC/EN 60204-1 a reset shall not initiate a restart).	ACS800-07: The drive starts and accelerates to the speed defined by the active reference. ACS800-17/37: The line contactor or air circuit breaker closes. The line-side converter charges. The motor-side converter and motor become live. The drive starts and accelerates to the speed defined by the active reference.

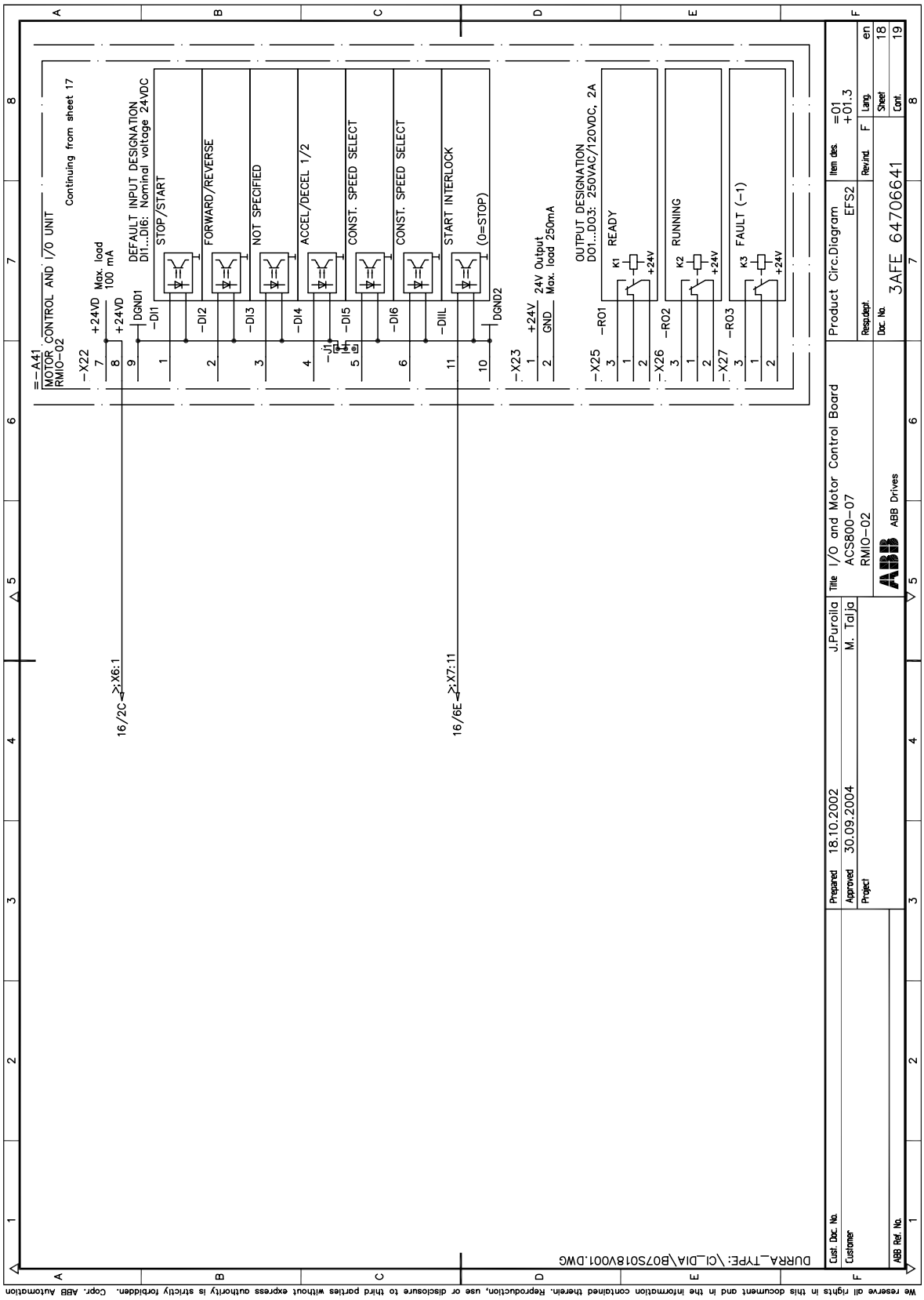
Circuit diagrams

ACS800-07 units with line contactor (+F250+Q952)

Example circuit diagrams below show the factory wiring. See the circuit diagrams delivered with the drive for the actual wiring.




DIODE SUPPLY SYSTEM BOARD
DSSB-01
CONTINUED FROM SHEET 15
INPUT DESIGNATION
DI1...DI4: Nominal voltage 24 – 250V AC/DC
OUTPUT DESIGNATION
RO1...RO5: Nominal voltage 24 – 250V AC/DC
REMOTE ON
1=ON
REMOTE START
0->1 START
REMOTE RESET
0->1 RESET
EXTERNAL FAULT
1=FAULT
FAULT
0=FAULT
RUNNING
1=RUNNING
OVERTEMP. WARNING
1=WARNING
EARTH FAULT MONITORING
EMERGENCY STOP
ACK TO INVERTER
0=EM. ACK
OUTPUT DESIGNATION
PHASE CURRENT VALUE 0–1mA
Note: Other than emergency stop circuit connections have been erased from the drawing.
Product Circ.Diagram
EFS2
3AFE 64706501
Title Supply Control Board
ACS800–07
DSSB–01 2/3xR8i/115V UPS
ABB Drives
Sergelius
M. Talja
Prepared 14.02.2003
Approved 20.09.2004
Project
Cust. Doc. No.
Customer
ABB Ref. No.


=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
+24VD
DGND1
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
Max. load 100 mA
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
STOP/START
FORWARD/REVERSE
NOT SPECIFIED
ACCEL/DECEL 1/2
CONST. SPEED SELECT
CONST. SPEED SELECT
START INTERLOCK
(0=STOP)
-J1
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
K1
READY
+24V
-X26
-RO2
K2
RUNNING
+24V
-X27
-RO3
K3
FAULT (-1)
+24V
16/2C
-X6:1
16/6E
-X7:11
DURRA_TYPE:\CI_DIA\B07501BV001.DWG
Prepared 18.10.2002 J.Puroila
Approved 30.09.2004 M. Talja
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title I/O and Motor Control Board
ACS800-07
RMIO-02
ABB Drives
Product Circ.Diagram
EFS2
Item des. =01
+01.3
Respdept.
Doc. No. 3AFE 64706641
Revind. F
Lang. en
Sheet 18
Cont. 19
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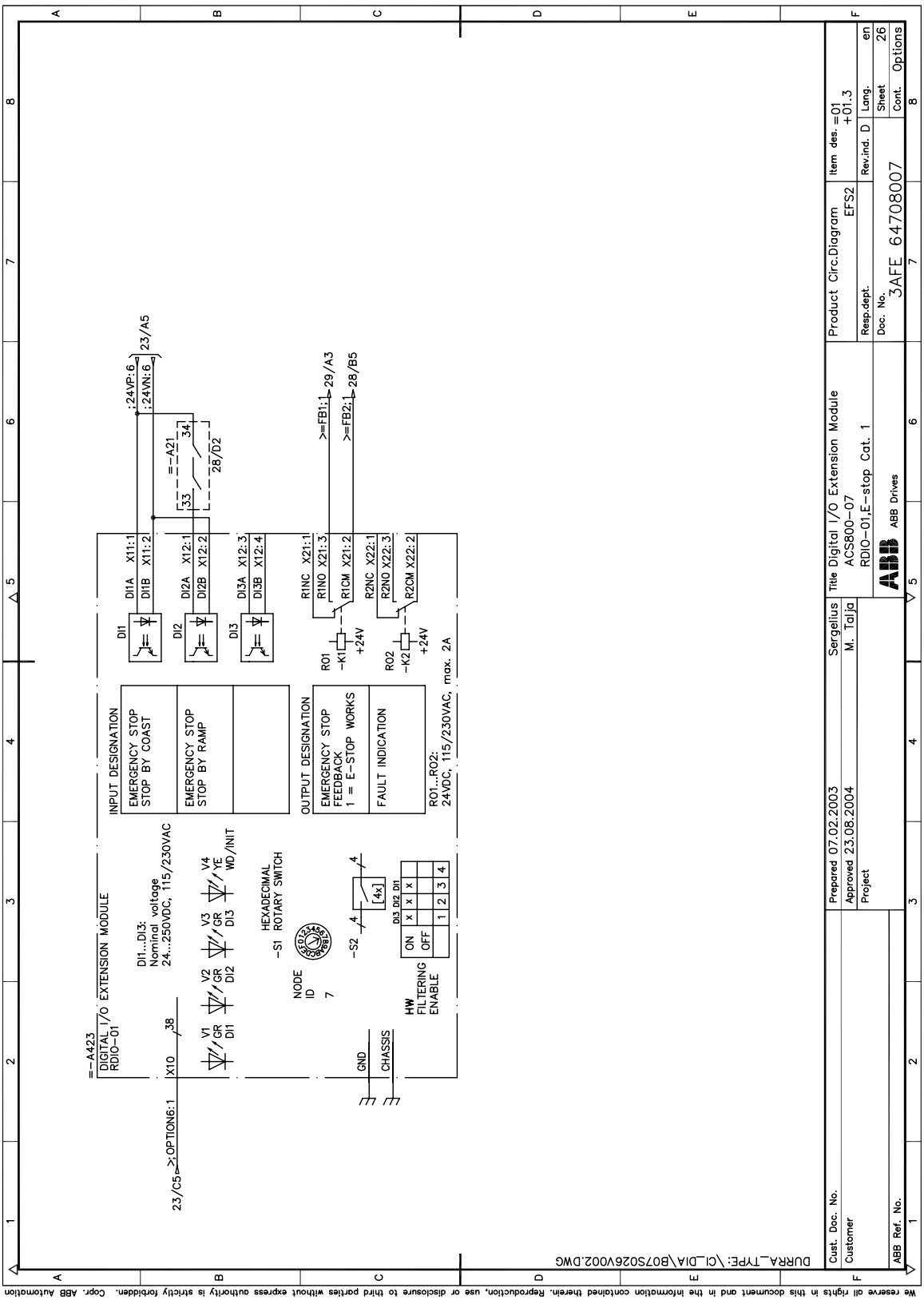
=-A423
DIGITAL I/O EXTENSION MODULE
RDIO-01
X10
38
23/C5
>:OPTION6:1
DI1...DI3:
Nominal voltage
24...250VDC, 115/230VAC
V1 GR DI1
V2 GR DI2
V3 GR DI3
V4 YE WD/INIT
HEXADECIMAL
ROTARY SWITCH
-S1
NODE
ID
7
-S2
4
4x
GND
CHASSIS
HW
FILTERING
ENABLE
DI3 DI2 DI1
ON x x x
OFF 1 2 3 4
INPUT DESIGNATION
EMERGENCY STOP
STOP BY COAST
EMERGENCY STOP
STOP BY RAMP
DI1
DI2
DI3
DI1A X11:1
DI1B X11:2
DI2A X12:1
DI2B X12:2
DI3A X12:3
DI3B X12:4
>:24VP:6
>:24VN:6
23/A5
=-A21
33
34
28/D2
OUTPUT DESIGNATION
EMERGENCY STOP
FEEDBACK
1 = E-STOP WORKS
FAULT INDICATION
R1NC X21:1
R1NO X21:3
R1COM X21:2
R2NC X22:1
R2NO X22:3
R2COM X22:2
>=FB1:1
29/A3
>=FB2:1
28/B5
RO1
-K1
+24V
RO2
-K2
+24V
RO1...RO2:
24VDC, 115/230VAC, max. 2A
DURA_TYPE:\CI_DIA\B07S026V002.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 07.02.2003
Sergelius
Approved 23.08.2004
M. Talja
Project
Title Digital I/O Extension Module
ACS800-07
RDIO-01,E-stop Cat. 1
ABB Drives
Product Circ.Diagram
EFS2
Resp.dept.
Doc. No.
3AFE 64708007
Item des. =01
+01.3
Rev.ind. D
Lang. en
Sheet 26
Cont. Options
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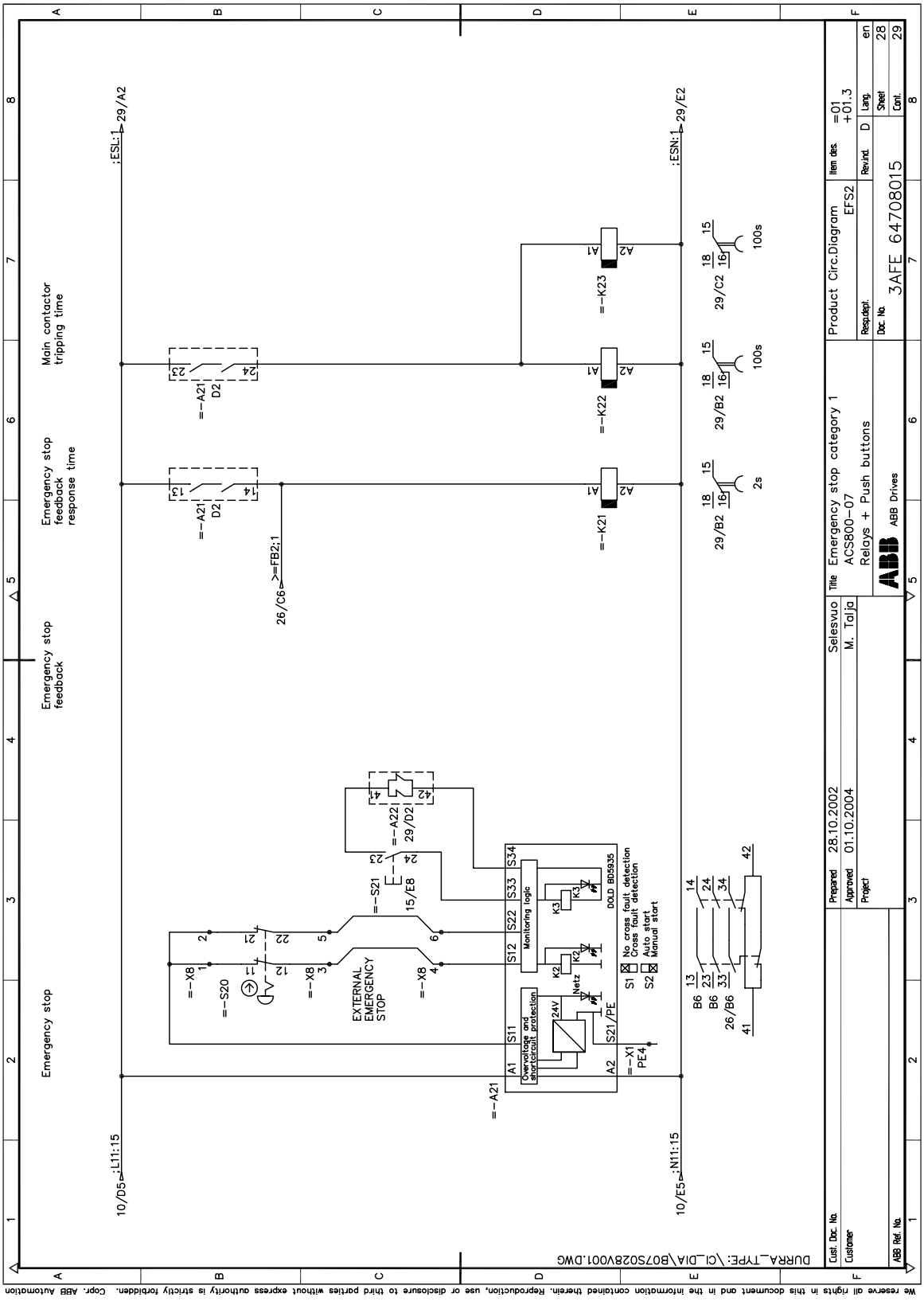
Emergency stop
Emergency stop feedback
Emergency stop feedback response time
Main contactor tripping time
EXTERNAL EMERGENCY STOP
=-S20
=-X8
=-S21
15/E8
=-A22
29/D2
=-A21
Overvoltage and overcurrent protection
Monitoring logic
DOLD BD5935
No cross fault detection
Cross fault detection
Auto start
Manual start
Netz
24V
S21/PE
=-X1
PE4
=-K21
=-K22
=-K23
29/B2
29/C2
100s
2s
26/C6
>=FB2:1
10/D5
:L11:15
10/E5
:N11:15
:ESL:1
29/A2
:ESN:1
29/E2
B6
26/B6
41
42
Product Circ.Diagram
EFS2
Item des. =01 +01.3
Emergency stop category 1
ACS800-07
Relays + Push buttons
ABB Drives
Doc. No. 3AFE 64708015
Revind. D
Lang. en
Sheet 28
Cont. 29
Prepared 28.10.2002 Selesvuo
Approved 01.10.2004 M. Talja
Project
Cust. Doc. No.
Customer
ABB Ref. No.
DURRA_TYPE:\CI_DIA\B07S028V001.DWG
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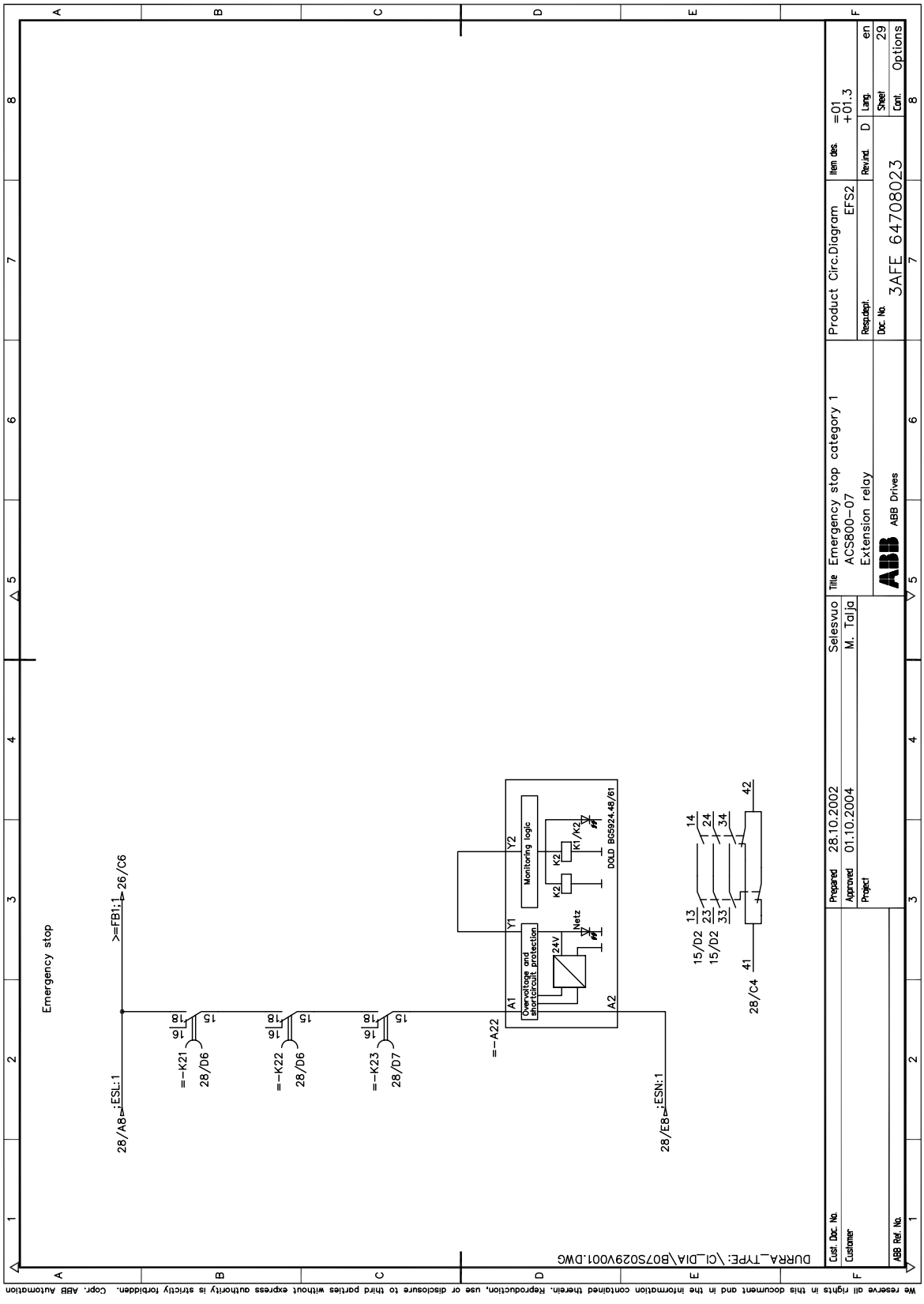
Emergency stop
>=FB1:1
26/C6
28/A8
:ESL:1
=-K21
28/D6
=-K22
28/D6
=-K23
28/D7
=-A22
Overvoltage and electrical protection
Monitoring logic
Y1
Y2
A1
A2
24V
Netz
K2
K1/K2
DOLD BG5924.48/61
15/D2
13
23
33
14
24
34
42
41
28/C4
28/E8
:ESN:1
DURA_TYPE:\CI_DIA\B07S029V001.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 28.10.2002
Approved 01.10.2004
Project
Selesvuo
M. Talja
Title Emergency stop category 1
ACS800-07
Extension relay
ABB Drives
Product Circ.Diagram
EFS2
Item des. =01
+01.3
Doc. No. 3AFE 64708023
Revind. D
Lang. en
Sheet 29
Cont. Options
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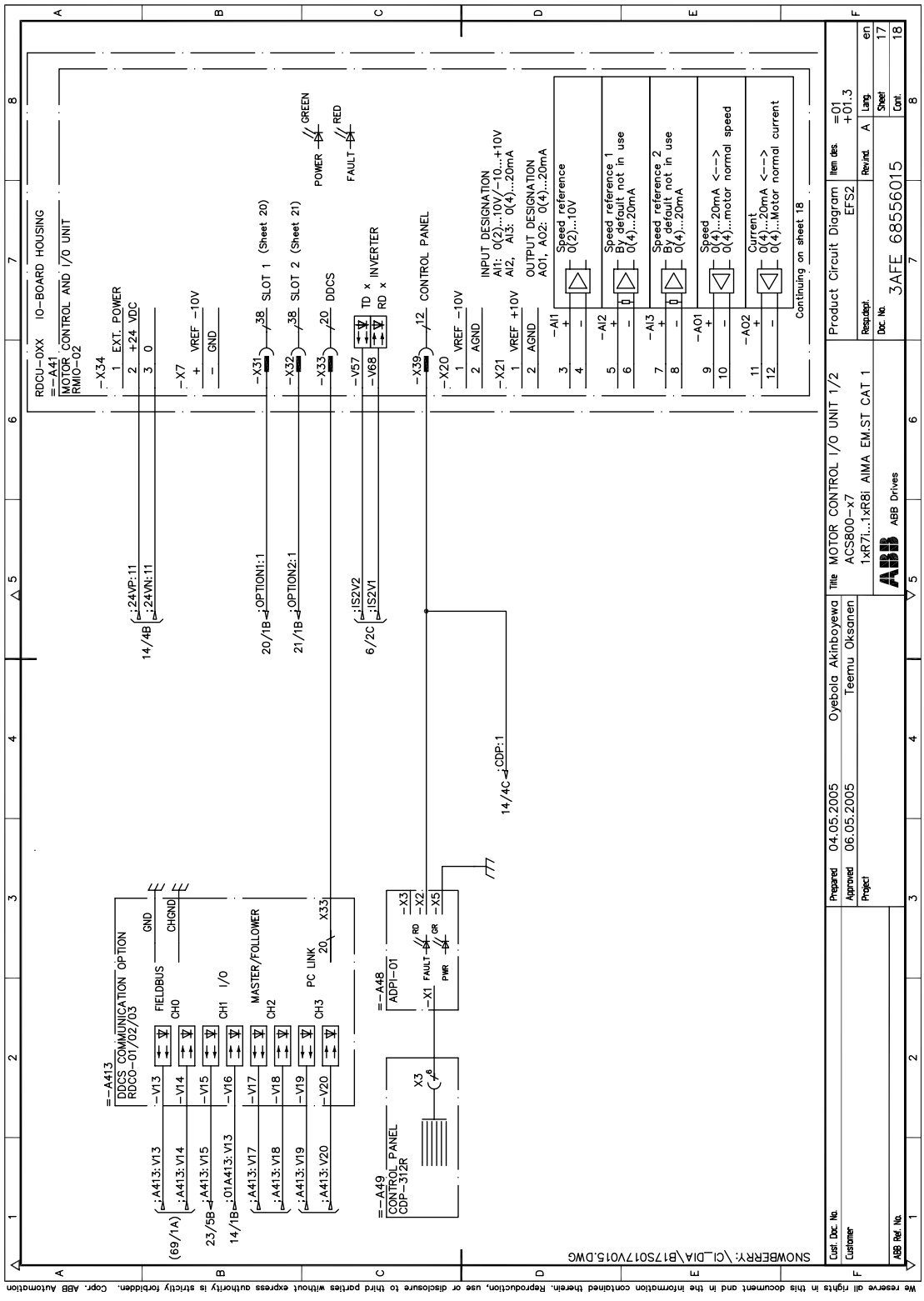
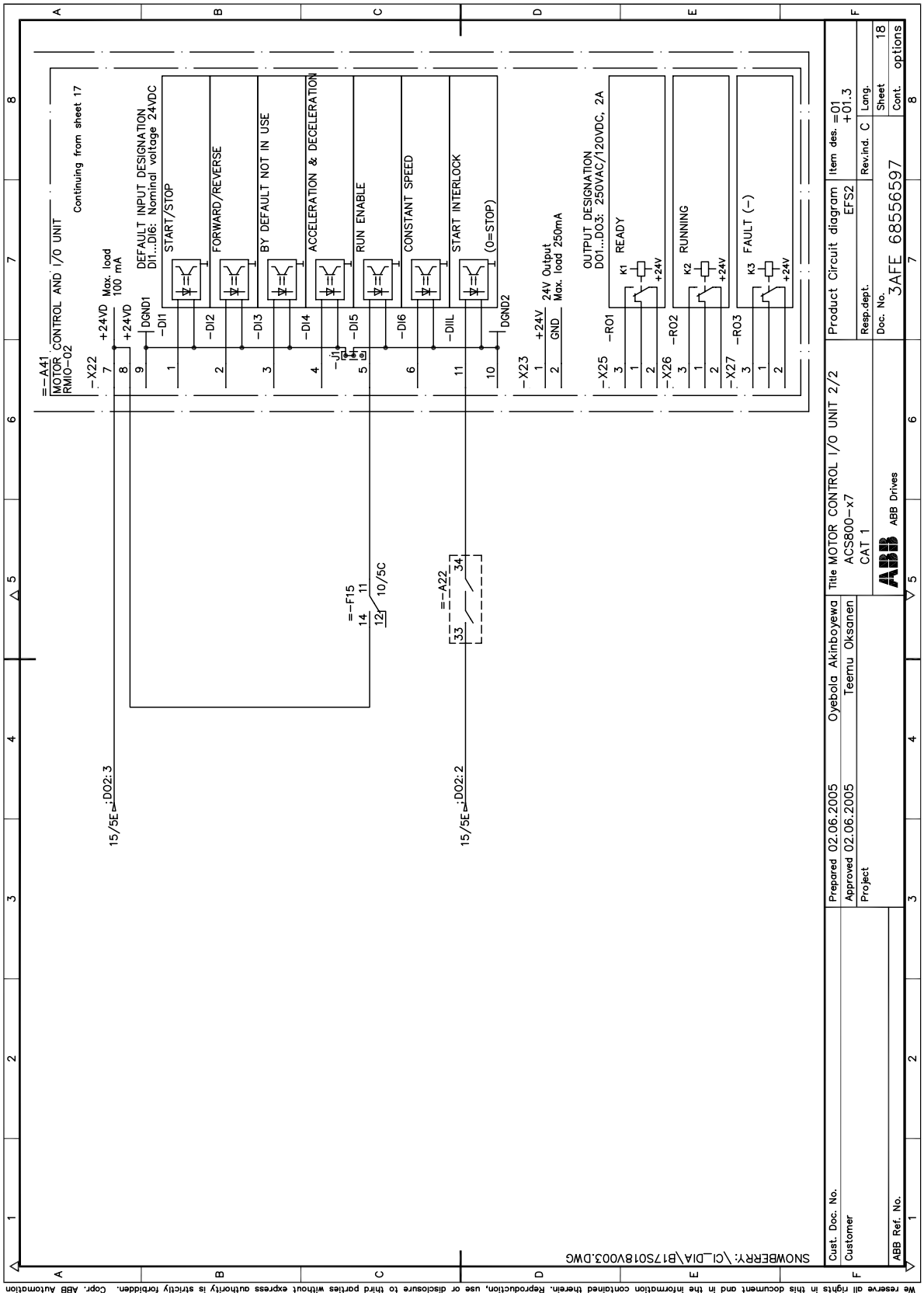
ACS800-17 and ACS800-37 units with line contactor (+F250+Q952)

Example circuit diagrams below show the factory wiring. See the circuit diagrams delivered with the drive for the actual wiring.




=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
+24VD
Max. load
100 mA
DGND1
-DI1
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
START/STOP
FORWARD/REVERSE
BY DEFAULT NOT IN USE
ACCELERATION & DECELERATION
RUN ENABLE
CONSTANT SPEED
START INTERLOCK
(0=STOP)
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
K1
READY
+24V
-X26
-RO2
K2
RUNNING
+24V
-X27
-RO3
K3
FAULT (-)
+24V
=-F15
14
11
12
10/5C
=-A22
33
34
15/5E
DO2:3
15/5E
DO2:2
SNOWBERRY:\CI_DIA\B17501BV003.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 02.06.2005 Oyebola Akinboyewa
Approved 02.06.2005 Teemu Oksanen
Project
Title MOTOR CONTROL I/O UNIT 2/2
ACS800-x7
CAT 1
ABB Drives
Product Circuit diagram
EFS2
Item des. =01 +01.3
Resp.dept.
Rev.ind. C
Lang.
Doc. No.
3AFE 68565597
Sheet 18
Cont. options
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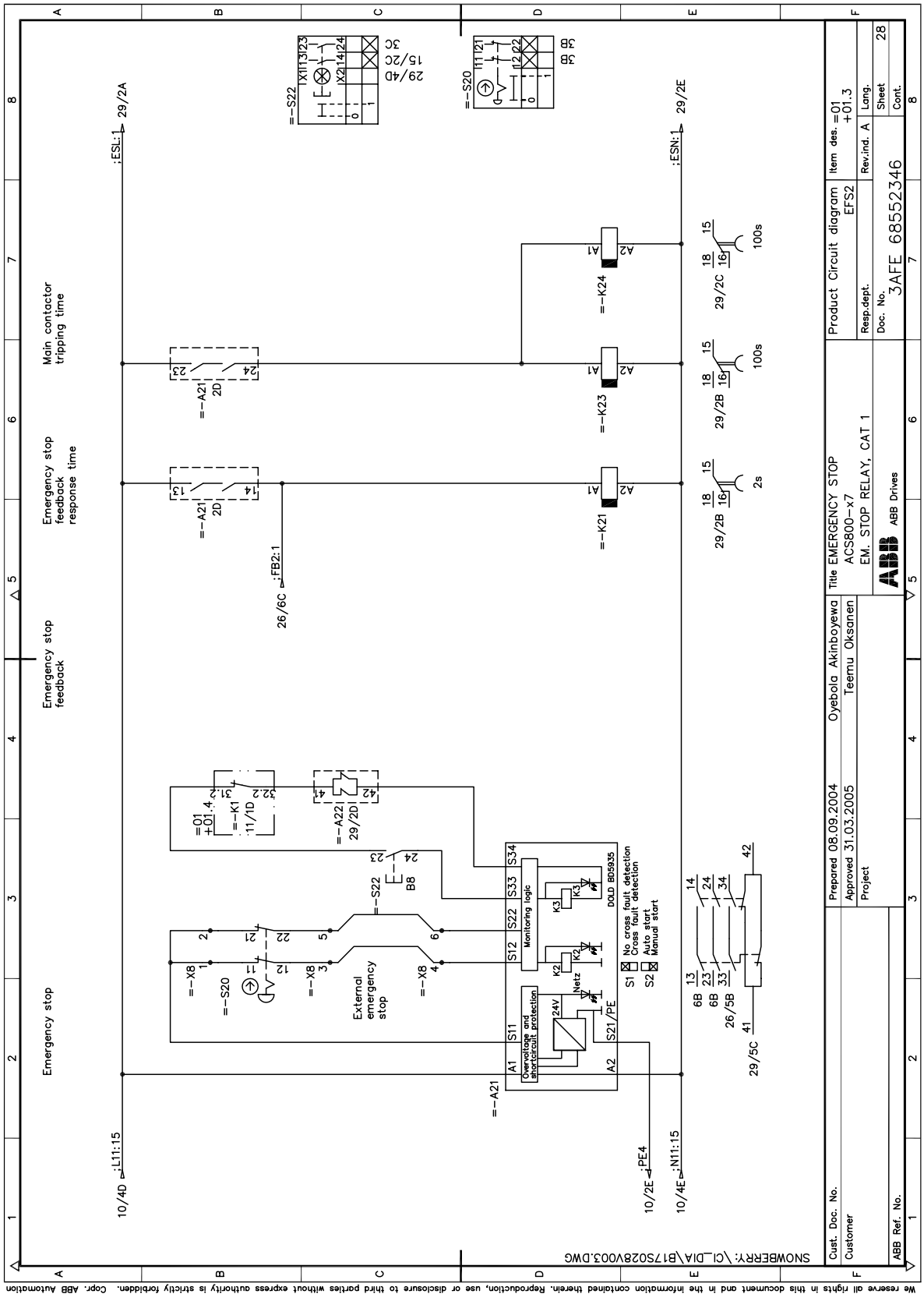

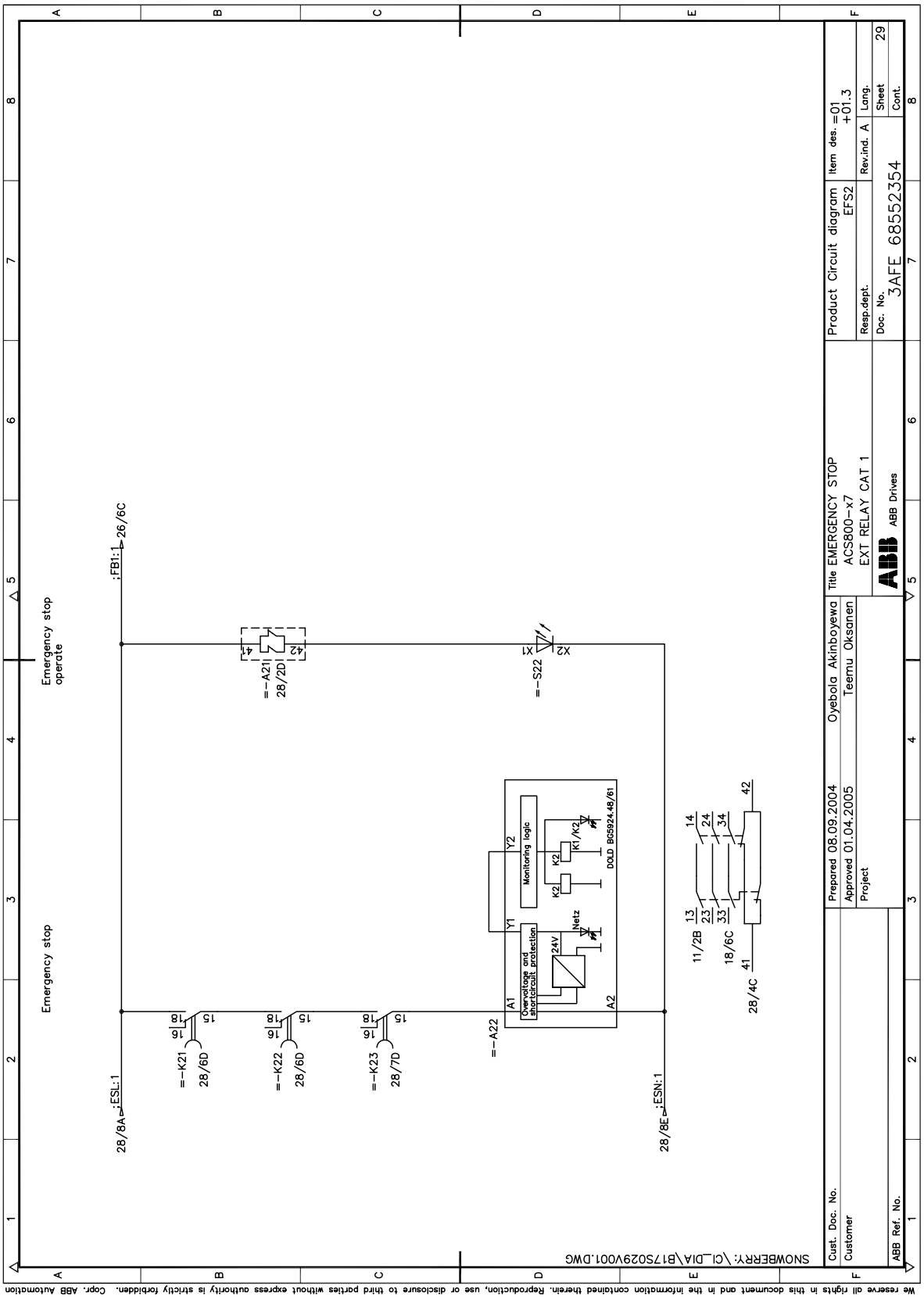
Emergency stop
operate
Emergency stop
;FB1:1
26/6C
=-A21
28/2D
=-S22
=-A22
=-K21
28/6D
=-K22
28/6D
=-K23
28/7D
28/8A
;ESL:1
28/8E
;ESN:1
11/2B
18/6C
28/4C
Overvoltage and short-circuit protection
Monitoring logic
24V
Netz
DOLD BG5924.48/61
Title EMERGENCY STOP
ACS800-x7
EXT RELAY CAT 1
ABB Drives
Product Circuit diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Rev.ind. A
Lang.
Doc. No.
3AFE 68552354
Sheet 29
Cont.
Prepared 08.09.2004 Oyebola Akinboyewa
Approved 01.04.2005 Teemu Oksanen
Project
Cust. Doc. No.
Customer
ABB Ref. No.
SNOWBERRY:\CI_DIA\B17502V001.DWG
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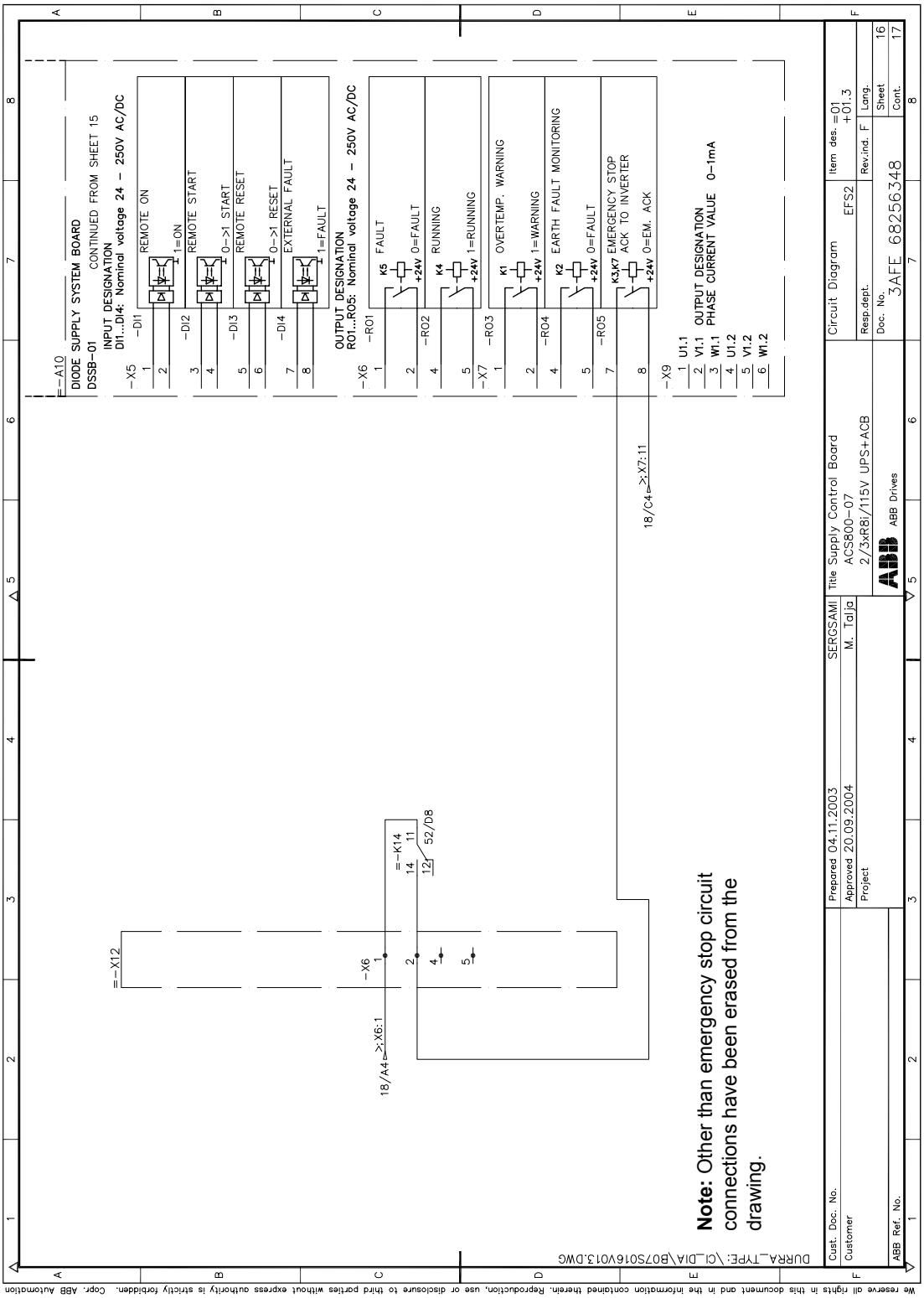
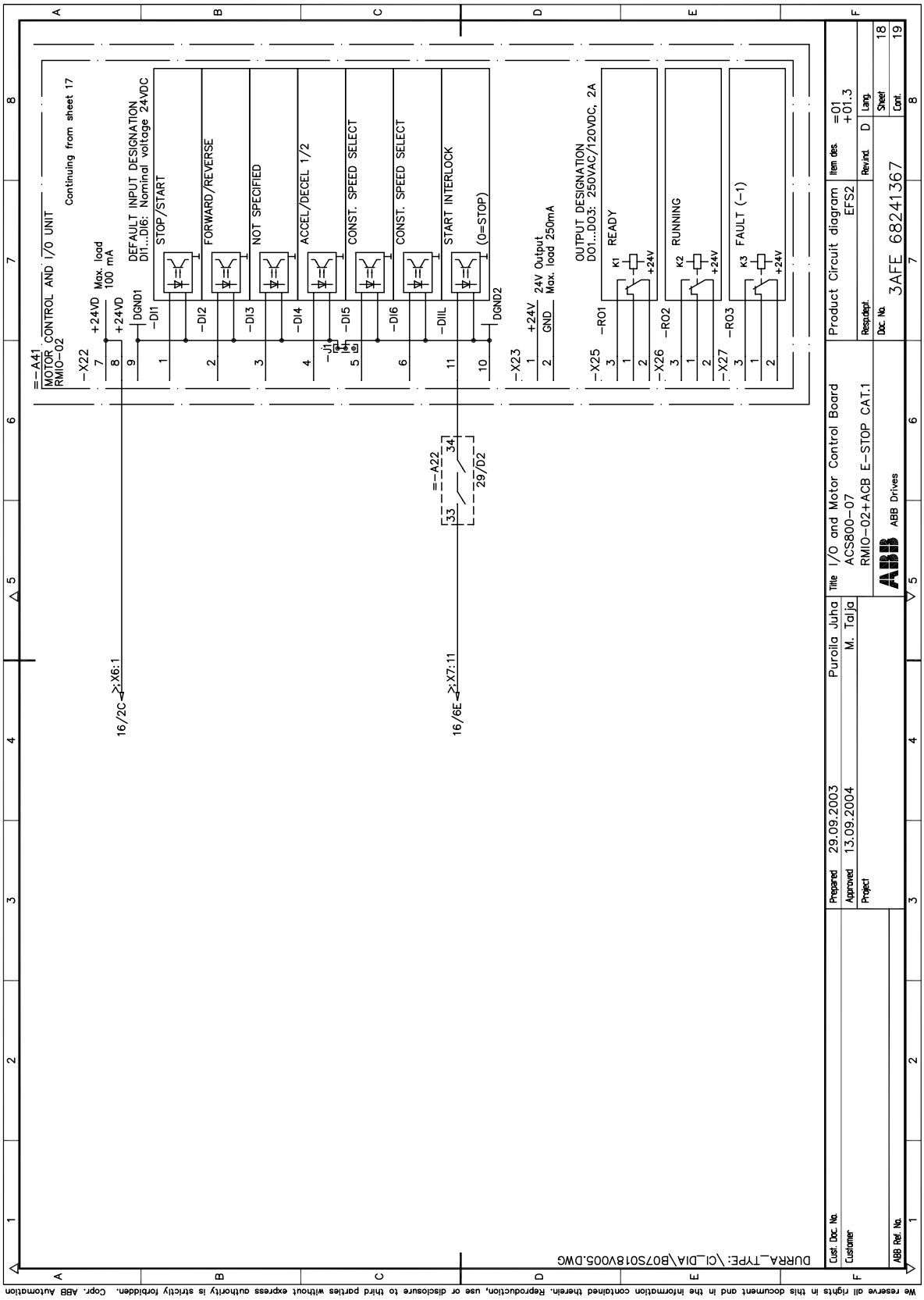
ACS800-07 units with air circuit breaker (+F255+Q952)

Example circuit diagrams below show the factory wiring. See the circuit diagrams delivered with the drive for the actual wiring.




=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
+24VD
DGND1
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
Max. load
100 mA
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
STOP/START
FORWARD/REVERSE
NOT SPECIFIED
ACCEL/DECEL 1/2
CONST. SPEED SELECT
CONST. SPEED SELECT
START INTERLOCK
(0=STOP)
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
K1
READY
+24V
-X26
-RO2
K2
RUNNING
+24V
-X27
-RO3
K3
FAULT (-1)
+24V
=-A22
33
34
29/D2
16/2C
>X6:1
16/6E
>X7:11
DURRA_TYPE:\CI_DIA\B07S018V005.DWG
Prepared 29.09.2003 Purola Juha
Approved 13.09.2004 M. Talja
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title I/O and Motor Control Board
ACS800-07
RMIO-02+ACB E-STOP CAT.1
ABB Drives
Product Circuit diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Revind. D
Lang.
Doc. No. 3AFE 68241367
Sheet 18
Cont. 19
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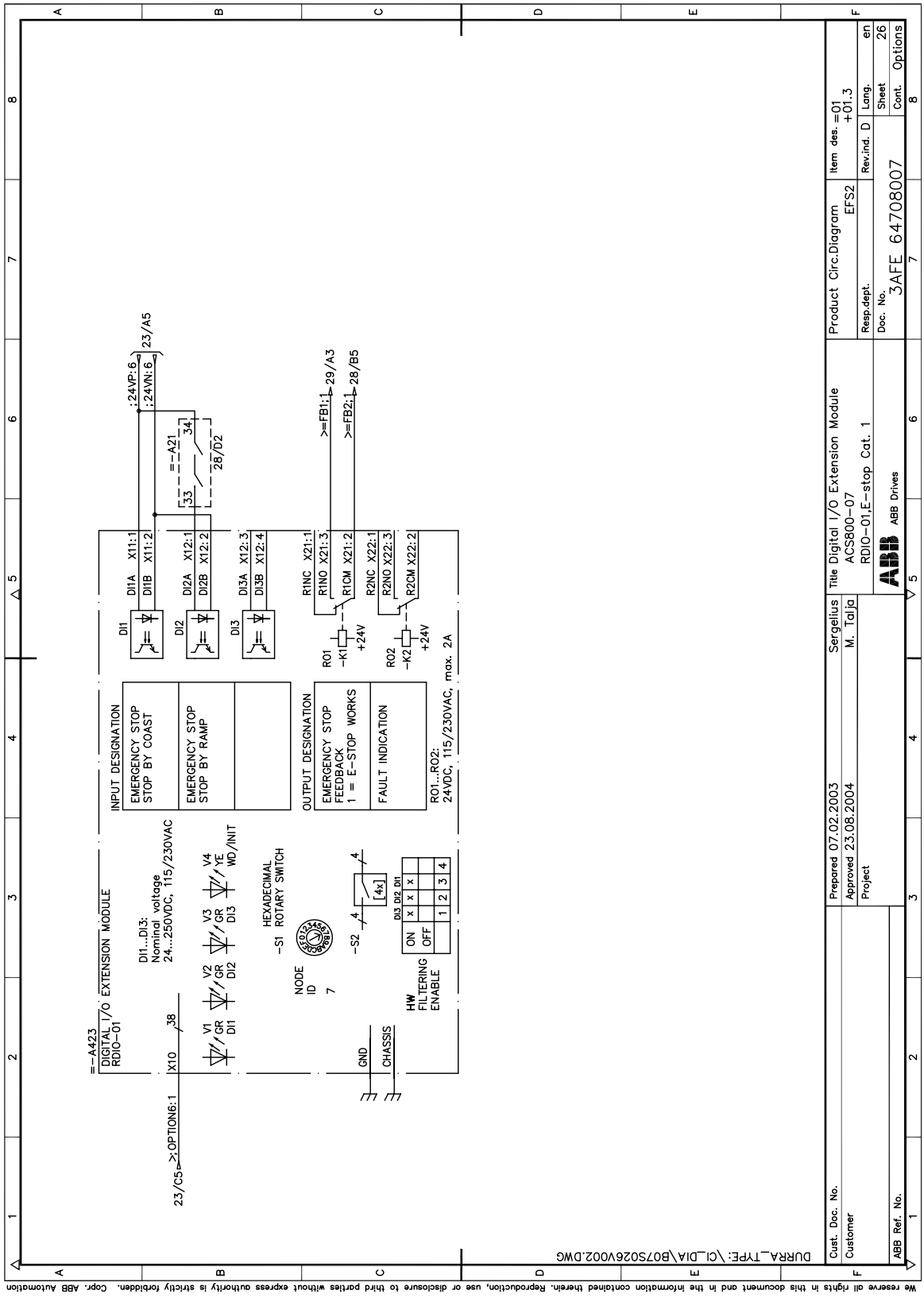
=-A423
DIGITAL I/O EXTENSION MODULE
RDIO-01
X10
38
23/C5
>:OPTION6:1
DI1...DI3:
Nominal voltage
24...250VDC, 115/230VAC
V1 GR DI1
V2 GR DI2
V3 GR DI3
V4 YE WD/INIT
HEXADECIMAL
ROTARY SWITCH
-S1
NODE
ID
7
-S2
4
[4x]
GND
CHASSIS
HW
FILTERING
ENABLE
DI3 DI2 DI1
ON x x x
OFF 1 2 3 4
INPUT DESIGNATION
EMERGENCY STOP
STOP BY COAST
EMERGENCY STOP
STOP BY RAMP
OUTPUT DESIGNATION
EMERGENCY STOP
FEEDBACK
1 = E-STOP WORKS
FAULT INDICATION
RO1...RO2:
24VDC, 115/230VAC, max. 2A
DI1
DI1A X11:1
DI1B X11:2
DI2
DI2A X12:1
DI2B X12:2
DI3
DI3A X12:3
DI3B X12:4
:24VP:6
:24VN:6
23/A5
=-A21
33
34
28/D2
R1NC X21:1
R1NO X21:3
R1COM X21:2
R2NC X22:1
R2NO X22:3
R2COM X22:2
RO1
-K1
+24V
RO2
-K2
+24V
>=FB1:1
29/A3
>=FB2:1
28/B5
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 07.02.2003
Approved 23.08.2004
Project
Sergelius
M. Talja
Title Digital I/O Extension Module
ACS800-07
RDIO-01,E-stop Cat. 1
ABB Drives
Product Circ.Diagram
EFS2
Resp.dept.
Doc. No.
3AFE 64708007
Item des. =01
+01.3
Rev.ind. D
Lang. en
Sheet 26
Cont. Options
DURRA_TYPE: \CI_DIA\B07S026V002.DWG
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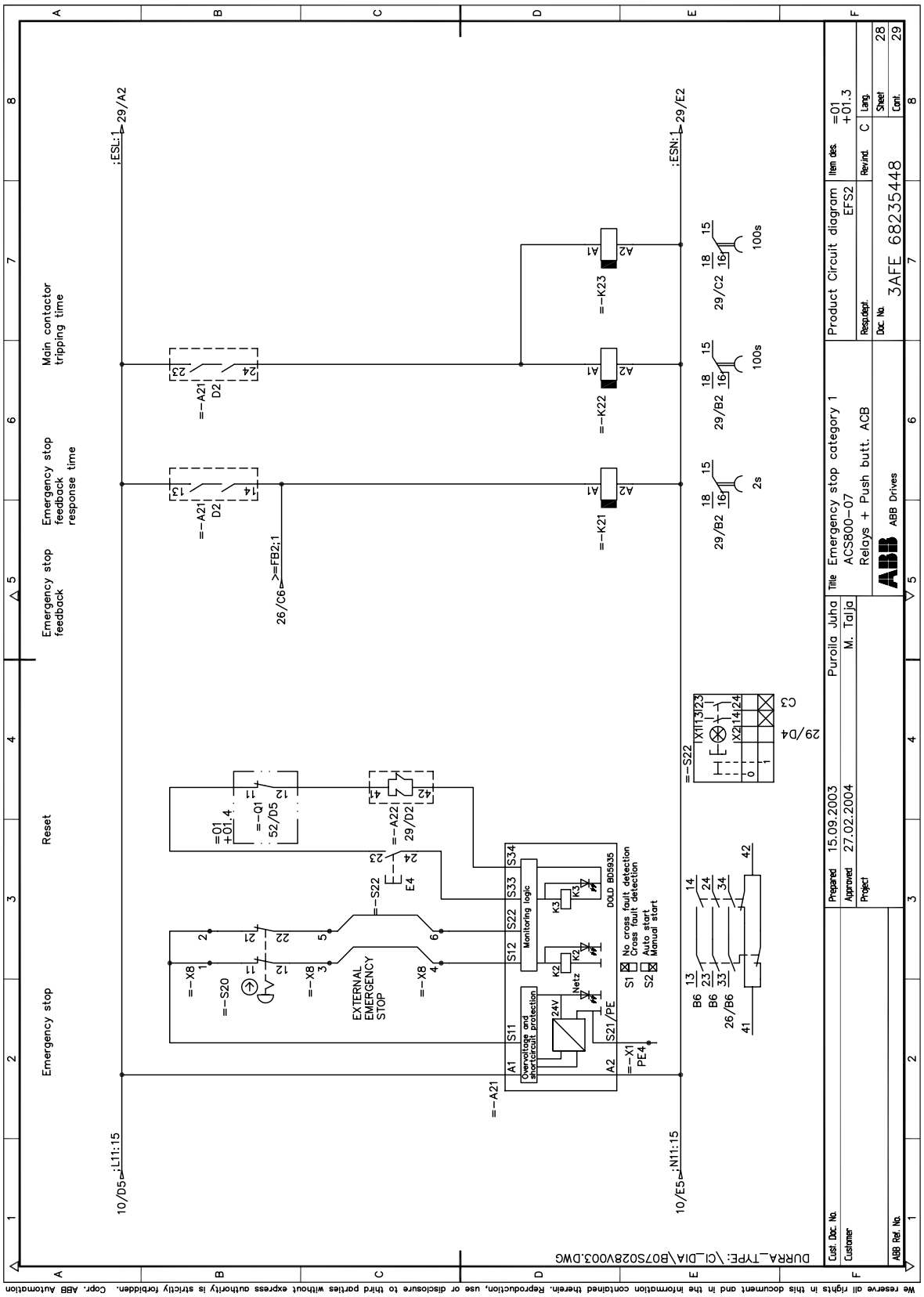

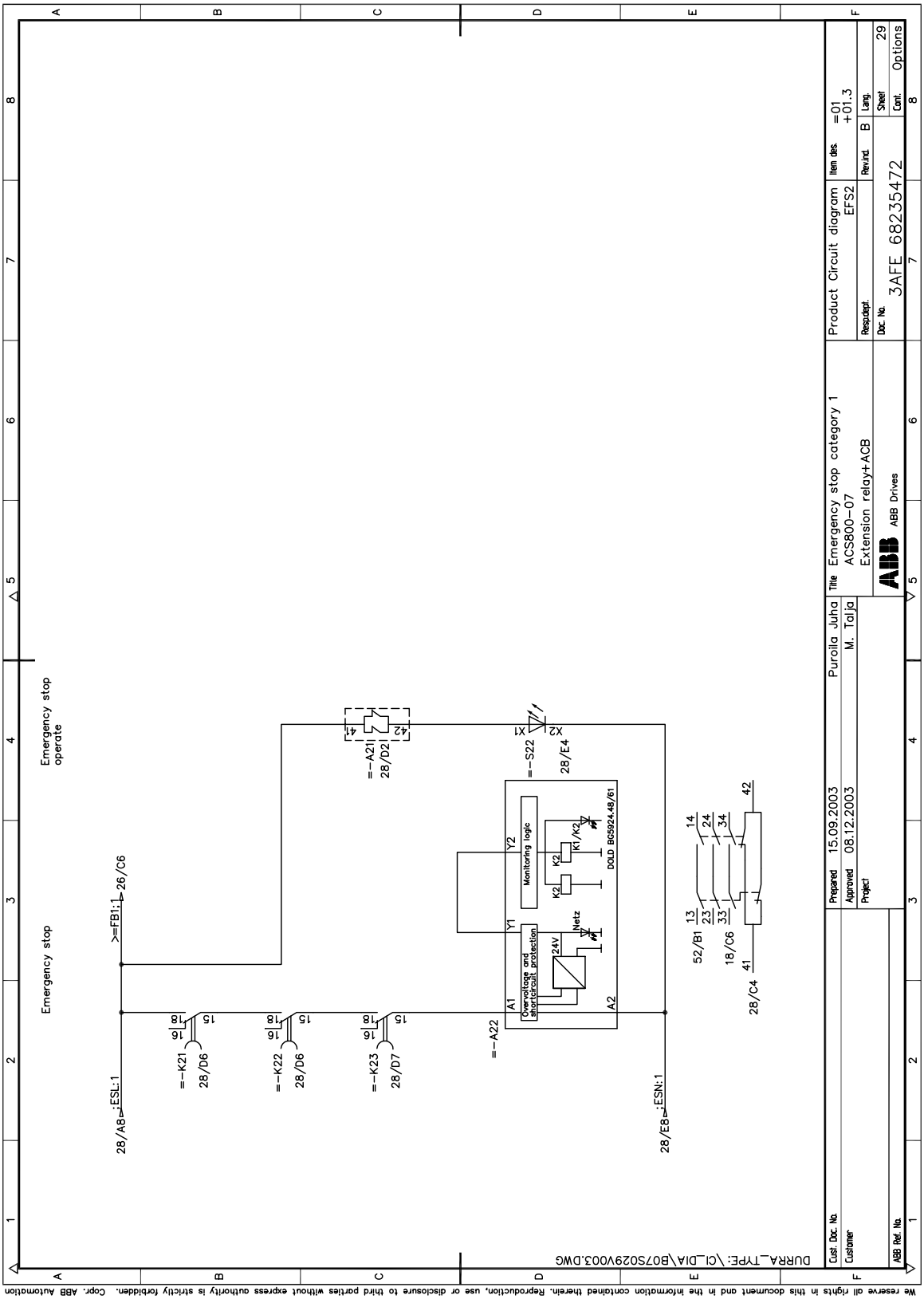
Emergency stop
operate
Emergency stop
>=FB1:1
26/C6
28/A8
-ESL:1
=-K21
28/D6
=-K22
28/D6
=-K23
28/D7
=-A22
=-A21
28/D2
=-S22
28/E4
28/E8
-ESN:1
Overvoltage and shortcircuit protection
Monitoring logic
DOLD BG5924.48/61
24V
Netz
52/B1
18/C6
28/C4
Prepared 15.09.2003 Puroila Juha
Approved 08.12.2003 M. Talja
Project
Title Emergency stop category 1
ACS800-07
Extension relay+ACB
ABB Drives
Product Circuit diagram
EFS2
Doc. No. 3AFE 68235472
Item des. =01
+01.3
Rev.ind. B
Sheet 29
Cont. Options
Cust. Doc. No.
Customer
ABB Ref. No.
DURRA_TYPE:\CI_DIA\B07S029V003.DWG
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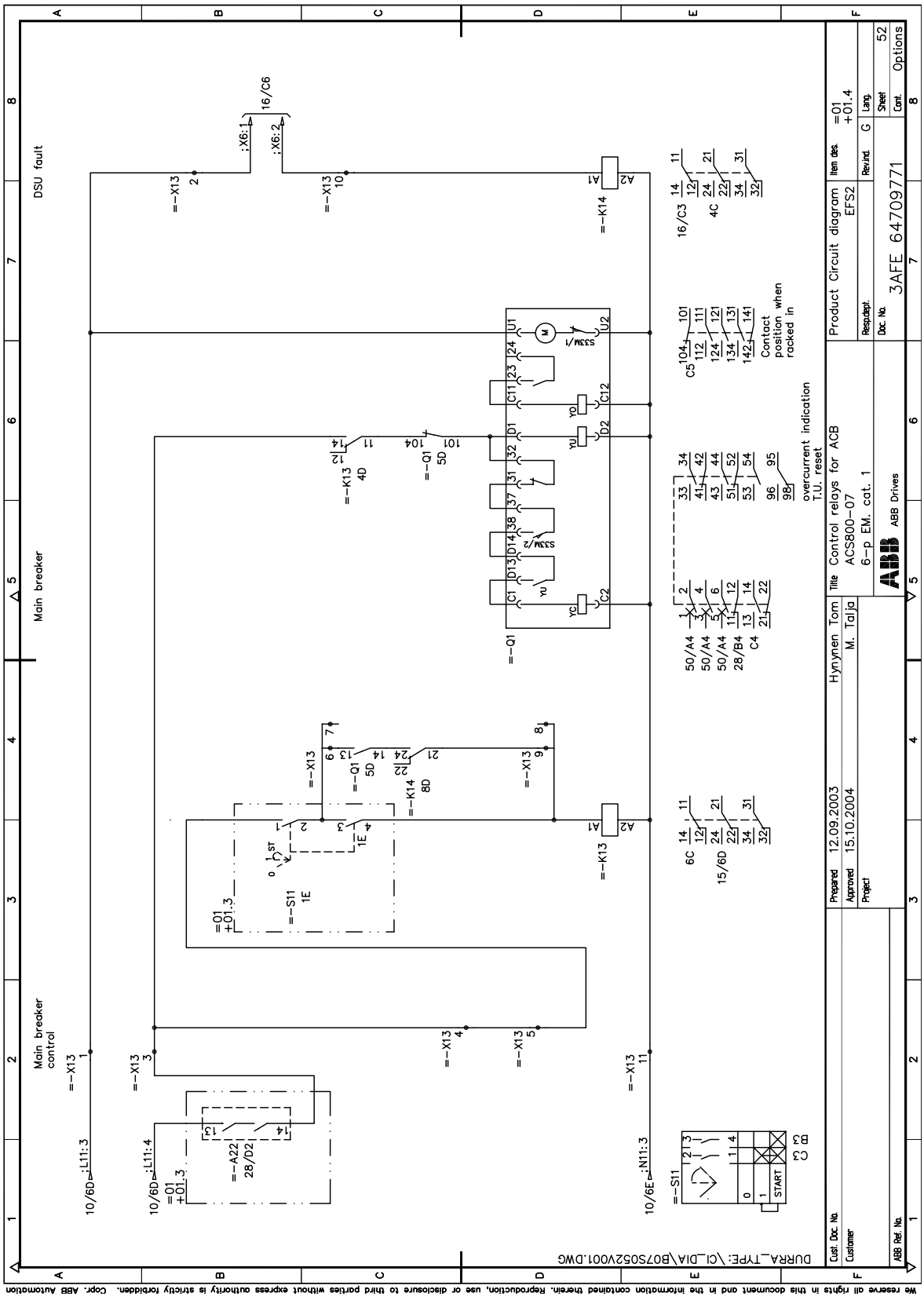
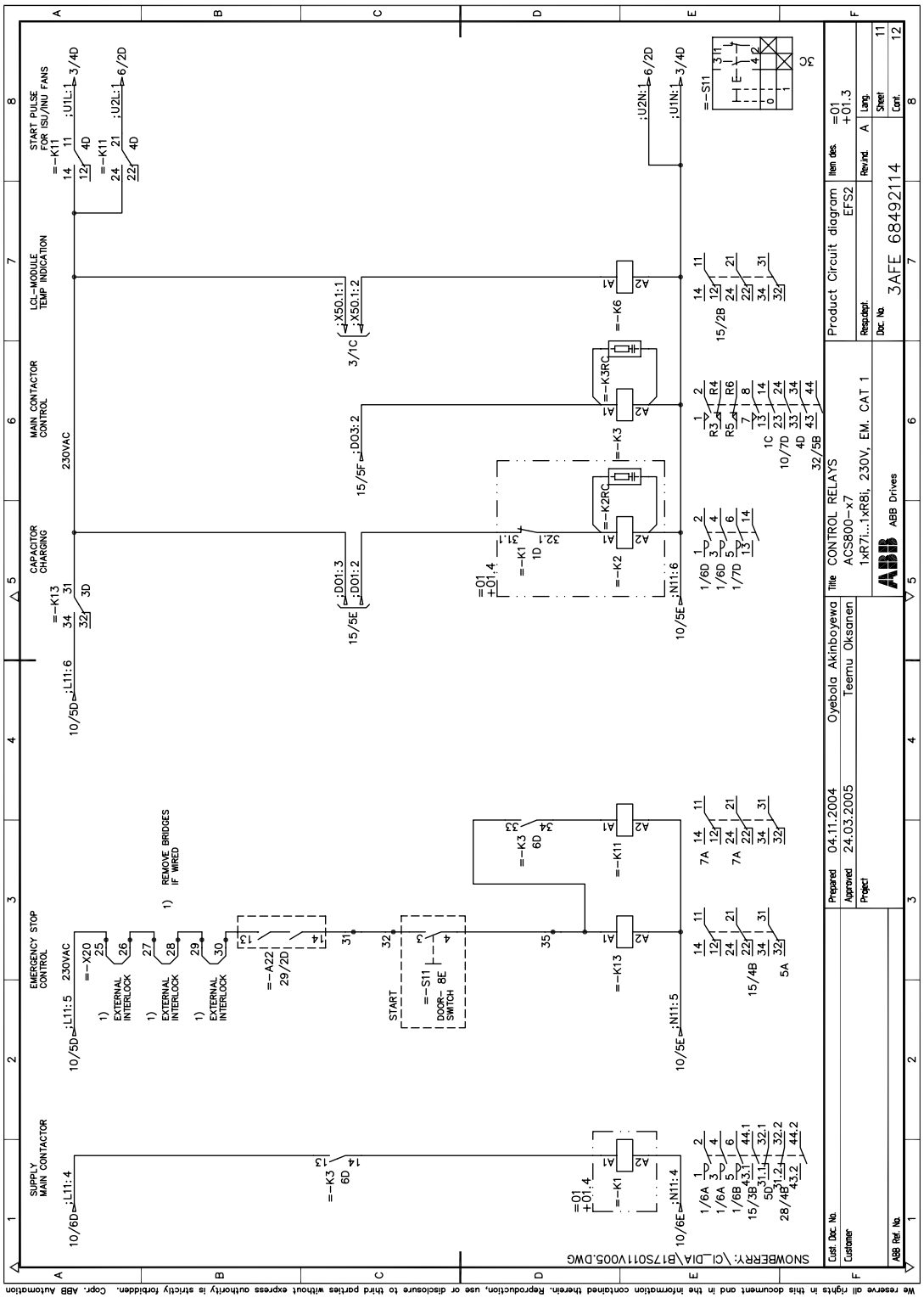
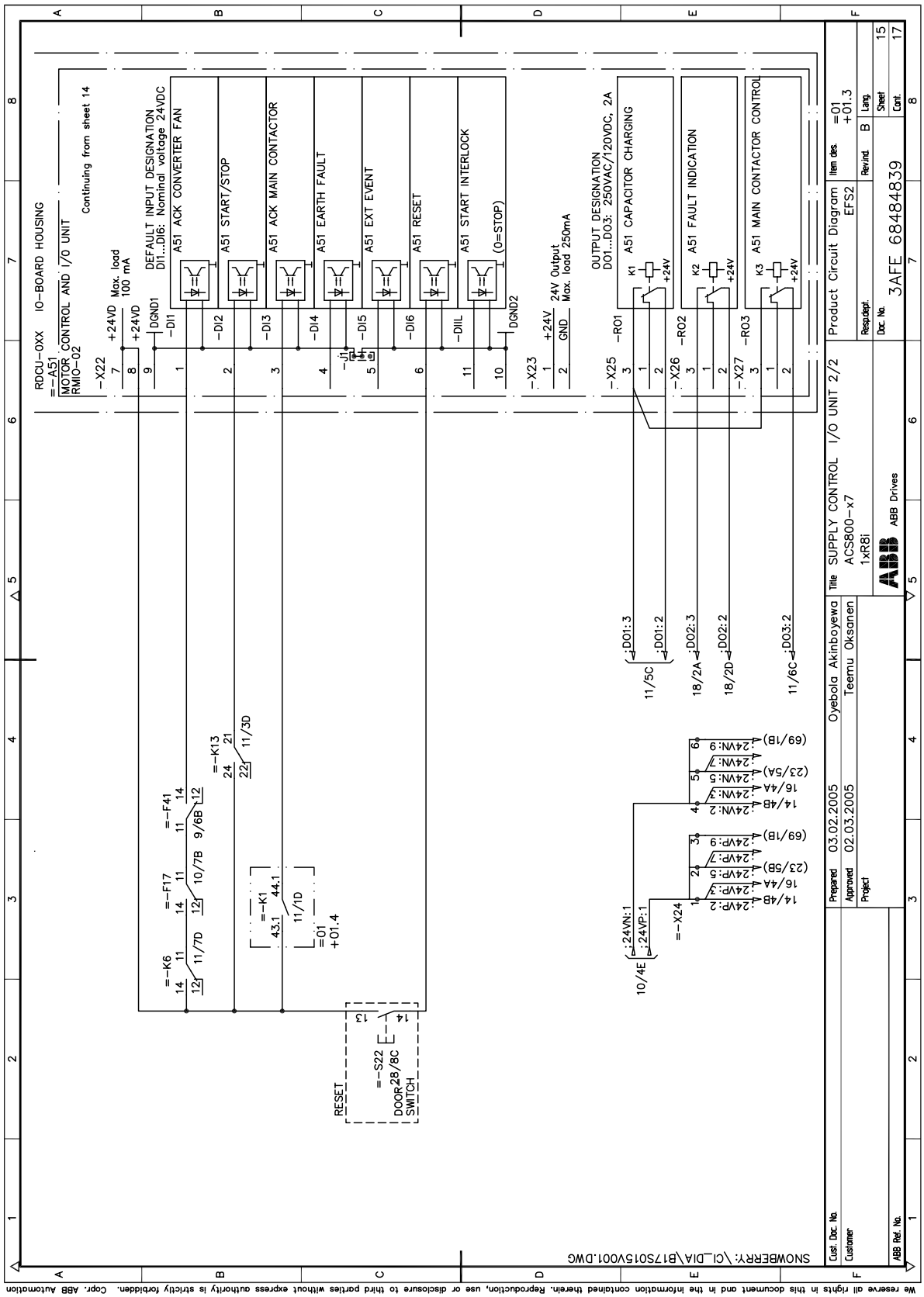


Category 1 emergency stop for ACS800-07/17/37 (+Q952, R6i, R7i, n×R8i)

ACS800-17 and ACS800-37 units with air circuit breaker (+F255+Q952)

Example circuit diagrams below show the factory wiring. See the circuit diagrams delivered with the drive for the actual wiring.




RDCU-0XX IO-BOARD HOUSING
=-A51
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 14
-X22
+24VD
+24VD
DGND1
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
Max. load 100 mA
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
A51 ACK CONVERTER FAN
A51 START/STOP
A51 ACK MAIN CONTACTOR
A51 EARTH FAULT
A51 EXT EVENT
A51 RESET
A51 START INTERLOCK
(0=STOP)
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
-X26
-RO2
-X27
-RO3
K1
K2
K3
+24V
A51 CAPACITOR CHARGING
A51 FAULT INDICATION
A51 MAIN CONTACTOR CONTROL
:DO1:3
:DO1:2
:DO2:3
:DO2:2
:DO3:2
11/5C
18/2A
18/2D
11/6C
=-K6
=-F17
=-F41
=-K13
=-K1
=01
+01.4
11/7D
10/7B
9/6B
11/3D
43.1
44.1
11/1D
RESET
=-S22
DOOR
SWITCH
28/8C
13
14
10/4E
:24VN:1
:24VP:1
=-X24
14/4B
16/4A
(23/5B)
(69/1B)
:24VP:2
:24VP:3
:24VP:5
:24VP:7
:24VP:9
14/4B
16/4A
(23/5A)
(69/1B)
:24VN:2
:24VN:3
:24VN:5
:24VN:7
:24VN:9
SNOWBERRY:\CI_DIA\B17501SV001.DWG
Prepared 03.02.2005 Oyebola Akinboyewa
Approved 02.03.2005 Teemu Oksanen
Project
Title SUPPLY CONTROL I/O UNIT 2/2
ACS800-x7
1xR8i
ABB Drives
Product Circuit Diagram
EFS2
Item des. =01 +01.3
Respdept.
Revind. B
Lang.
Doc. No. 3AFE 68484839
Sheet 15
Cont. 17
Cust. Doc. No.
Customer
ABB Ref. No.
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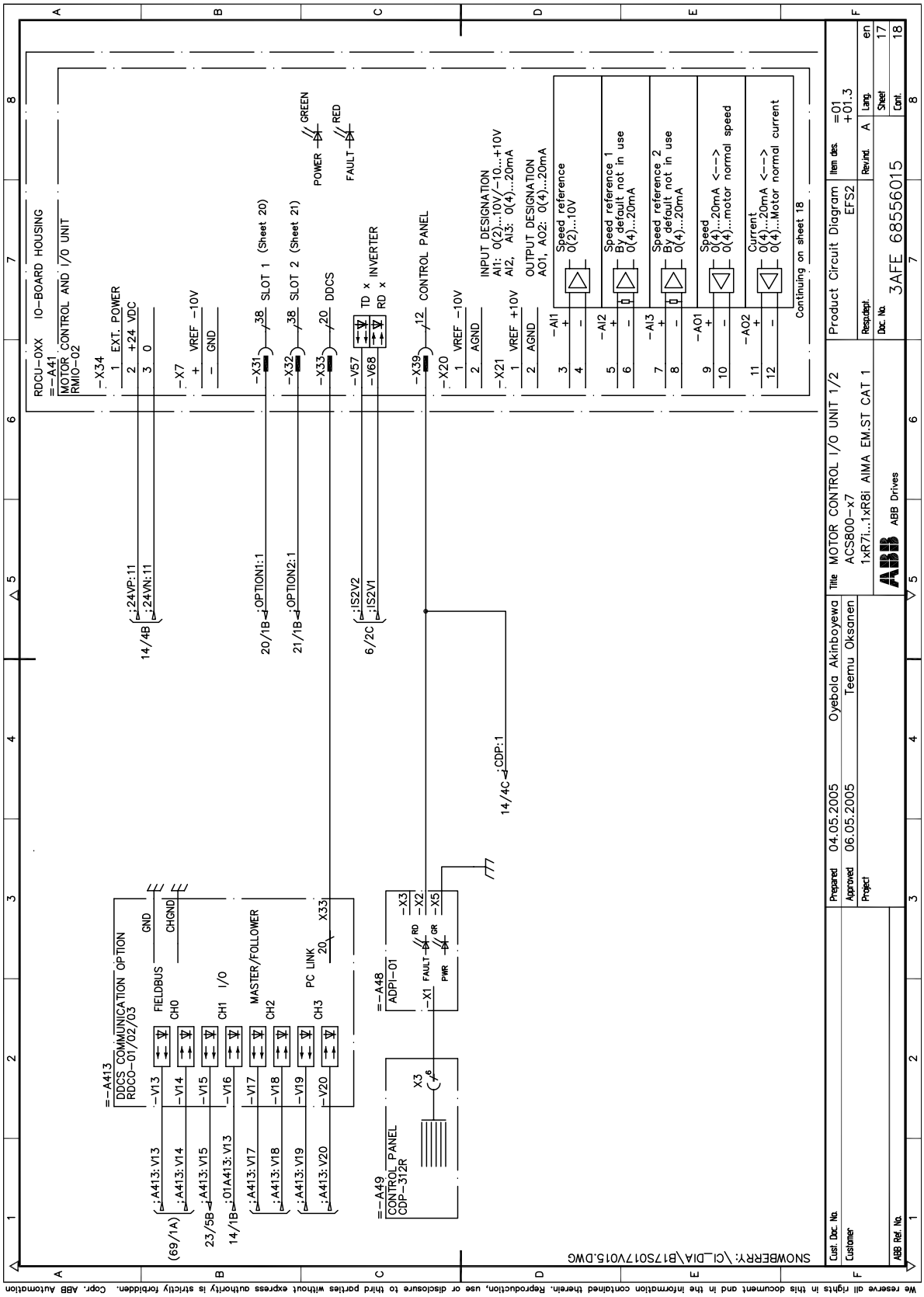
RDCU-0XX IO-BOARD HOUSING
=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
-X34
1 EXT. POWER
2 +24 VDC
3 0
-X7
+ VREF -10V
- GND
-X31
-X32
-X33
-V57
-V68
-X39
-X20
1 VREF -10V
2 AGND
-X21
1 VREF +10V
2 AGND
-AI1
-AI2
-AI3
-AO1
-AO2
38 SLOT 1 (Sheet 20)
38 SLOT 2 (Sheet 21)
20 DDCS
TD x INVERTER
RD x
12 CONTROL PANEL
INPUT DESIGNATION
AI1: 0(2)...10V/-10...+10V
AI2, AI3: 0(4)...20mA
OUTPUT DESIGNATION
AO1, AO2: 0(4)...20mA
Speed reference
0(2)...10V
Speed reference 1
By default not in use
0(4)...20mA
Speed reference 2
By default not in use
0(4)...20mA
Speed
0(4)...20mA <-->
0(4)...motor normal speed
Current
0(4)...20mA <-->
0(4)...Motor normal current
Continuing on sheet 18
POWER GREEN
FAULT RED
14/4B ;24VP:11
;24VN:11
20/1B ;OPTION1:1
21/1B ;OPTION2:1
6/2C ;IS2V2
;IS2V1
14/4C ;CDP:1
=-A413
DDCS COMMUNICATION OPTION
RDCO-01/02/03
GND
CHGND
FIELDBUS
CH0
CH1 I/O
CH2 MASTER/FOLLOWER
CH3 PC LINK
-V13
-V14
-V15
-V16
-V17
-V18
-V19
-V20
(69/1A) ;A413:V13
;A413:V14
23/5B ;A413:V15
14/1B ;01A413:V13
;A413:V17
;A413:V18
;A413:V19
;A413:V20
=-A48
ADPI-01
-X1
-X2
-X3
-X5
FAULT
PWR
RD
GR
=-A49
CONTROL PANEL
CDP-312R
X3
SNOWBERRY:\CI_DIA\B17501701S.DWG
Prepared 04.05.2005 Oyebola Akinboyewa
Approved 06.05.2005 Teemu Oksanen
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title MOTOR CONTROL I/O UNIT 1/2
ACS800-x7
1xR7i...1xR8i AIMA EM.ST CAT 1
ABB Drives
Product Circuit Diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Doc. No. 3AFE 68556015
Revind. A
Lang. en
Sheet 17
Cont. 18
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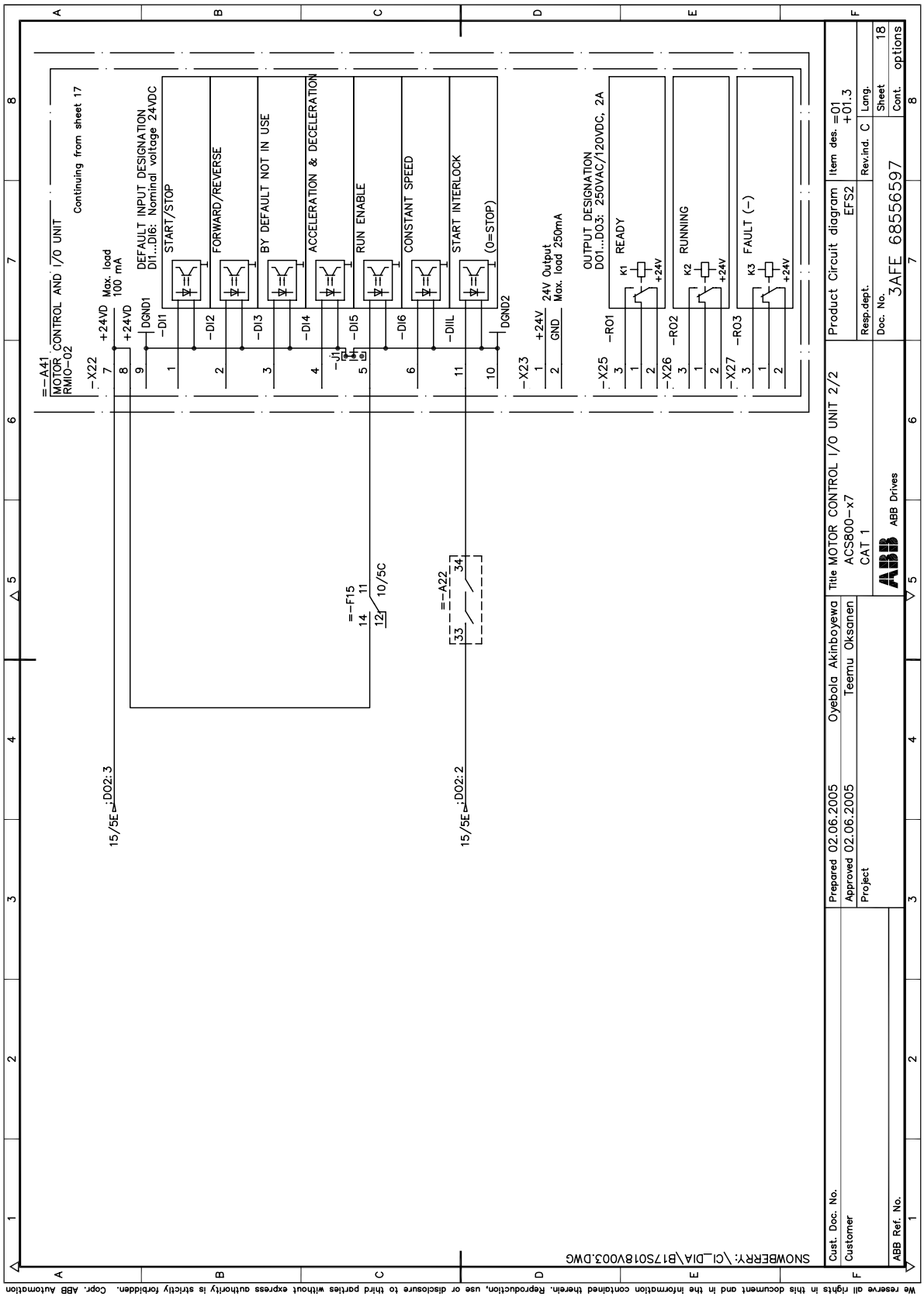
=-A41
MOTOR CONTROL AND I/O UNIT
RMIO-02
Continuing from sheet 17
-X22
+24VD
Max. load
100 mA
DGND1
-DI1
-DI2
-DI3
-DI4
-DI5
-DI6
-DIIL
DGND2
DEFAULT INPUT DESIGNATION
DI1...DI6: Nominal voltage 24VDC
START/STOP
FORWARD/REVERSE
BY DEFAULT NOT IN USE
ACCELERATION & DECELERATION
RUN ENABLE
CONSTANT SPEED
START INTERLOCK
(0=STOP)
-X23
+24V
GND
24V Output
Max. load 250mA
OUTPUT DESIGNATION
DO1...DO3: 250VAC/120VDC, 2A
-X25
-RO1
K1
READY
-X26
-RO2
K2
RUNNING
-X27
-RO3
K3
FAULT (-)
=-F15
=-A22
15/5E
:DO2:3
:DO2:2
10/5C
SNOWBERRY:\CI_DIA\B17S018V003.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 02.06.2005 Oyebola Akinboyewa
Approved 02.06.2005 Teemu Oksanen
Project
Title MOTOR CONTROL I/O UNIT 2/2
ACS800-x7
CAT 1
ABB Drives
Product Circuit diagram
EFS2
Item des. =01
+01.3
Resp.dept.
Rev.ind. C
Lang.
Doc. No.
3AFE 68656597
Sheet 18
Cont. options
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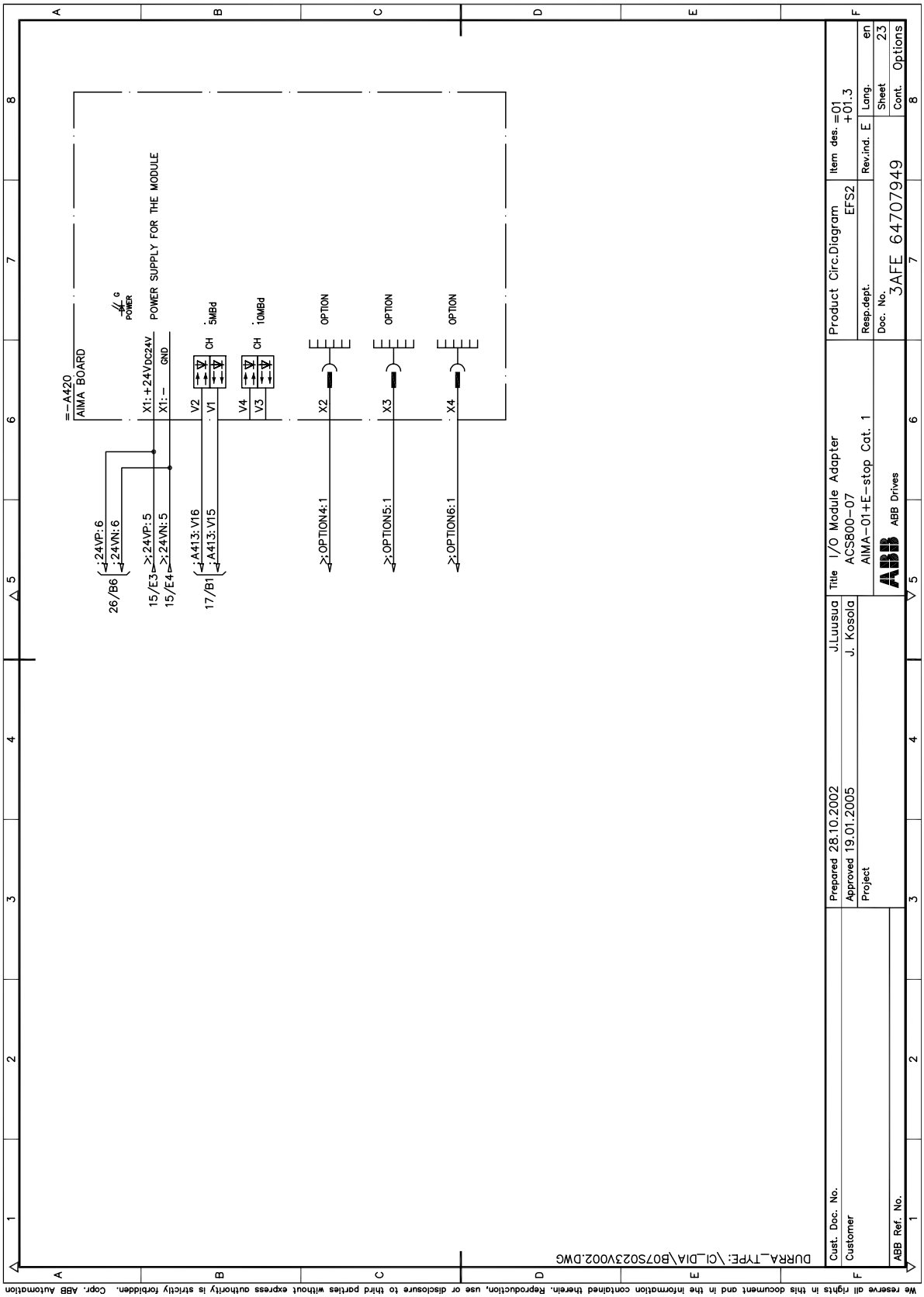
=-A420
AIMA BOARD
POWER
POWER SUPPLY FOR THE MODULE
X1: +24VDC24V
X1: –
GND
V2
V1
V4
V3
CH
5MBd
CH
10MBd
X2
X3
X4
OPTION
OPTION
OPTION
26/B6
-:24VP:6
-:24VN:6
15/E3
>:24VP:5
15/E4
>:24VN:5
17/B1
-:A413:V16
-:A413:V15
>:OPTION4:1
>:OPTION5:1
>:OPTION6:1
DURRA_TYPE:\CI_DIA\B07S023V002.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 28.10.2002
J.Luusua
Approved 19.01.2005
J. Kosola
Project
Title I/O Module Adapter
ACS800-07
AIMA-01+E-stop Cat. 1
ABB Drives
Product Circ.Diagram
EFS2
Resp.dept.
Doc. No.
3AFE 64707949
Item des. =01
+01.3
Rev.ind. E
Lang. en
Sheet 23
Cont. Options
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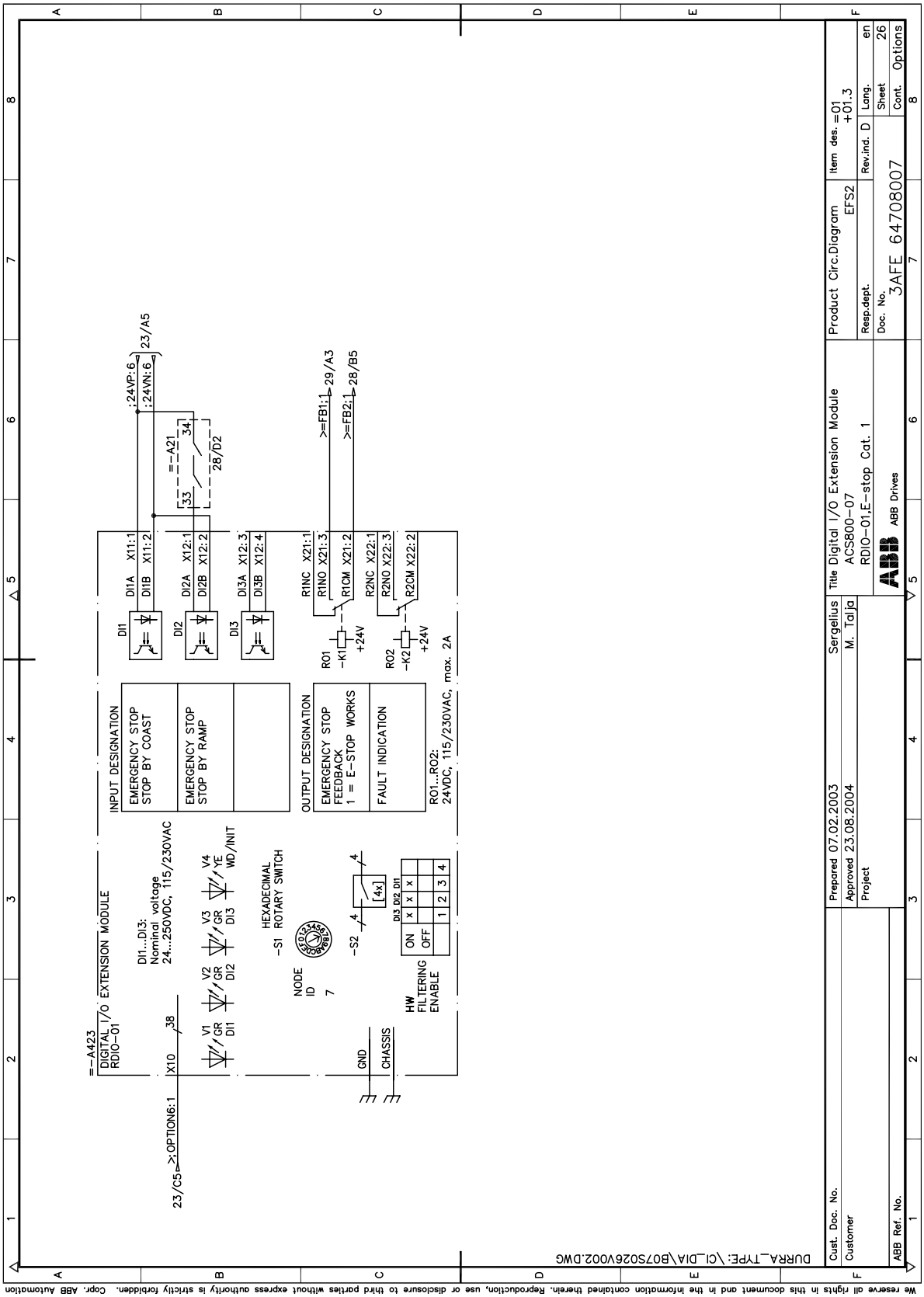
=-A423
DIGITAL I/O EXTENSION MODULE
RDIO-01
INPUT DESIGNATION
EMERGENCY STOP
STOP BY COAST
EMERGENCY STOP
STOP BY RAMP
DI1...DI3:
Nominal voltage
24...250VDC, 115/230VAC
23/C5
>:OPTION6:1
X10
38
V1 GR DI1
V2 GR DI2
V3 GR DI3
V4 YE WD/INIT
HEXADECIMAL
ROTARY SWITCH
-S1
NODE
ID
7
-S2
4x
DI3 DI2 DI1
ON
OFF
HW
FILTERING
ENABLE
GND
CHASSIS
DI1
DI2
DI3
DI1A X11:1
DI1B X11:2
DI2A X12:1
DI2B X12:2
DI3A X12:3
DI3B X12:4
:24VP:6
:24VN:6
23/A5
=-A21
33
34
28/D2
OUTPUT DESIGNATION
EMERGENCY STOP
FEEDBACK
1 = E-STOP WORKS
FAULT INDICATION
RO1...RO2:
24VDC, 115/230VAC, max. 2A
R1NC X21:1
R1NO X21:3
R1COM X21:2
R2NC X22:1
R2NO X22:3
R2COM X22:2
RO1
-K1
+24V
RO2
-K2
+24V
>=FB1:1
29/A3
>=FB2:1
28/B5
DURRA_TYPE:\CI_DIA\B07S026V002.DWG
Cust. Doc. No.
Customer
ABB Ref. No.
Prepared 07.02.2003
Sergelius
Approved 23.08.2004
M. Talja
Project
Title Digital I/O Extension Module
ACS800-07
RDIO-01,E-stop Cat. 1
ABB Drives
Product Circ.Diagram
EFS2
Resp.dept.
Doc. No.
3AFE 64708007
Item des. =01
+01.3
Rev.ind. D
Lang. en
Sheet 26
Cont. Options
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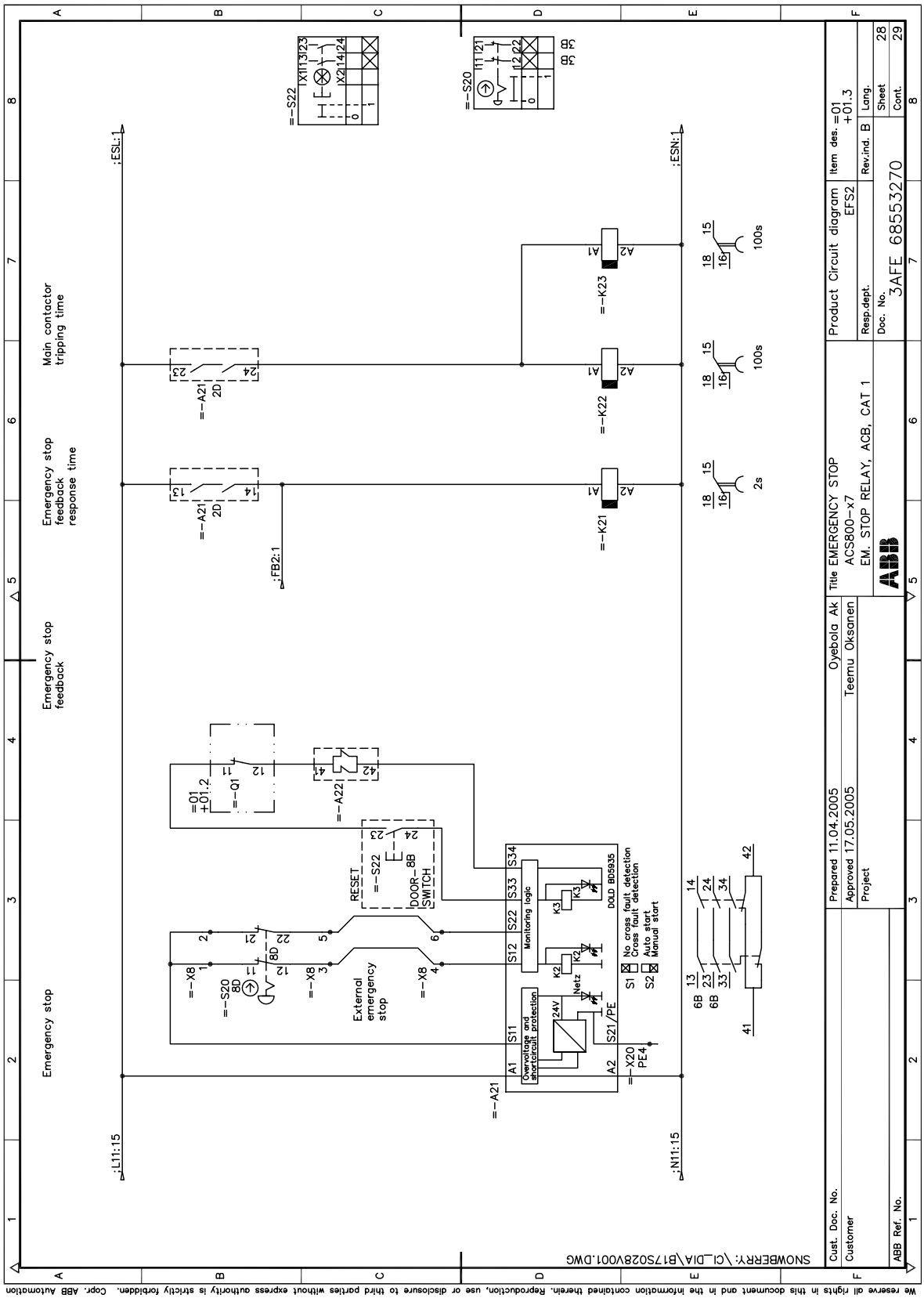
Emergency stop
Emergency stop feedback
Emergency stop feedback response time
Main contactor tripping time
External emergency stop
RESET
DOOR-8B SWITCH
Overvoltage and shortcircuit protection
Monitoring logic
DOLD BD5935
No cross fault detection
Cross fault detection
Auto start
Manual start
Netz
24V
Title EMERGENCY STOP
ACS800-x7
EM. STOP RELAY, ACB, CAT 1
Product Circuit diagram
EFS2
Item des. =01
+01.3
Rev.ind. B
Lang.
Sheet 28
Cont. 29
Doc. No. 3AFE 68553270
Resp.dept.
Prepared 11.04.2005 Oyebola Ak
Approved 17.05.2005 Teemu Oksanen
Project
Cust. Doc. No.
Customer
ABB Ref. No.
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100s
2s
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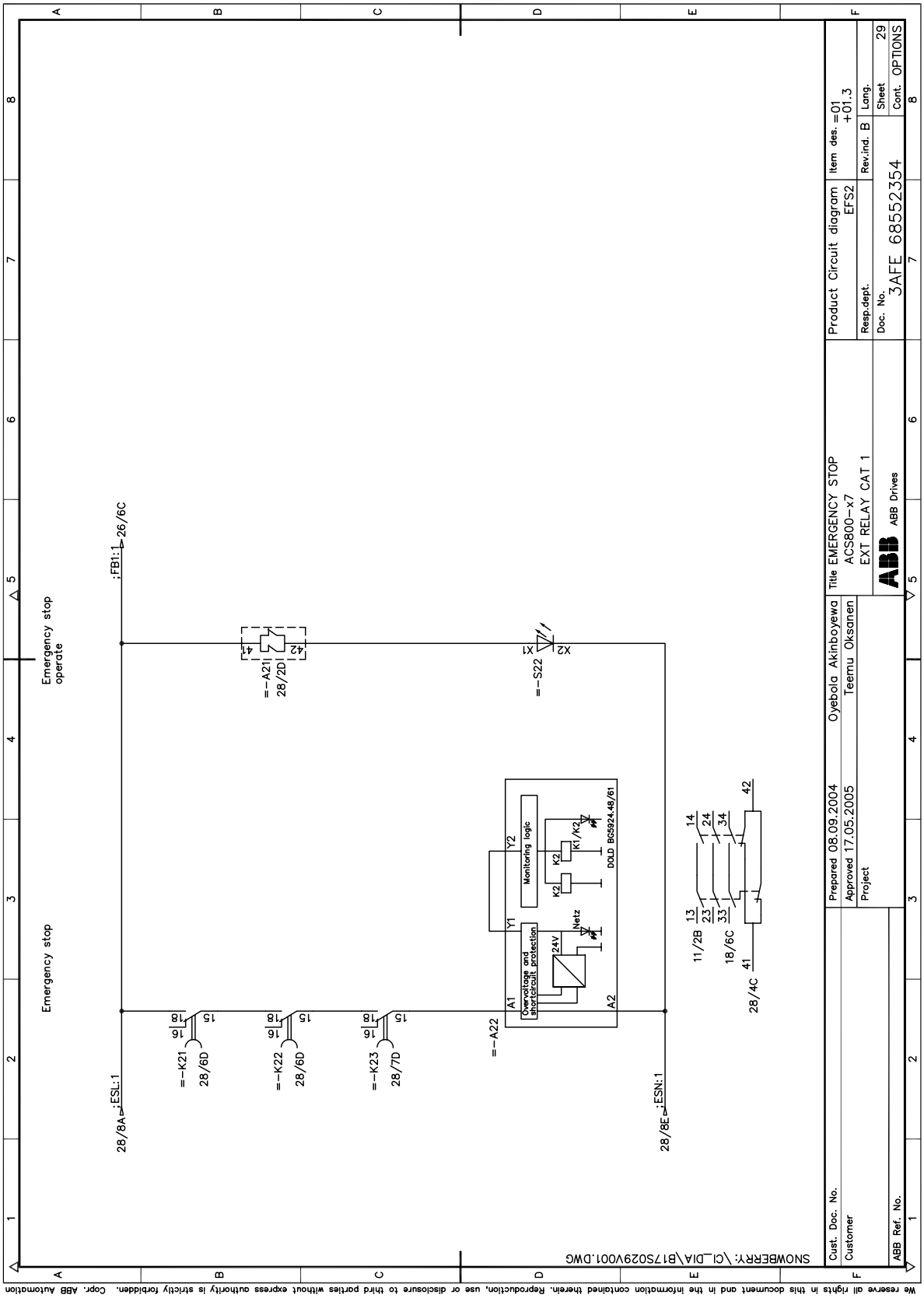
Emergency stop
operate
Emergency stop
;FB1:1
26/6C
=-A21
28/2D
41
42
=-S22
X1
X2
=-A22
A1
A2
Overvoltage and shortcircuit protection
24V
Netz
Y1
Y2
Monitoring logic
K2
K1/K2
DOLD BC5924.48/61
=-K21
28/6D
=-K22
28/6D
=-K23
28/7D
15
16
18
28/8A
;ESL:1
28/8E
;ESN:1
11/2B
13
23
33
18/6C
41
28/4C
14
24
34
42
Prepared 08.09.2004
Oyebola Akinboyewa
Approved 17.05.2005
Teemu Oksanen
Project
Cust. Doc. No.
Customer
ABB Ref. No.
Title EMERGENCY STOP
ACS800-x7
EXT RELAY CAT 1
ABB Drives
Product Circuit diagram
EFS2
Resp.dept.
Doc. No.
3AFE 68552354
Item des. =01
+01.3
Rev.ind. B
Lang.
Sheet
29
Cont. OPTIONS
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Earth fault monitoring in IT (ungrounded) systems (+Q954)

What this chapter contains

This chapter describes earth fault monitoring option +Q954 in IT (ungrounded) systems. The chapter deals with applicability, wiring, operation and use. Example circuit diagrams are included. The chapter also describes the internal earth fault protection of the drive in short.

To which drives this chapter applies

The chapter applies to the following drives:

Drive type	Frame sizes	Option code and description
ACS800-07 ACS800-U7	R6, R7, R8; n×R8i	**+Q954** = earth fault monitoring for IT (ungrounded) systems
ACS800-17 ACS800-37	R6i, R7i, n×R8i	

Earth fault protection in TN (grounded) systems

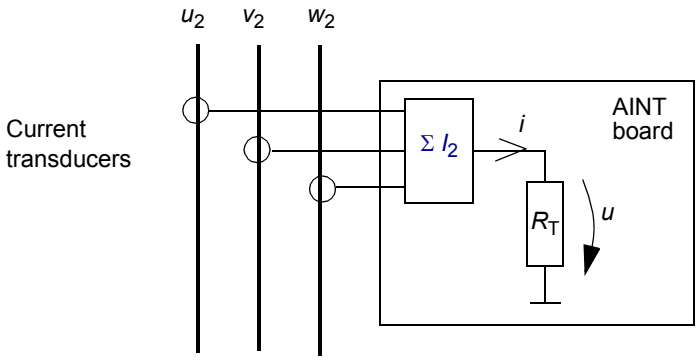
AC fuses

The supply AC fuses protect the drive against a direct earth fault in the supply or intermediate DC circuit in case the fault current exceeds the operating current of the fuse.

Internal earth fault protection of the ACS800-02/U2/07/U7

The drive is equipped with a hardware and software based earth fault protection against earth faults in the motor cable or motor. The output currents of the drive are measured by current transducers and added up. The current sum is normally close to zero. In case of an earth fault, current *i* produces over resistor R_T a voltage which is measured by the AINT board. A signal is sent to the RMIO board. If the measured voltage exceeds the set limit, an earth fault warning or trip is produced, depending on a parameter setting of the application program.

In parallel-connected inverters, the sum current measurement is located at the output of each inverter. One RMIO board produces an earth fault warning or trip, whenever the current sum of an inverter exceeds the set limit.



Note concerning parallel-connected inverter modules

There is some current deviation between parallel-connected inverter modules due to slight differences in the components.

Motor cabling of parallel-connected inverter modules produces cable stray capacitances in a larger scale than in single inverters. When the IGBTs are switched, high-frequency common mode current flows through these stray capacitances to earth. The current sum measurement detects the leakage currents as well as “real” earth faults. Therefore, the trip level should not be set too low.

If there is a fault affecting a phase current in one inverter module e.g. U2 current is missing, the U2 currents of the other inverter modules are increased accordingly. The current sum measurement detects the increase in one inverter module.

Because of these reasons, the current sum measurement can indicate an actual earth fault or a current imbalance situation between the inverter modules.

Parameter settings

The following Standard Application Program parameter setting defines how the drive reacts when an earth fault is detected:

Parameter 30.17 EARTH FAULT

WARNING	The drive generates a warning.
FAULT	Default The drive trips on EARTH FAULT (non-parallel-connected inverter modules) or CUR UNBAL xx (paralled-connected inverter modules).

For other application programs, refer to their firmware manuals.

Internal earth fault protection of the ACS800-17/37

The drive is equipped with a similar earth fault protection against earth faults in the motor cable or motor as in the ACS800-07. In addition, the drive is equipped with an earth fault protection against earth faults in the input cable and line-side converter based on input current sum measurement.

Parameter settings

The following IGBT Supply Control Program parameter settings define how the line-side converter reacts when an earth fault is detected:

Parameter 30.02 EARTH FAULT

WARNING	The converter generates a warning.
FAULT	Default (with parallel-connected converter modules fixed) The converter trips on EARTH FAULT (non-parallel-connected converter modules) or CUR UNBAL xx (parallel-connected converter modules).

Parameter 30.03 EARTH FAULT is fixed to 3.

Earth fault monitoring in IT (ungrounded) systems

The internal current sum measurement-based earth fault monitoring of the drive detects earth faults in some cases in IT (ungrounded) systems. However, often the earth fault leakage current does not exceed the trip level and the drive goes on running.

According to EN 60204-1 protection against indirect contact by automatic disconnection of supply (6.3.3) requires the use of earth fault detection or residual current detection to initiate automatic disconnection of IT systems. If earth fault detection is used, it is permissible for the first fault to initiate only an alarm signal instead of automatic disconnection. For this type of protection, the requirements of 413.1 of IEC 60364-4-41 shall apply:

- In cases where an IT system is used for reasons of continuity of supply, an insulation monitoring device shall be provided to indicate the occurrence of a first fault from a live part to exposed-conductive-parts or to earth. This device shall initiate an audible and/or visual signal.
- If there are both audible and visible signals, it is permissible for the audible signal to be cancelled, but the visual alarm shall continue as long as the fault persists.
- **Note:** It is recommended that a first fault be eliminated with the shortest practicable delay.

The drive can be equipped with insulation monitoring device option +Q954 for the above described protection, or the IT system must be monitored otherwise with a monitoring device suitable for use with variable speed drives. Because of the leakage currents of drives, many earth fault monitoring devices do not work properly with drives.

Applicable standards

The following standards concern earth fault monitoring in IT systems:

- IEC/EN 60204-1:1997 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”.
- IEC 60364-4-41:2001 “Electrical installations of buildings – Protection for satefy – Protection against electrical shock”.

Safety

Follow the safety instructions in *IRDH275 Operating Manual* by Bender (code: TGH1386).

The insulation monitoring device is constructed according to state-of-the-art and recognised technical safety rules. Nevertheless, when the device is used, hazards may occur to the life and limb of the user or of third parties, or there may be adverse effects on the monitoring device or on other valuable property. The monitoring device must only be used

- for the purpose for which it is intended
- when it is in perfect technical condition as far as safety is concerned.

The earth fault monitoring function (+Q954) is not a personal safety or fire protection feature.

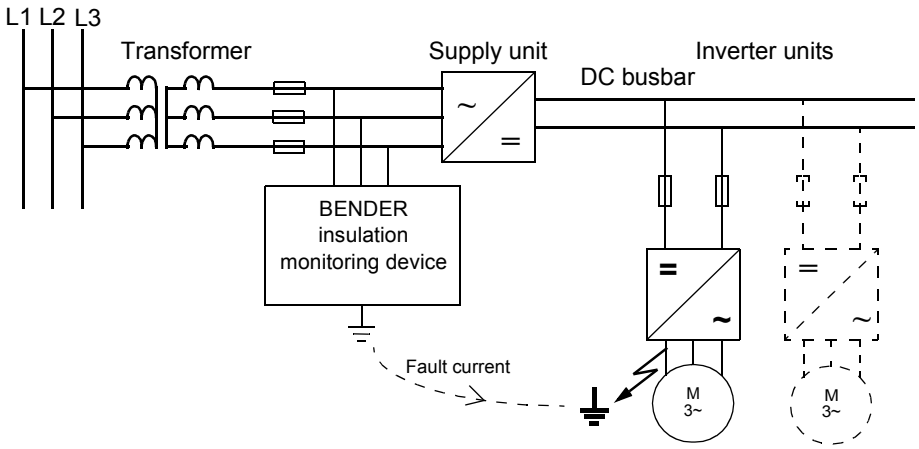
Twelve-pulse units

The supply voltage to the insulation monitoring device is taken from the L11-L21-L31 branch in six- and twelve-pulse connected drives. In units with line contactor, the insulation monitoring device detects earth faults in both supply branches when the line contactor is closed. When the line contactor is open, only the measured branch is monitored.

Description of the +Q954 option

Earth faults in IT (ungrounded) systems are monitored by a Bender IRDH275 insulation monitoring device.

The monitoring device is connected between the ungrounded system and the drive grounding conductor (PE). The IRDH275 monitors the insulation resistance of the IT system.



A pulsating AC measuring voltage is superimposed on the system (measuring principle *Adaptive Measuring Pulse,* developed by BENDER). The measuring pulse consists of positive and negative pulses of the same amplitude. The period depends on the respective leakage capacitances and the insulation resistance of the system to be monitored.

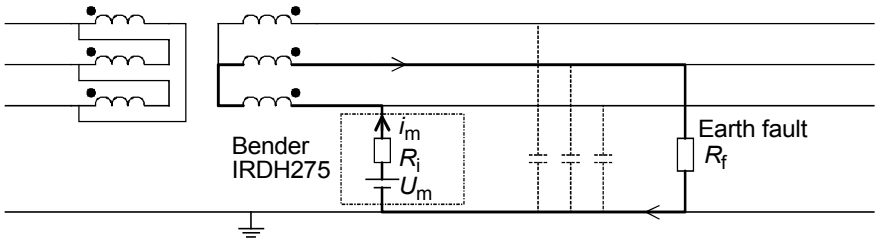
The response values and other function parameters of the IRDH275 are set via the function keys. The parameters are indicated on the display and stored in a non-volatile memory after the setting is completed. It is possible to set two response values, Alarm 1 (prewarning) and Alarm 2 (main alarm), in the range of 1 kohm to 10 Mohm. Both response values have their own alarm LEDs and relays. If the reading is below the set response value, the associated alarm relay responds, the alarm LED lights up and the measuring value is indicated on the display. The function of the alarm relay depends on its setting.

When auxiliary power to the IRDH275 is switched off, the alarm relay is switched to the fault position.

In case of an earth fault, the indicator light illuminates on the door of the drive cabinet.

Operation principle of the IRDH275

The internal structure of the IRDH275 is presented below with a simplified circuit diagram in case of an earth fault in V-phase.



Earth fault in V-phase

When there is no earth fault, the measuring voltage U_m (direct voltage) does not cause direct current to flow through earth. A resistive earth fault closes the circuit for direct current. This direct current (I_m) caused by the measuring voltage is filtered from the total current (i_M) flowing through the IRDH275. The fault resistance is calculated as follows:

$$R_f = \frac{U_m}{I_m} - R_i$$

where

R_f ≙ fault resistance
U_m ≙ measuring voltage
I_m ≙ filtered direct component of i_M (equals to the current flowing through the earth fault)
R_i ≙ internal resistance (120 kohm) of the Bender

The insulation resistance is indicated on the display or an external ohmmeter after the response time.

Note 1: The IRDH275 reacts to all earth faults in IT systems which are galvanically connected to each other. The earth fault detection is not based on system imbalance but the IRDH275 detects symmetrical and unsymmetrical earth faults as well.

Note 2: The internal resistance of the IRDH275 is approximately 120 kohm. This allows direct current to flow through the IRDH275 from phase to earth. This is why it is not allowed to connect two IRDH275 units in the same IT system or in systems galvanically connected to each other. The IRDH275 would react to the other IRDH275 as to an earth fault.

Technical data

Bender insulation monitoring device IRDH275-435

Nominal voltage: 0…793 VAC, 0…650 VDC

Resistance response values for Alarm 1 and Alarm 2: 1 kohm …10 Mohm

Supply voltage: 88…230 VAC

Wiring

Typically, the user connects a relay output(s) on the insulation monitoring device to an overriding system. See the circuit diagram delivered with the drive.

Start-up

Settings of the insulation monitoring device

Set the two resistance response values under the ISO SETUP menu according to the instructions given in *IRDH275 Operating Manual* by Bender (code: TGH1386).

The alarm relays are set at the factory.

ACS800-07 frame sizes n×R8i

Check that the internal earth (ground) fault detection is inactivated, i.e. switch S1 on the supply control board is set to the “disabled” (0 A) position. See *ACS800-07 Hardware Manual* [3AFE64731165 (English)], chapter *Electrical Installation*.

ACS800-17 and ACS800-37

The IRDH275 is connected to digital input DI4 at the factory and parameter 30.04 EXT EARTH FAULT is set accordingly.

Functional test before start-up

The function of the IRDH275 has been tested at the factory.

Fault tracing

The Bender IRDH275 continuously monitors the IT system and earth (PE) as a factory setting. In small systems, the normal insulation resistance without an earth fault may be high enough to cause false alarms (as if the supply connection was missing). In such cases, switch the connection monitoring off in the ISO SETUP menu, by selecting the sub menu Memory: on/off.

Pressing the RESET button resets the fault message, provided that the currently displayed insulation resistance is at least 25% above the set resistance response value.

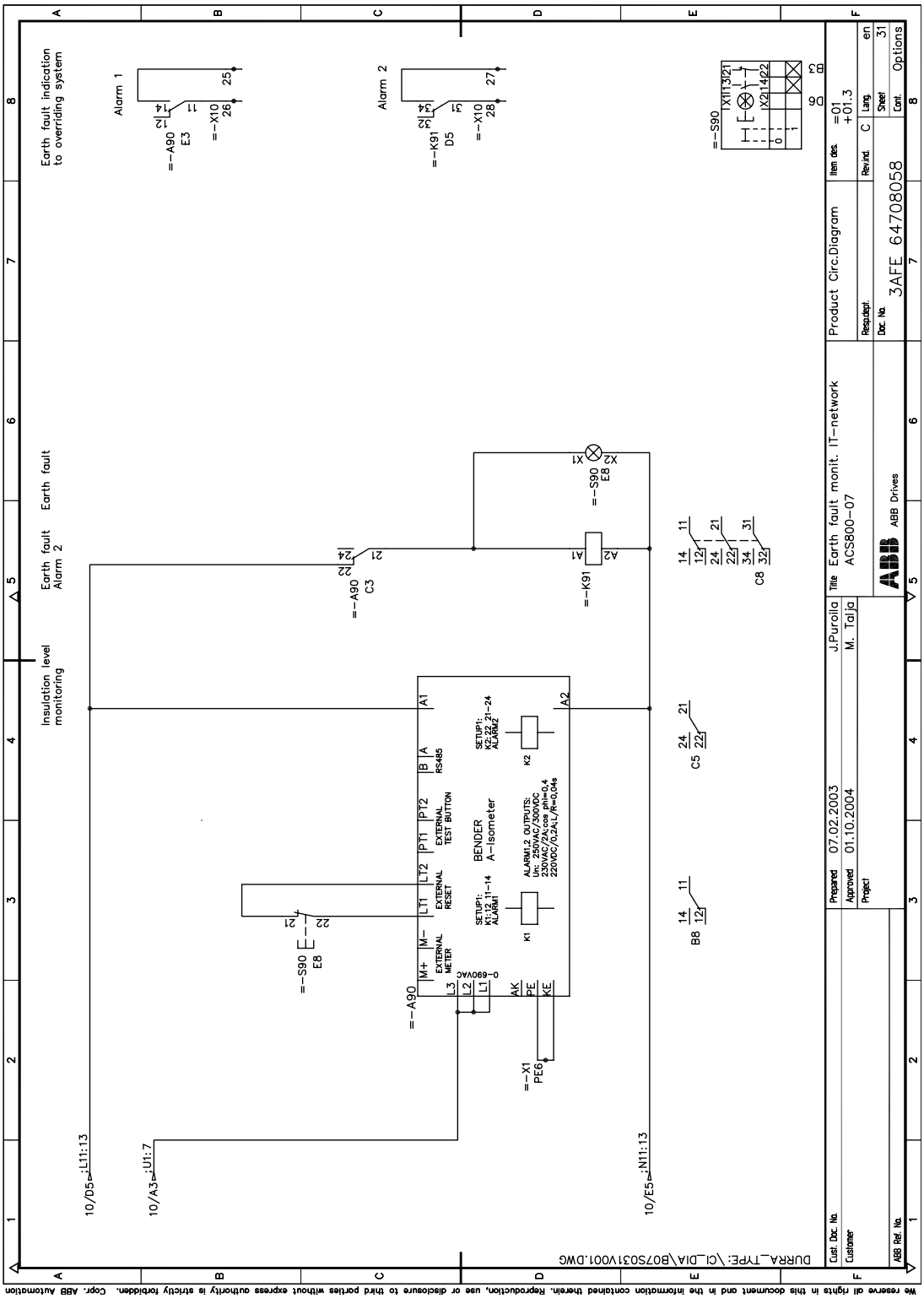
This table lists recommended actions in faults indicated by the IRDH275.

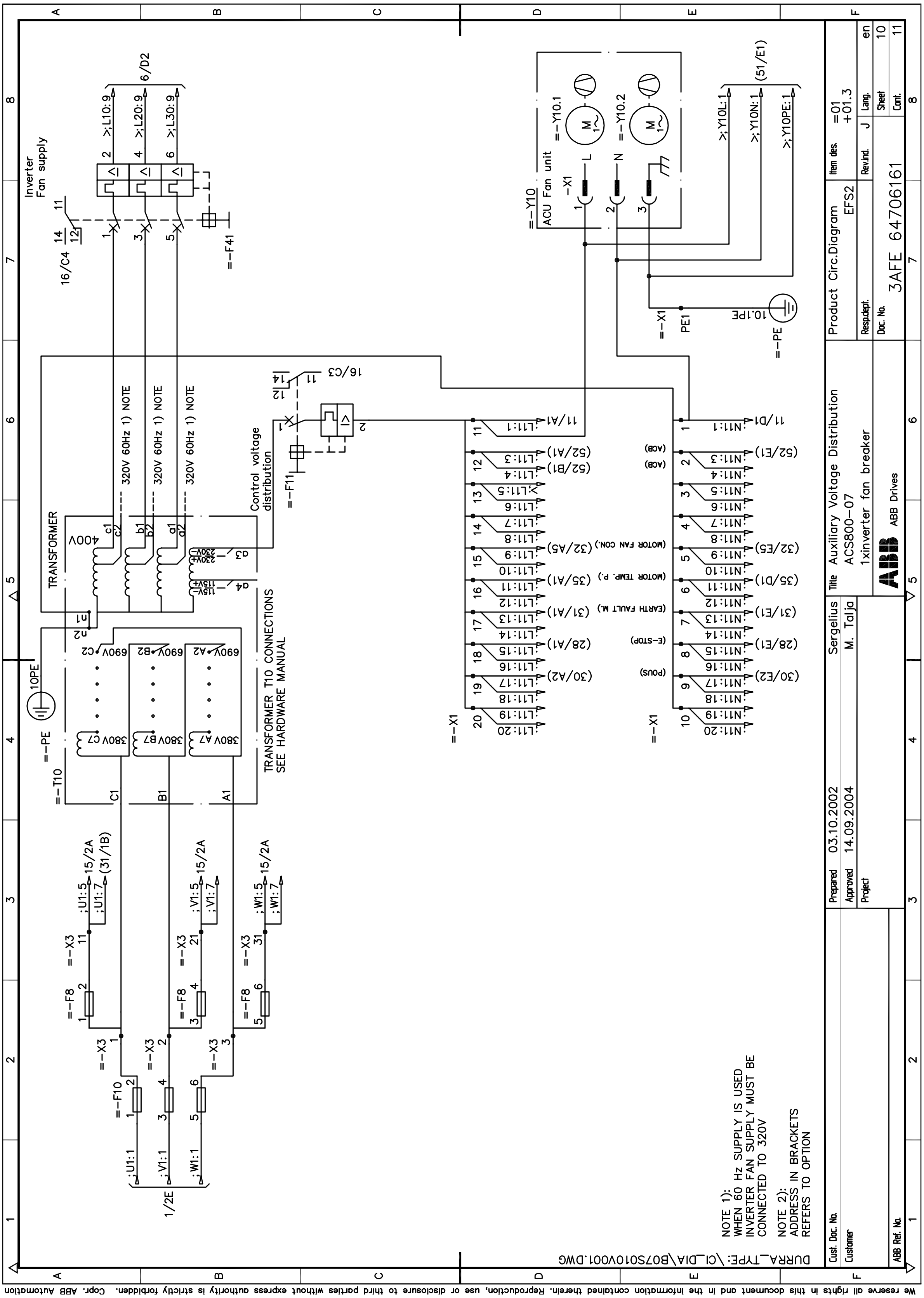
Display indication	**Cause**	**What to do**
No display	The alarm relay is in the fault position and the main contactor / breaker of the drive has opened.	Check the auxiliary power supply of the IRDH275.
Connection PE?	Low-resistance conductor to earth is not connected to terminals ⏚ and KE.	1. Check the wiring of terminals ⏚ and KE to the drive PE. 2. Press the TEST button. 3. Switch the supply voltage off and on.
System connection	Low-resistance conductors from the IT system are not connected to terminals L1, L2 or L3.	1. Check the wiring of terminals L1 and L2 to the drive. 2. Press the TEST button. 3. Switch the supply voltage off and on. 4. Check the fuses.
Device error x	Internal device error	1. Press the TEST button. 2. Switch the supply voltage off and on. 3. Contact BENDER.

Note: If the on/off switching of the supply voltage is not possible for technical reasons, a RESET of the process control can be carried out by pressing the ESC, RESET and MENU keys simultaneously.

Circuit diagrams

Example circuit diagrams of the factory wiring are shown below. See the circuit diagrams delivered with the drive for the actual wiring.





Product Circ.Diagram
EFS2
Auxiliary Voltage Distribution
ACS800-07
1xinverter fan breaker
3AFE 64706161
Sergelius
M. Talja
03.10.2002
14.09.2004
=01
+01.3
en
10
11
ABB Drives
NOTE 1):
WHEN 60 Hz SUPPLY IS USED
INVERTER FAN SUPPLY MUST BE
CONNECTED TO 320V
NOTE 2):
ADDRESS IN BRACKETS
REFERS TO OPTION
TRANSFORMER T10 CONNECTIONS
SEE HARDWARE MANUAL
TRANSFORMER
Control voltage distribution
Inverter Fan supply
ACU Fan unit
DURRA_TYPE:\CI_DIA\B07S010V001.DWG
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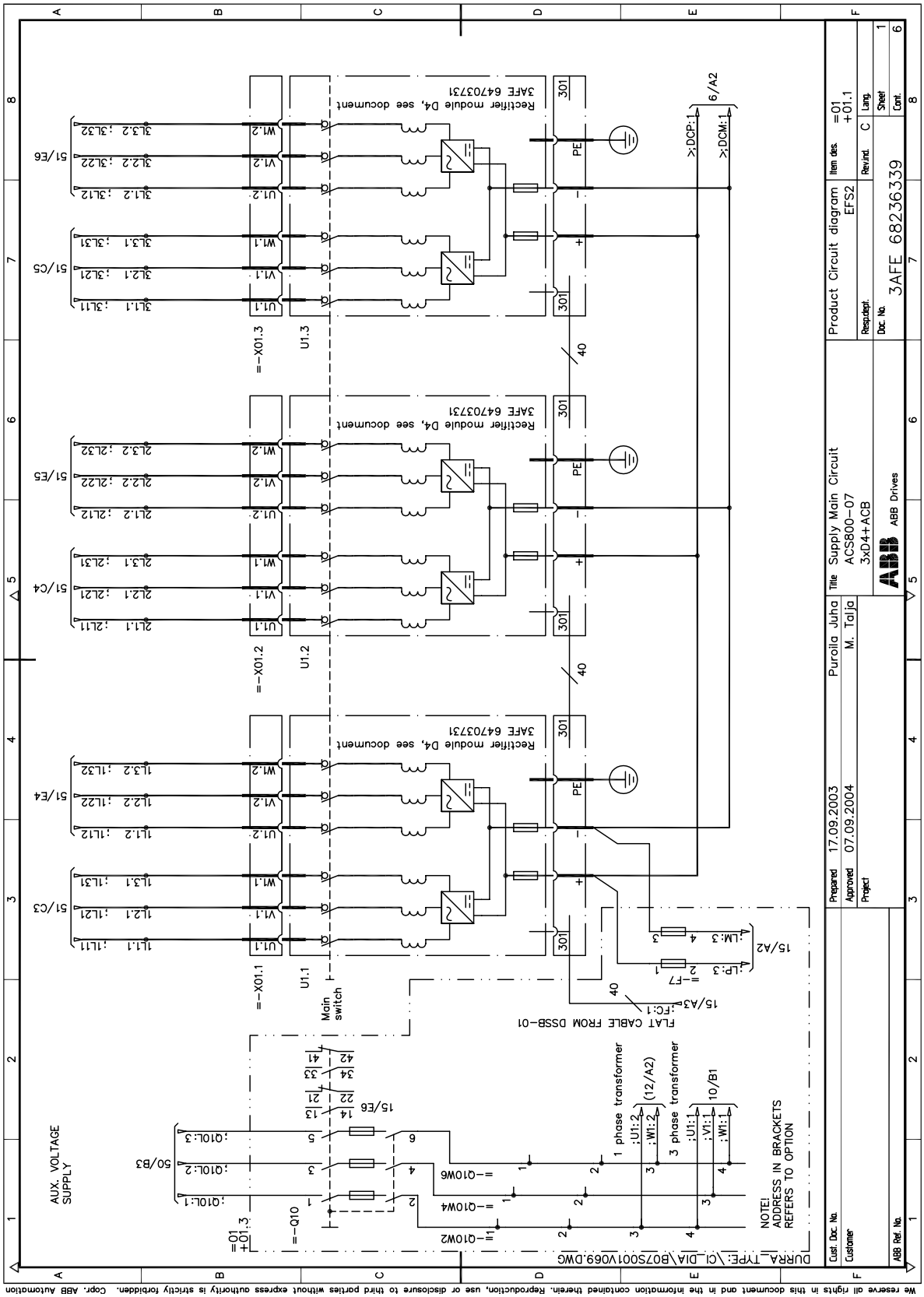
Rectifier module D4, see document
3AFE 64703731
=-X01.1
=-X01.2
=-X01.3
U1.1
U1.2
U1.3
Main switch
=-Q10
=-Q10W2
=-Q10W4
=-Q10W6
=-F7
=-FC:1
FLAT CABLE FROM DSSB-01
AUX. VOLTAGE SUPPLY
50/B3
15/E6
15/A3
15/A2
10/B1
(12/A2)
1 phase transformer
3 phase transformer
NOTE!
ADDRESS IN BRACKETS
REFERS TO OPTION
>:DCP:1
>:DCM:1
6/A2
51/C3
51/C4
51/E4
51/E5
51/E6
Prepared 17.09.2003 Purola Juha
Approved 07.09.2004 M. Talja
Project
Title Supply Main Circuit
ACS800-07
3xD4+ACB
ABB Drives
Product Circuit diagram
EFS2
Item des. =01
+01.1
Doc. No. 3AFE 68236339
Sheet 1
Cont. 6
Cust. Doc. No.
Customer
ABB Ref. No.
DURRA_TYPE:\CI_DIA\B07S001V069.DWG
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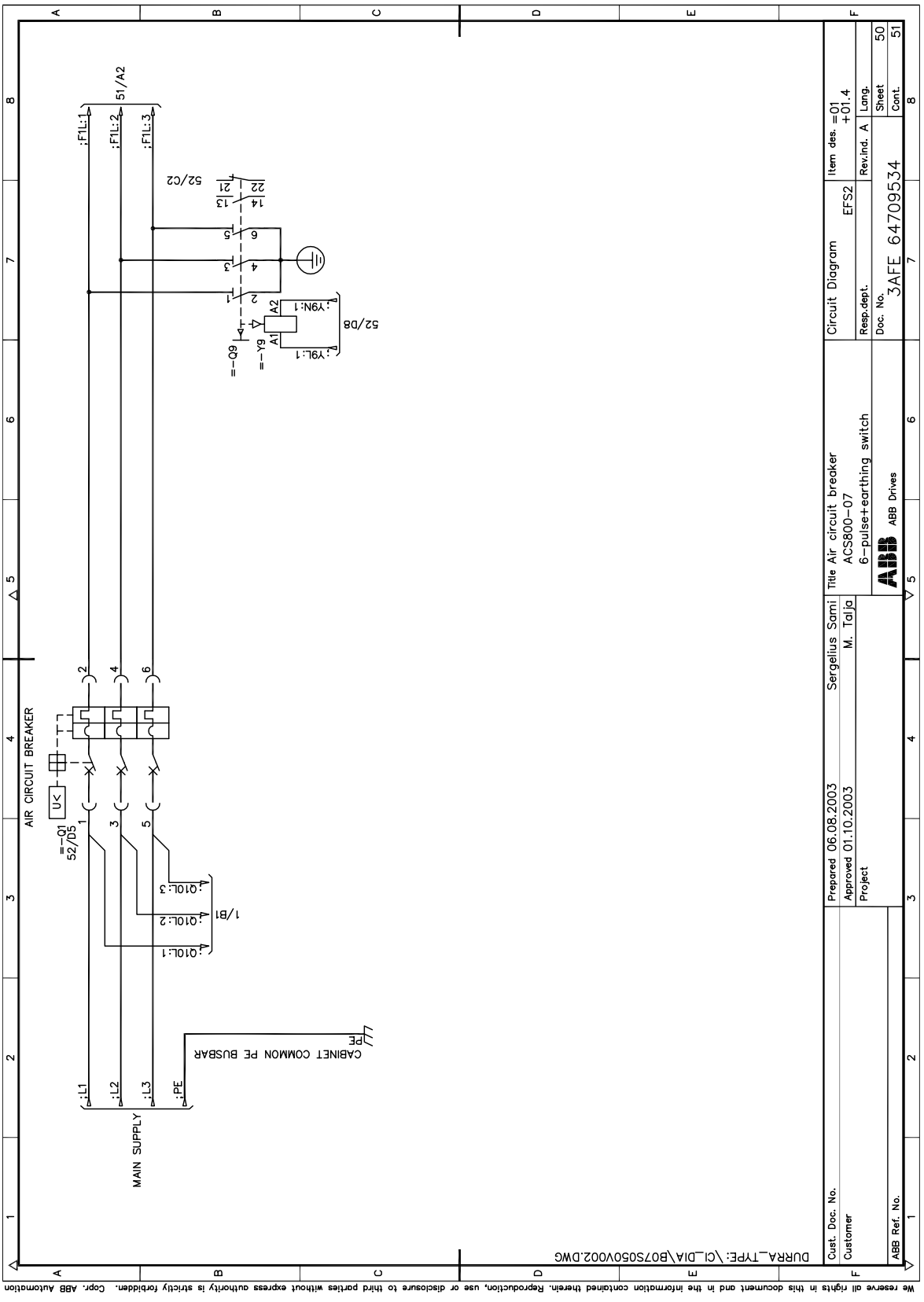
AIR CIRCUIT BREAKER
=-Q1
52/D5
U<
MAIN SUPPLY
:L1
:L2
:L3
:PE
CABINET COMMON PE BUSBAR
:Q10L:1
:Q10L:2
:Q10L:3
1/B1
:F1L:1
:F1L:2
:F1L:3
51/A2
52/C2
=-Q9
=-Y9
:Y9L:1
:Y9N:1
52/D8
Circuit Diagram
EFS2
Item des. =01 +01.4
Resp.dept.
Rev.ind. A
Lang.
Doc. No. 3AFE 64709534
Sheet 50
Cont. 51
Prepared 06.08.2003 Sergelius Sami
Approved 01.10.2003 M. Talja
Project
Title Air circuit breaker ACS800-07 6-pulse+earthing switch
ABB Drives
Cust. Doc. No.
Customer
ABB Ref. No.
DURRA_TYPE: \CI_DIA\B07505OV002.DWG
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