User's Guide

Supplement to Users' Guide
ABB ACS550 VFD

Rev. 01 2018-08-02

Table of Contents

Reference Documents

SOURCE	TITLE	DOWNLOAD REF
ABB	ABB ACS550 Users' Guide	https://library.e.abb.com/public/313b6ebaf237059fc1257d0a0048fd68/EN_ACS550_01_UM_H_A4.pdf
Lev-co	Users' Guide - Control Systems for VFD-Based Fume and Dust Collection Systems	

Revision Record

DATE	Rev No.	Description
2018-03-02	00	First Release
2018-08-02	01	Drawing updates; updated Run Lists

Warranty

This product is guaranteed to be free of defects in materials or workmanship for a period of one (1) year from date of delivery. Lev-co undertakes to repair and/or replace any such defect within the warranty period at no cost to the client. Any action by the client involving attempted repair and/or replacement either by himself or a third party voids this and all warranties.

If such exists, Lev-co extends the warranty of the manufacturer(s) for components used in this product under the terms stipulated in said warranty(ies). No other warranty is either express or implied.

1 Introduction

This Manual Supplement provides detailed documentation on the use of an ABB ACS550 VFD in a Lev-co Fume and Dust Extraction System.

Technical documentation is attached below. The User is encouraged to start with a detailed reading of the Owners' Manual to gain an understanding of installation, wiring and setup issues. This should be followed by a study of the schematic for the system supplied to gain an understanding of what the system elements are and how they are connected. The systems covered in this supplement are:

- Model 13-12 – Type 1 – VFD as a Contactor Replacement
- Model 13-13 – Type 2 – VFD System with Constant Duct Pressure
- Model 13-14 – Type 3 – Type 2 System with Controlled Electrical Dampers
- Model 13-75 – Type 2 System with Shaker Motor Cleaning
- Models 13-76 and 13-77 – Type 2 System with Sequenced Solenoids Cleaning

Items which are critical for safety, performance, or compliance with legal requirements are highlighted in RED and marked with this symbol. 

2 Installation

2.1 Mechanical Installation

The control package comprises two units: a control panel and a separate VFD. These may be mounted as desired, although care must be observed in selecting the location of the VFD.

The VFD must be located within a 50m cable run from the motor for best performance and motor life.

See the Installation section of the ABB User Guide (page 15) for detailed installation information. Note that the VFD keypad is used for drive setup and manual override and should thus be easily operator-accessible.

The installation may also require a pressure-sensing hose – see section 4.1 of the Lev-Co User Guide.

Four-conductor and STP cables are used to connect the Control Panel and the VFD. A maximum separation of 10 feet is recommended, using the cable types shown as recommended on the drawings.

2.2 Electrical Installation

Power wiring must observe the requirements of the Canadian Electrical Code CSA C22.1-15. Additionally, screened wiring is recommended for the connection from the VFD to the motor. See page 23 of the ABB ACS550 User Guide for detailed installation information.

Using the recommended cables, follow the Schematic Diagram to connect the Control Panel and the VFD. A RUN LIST and Wiring Diagram is provided for each wiring installation. **Note the jumpers on the VFD and ensure they are in place.**

3 VFD Setup

Standard VFD setup is shown on the later sheets of the schematic. For detailed information see the Start-up section on page 37 and the Parameters section on page 91 of the ABB ACS550 User Guide. When performing this setup, a comprehensive list of all parameter settings should be created for future reference.

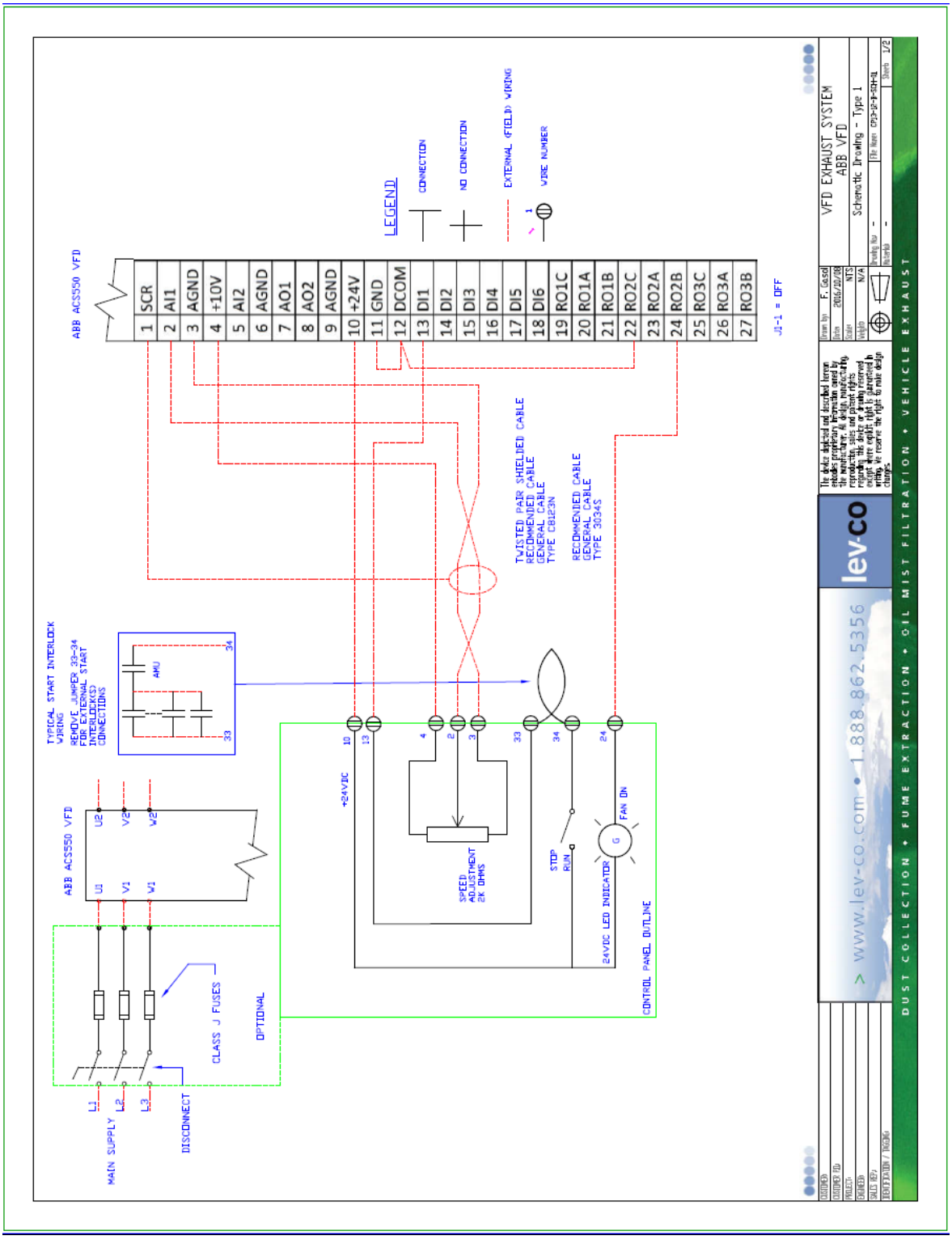
4 Drawings

Drawings follow below.

NOTE: All type 2 and type 3 systems have identical panel-to-drive wiring and drive programming. Hence, this information is presented only once, in the Type 2 section under paragraphs 4.2.1, 4.2.2, and 4.2.3.

4.1 Model 13-12 – Type 1 – VFD as a Contactor Replacement

4.1.1 Schematic Diagram and Drive Programming



Lev-Co Parameters Setup for Type1 ABB ACS550 VFD Systems

NOTE: These parameters must be entered in the order shown.

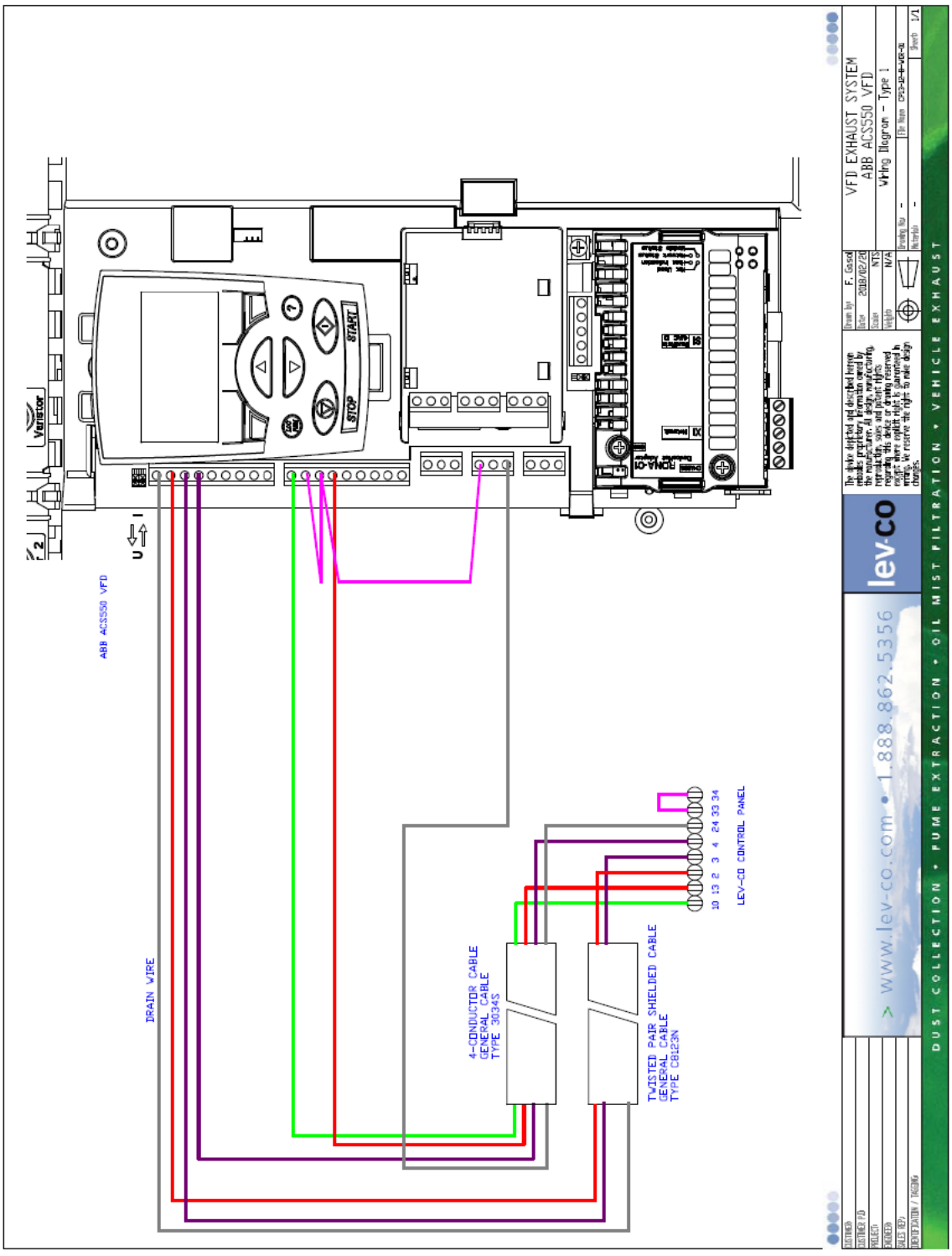
Code	Description	Set To	Units	Meaning	Notes
9901	Language	0		English	
9902	Application Macro	1		ABB Standard	
9905-9	Motor Nameplate Data	See Note			Enter Nameplate Data
2101	Start Mode	1		Auto	Drive selects optimum mode
2007	Minimum Frequency	12	Hz	12 Hz (20%) min speed	For motor cooling
2008	Maximum Frequency	60	Hz	100% max speed	See note 2
9910	ID Run	0			Perform static ID run per ABB manual P 40. Then enter the following parameters.

Code	Description	Set To	Units	Meaning	Notes
1602	Parameter Lock	1		Unlocked	See note 1
1603	Pass Code				See note 1
2102	Stop Mode	2		Ramp to Stop	
2202	ACCELERATION TIME 1	See Note	sec	Ramp up time	Set as desired. Typ = 30 secs
2203	DECELERATION TIME 1	See Note	sec	Ramp down time	Set as desired. Typ = 30 secs
2204	RAMP SHAPE 1	See Note	sec	Ramp shape	Set as desired. Typ = 6 secs

Note 1: If a pass code is ever requested, enter 358 in parameter 1603 and verify 1602 = 1

Note 2: This parameter may optionally be set higher than 100% (max RPM) if overspeed operation is desired.

4.1.2 Wiring Diagram

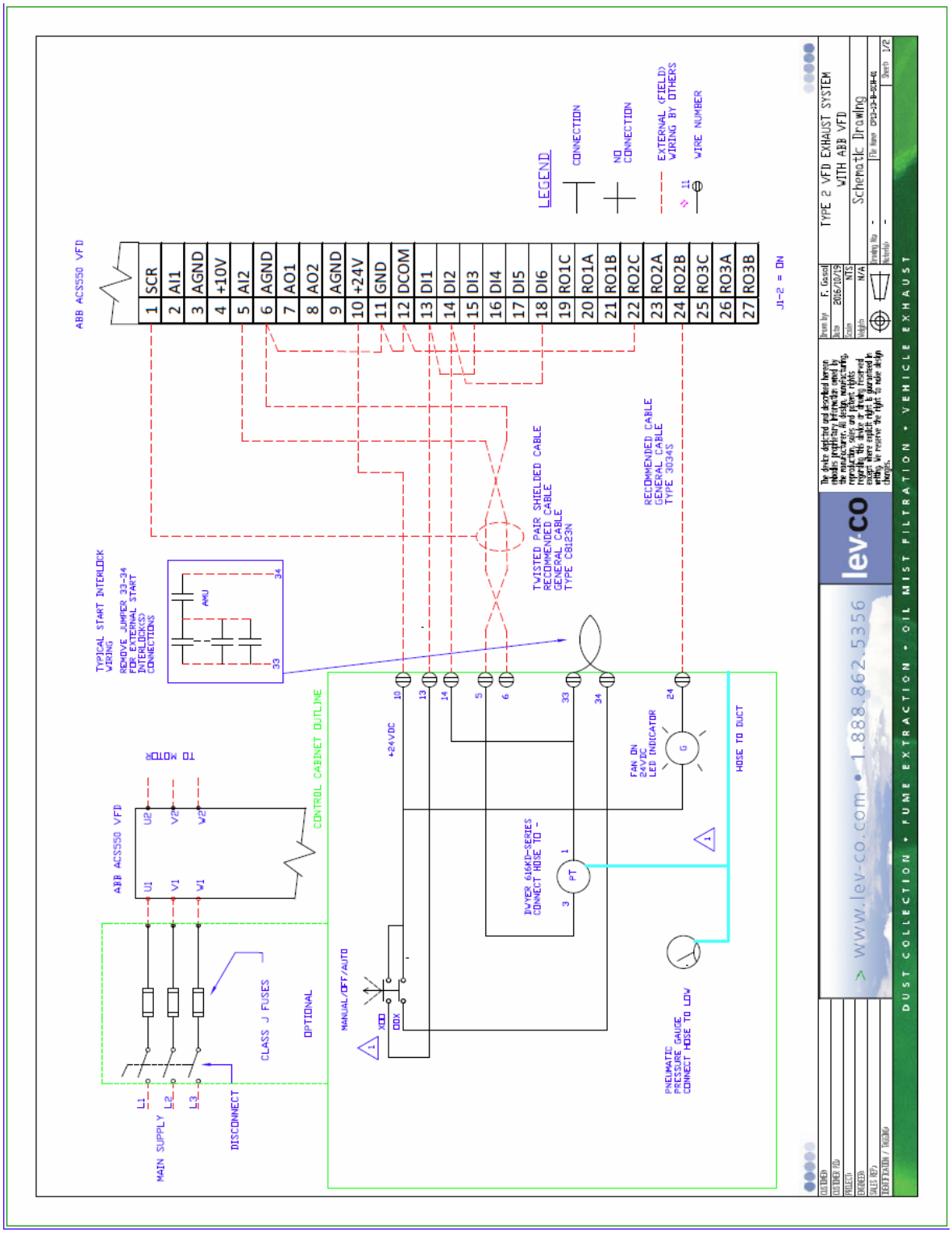


4.1.3 Run List

CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 4	VFD 4
4-conductor	RED	Control Panel 10	VFD 10
4-conductor	BLACK	Control Panel 13	VFD 13
4-conductor	WHITE	Control Panel 24	VFD 24
STP	RED	Control Panel 2	VFD 2
STP	BLACK	Control Panel 3	VFD 3
STP	SHIELD	No Connection	VFD 1
JUMPER	Any	VFD 11	VFD 12
JUMPER	Any	VFD 12	VFD 22

4.2 Model 13-13 – Type 2 – VFD System with Constant Duct Pressure

4.2.1 Schematic Diagram and Drive Programming



Lev-Co Parameters Setup for Type 2/3 ABB ACS550 VFD Systems

NOTE: These parameters must be entered in the order shown.

Code	Description	Set To	Units	Meaning	Notes
9901	Language	0		English	
9902	Application Macro	1		ABB Standard	Temporary for initial setup
9905-9	Motor Nameplate Data	See Note			Enter Nameplate Data
2101	Start Mode	1		Auto	Drive selects optimum mode
2007	Minimum Frequency	12	Hz	12 Hz (20%) min speed	For motor cooling
2008	Maximum Frequency	60	Hz	100% max speed	See note 2
9910	ID Run	0			Perform static ID run per ABB manual P 40. Then enter the following parameters.

Code	Description	Set To	Units	Meaning	Notes
9902	Application Macro	6		PID Mode	Save and continue
9904	Motor Control Mode	3		Scalar Mode	Override macro setting
1106	Ref 2 Select	19		PID Out	Set by macro - verify only
1107	Ref 2 Min	20	%	20% min speed	For motor cooling
1108	Ref 2 Max	100	%	100% max speed	See note 2
1202	Constant Speed 1	60	Hz	Full Speed	Speed set for MANUAL Mode - see note 3
1304	Min AI2	20	%	% of sensor input (4mA)	Set by macro - verify only
1305	Max AI2	100	%	% of sensor input (20mA)	Set by macro - verify only
1401	Relay Output 1	2		Run Signal	Override macro setting
1402	Relay Output 2	2		Run Signal	Set by macro - verify only
1601	Run Enable	0		Ignore	Override macro setting
1602	Parameter Lock	1		Unlocked	See note 1
1603	Pass Code				See note 1
2102	Stop Mode	2		Ramp to Stop	
2201	ACC/DEC Select	0		Select first pair	Set by macro - verify only
2202	ACCELERATION TIME 1	See Note	sec	Ramp up time	Set as desired. Typ = 30 secs
2203	DECELERATION TIME 2	See Note	sec	Ramp down time	Set as desired. Typ = 30 secs
2204	RAMP SHAPE 1	See Note	sec	Ramp shape	Set as desired. Typ = 6 secs
4001	PID Gain	1			Set by macro - see note 4
4002	PID Integration Time	60	sec		Set by macro - see note 4
4006	PID Units	4		%	
4007	PID Unit Scale	0		No decimal point	Accuracy 1%
4008	0% Value	20	%	PID target for 0 input	For motor cooling
4009	100% Value	100	%	PID target for max input	See note 2.
4010	PID Reference	19		Internal - parameter 4011	
4012	Setpoint Minimum	20	%	20% min speed	
4013	Setpoint Maximum	100	%	100% maximum speed	See note 2
4011	Internal Setpoint	See Note	%	AUTO Target Pressure	To set the target negative pressure, turn on the drive in LOCAL mode and ramp the motor speed up (or down) to achieve the desired value on the pressure gauge display. Read the sensor output % at parameter 0121. Stop the drive and set parameter 4011 to this value.

Note 1: If a pass code is ever requested, enter 358 in parameter 1603 and verify 1602 = 1

Note 2: These parameters may optionally be set higher than 100% (max RPM) if overspeed operation is desired.
Their values should be consistent.

Note 3: The MANUAL operating speed may be set higher than 60 Hz if Note 2 is in effect.

Note 4: For fine tuning of control loop operation, see ABB manual page 170.

1 ADDED PRESSURE HOSE
REVISED SWITCH REPRESENTATION
UPDATED PARAMETER SETTINGS
2018-07-25 FG

CUSTOMER:
CUSTOMER P/O:
PROJECT:
ENGINEER:
SALES REP:
IDENTIFICATION / TAGGING:

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Drawn by: F. Gasol
Date: 2016/10/19
Scale: NTS
Weight: N/A
Drawing No: -
Material: -

TYPE 2 VFD EXHAUST SYSTEM
WITH ABB VFD
Schematic Drawing

File Name: CP13-13-B-SCH-01
Sheet: 2/2

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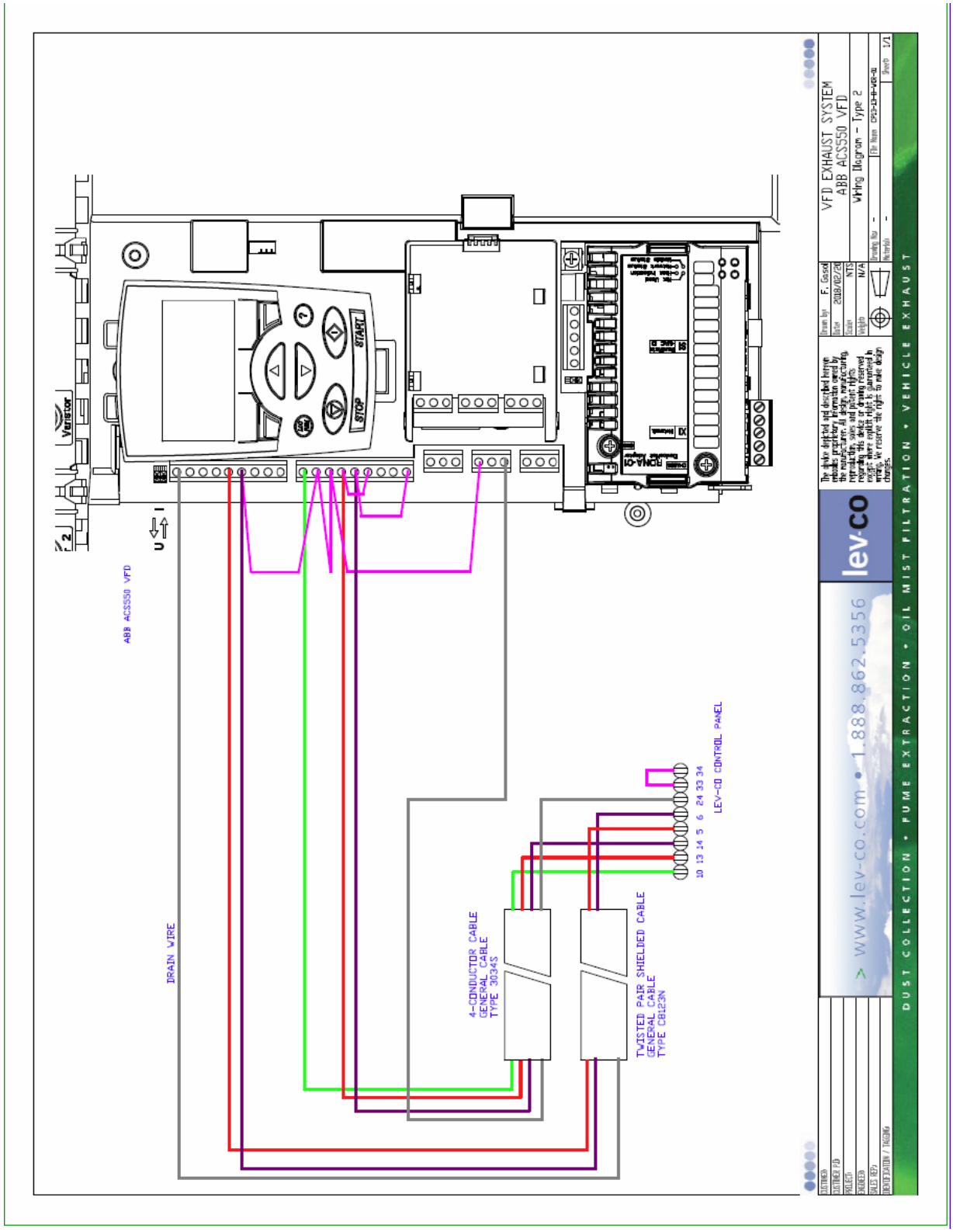
4.2.2 Wiring Diagram

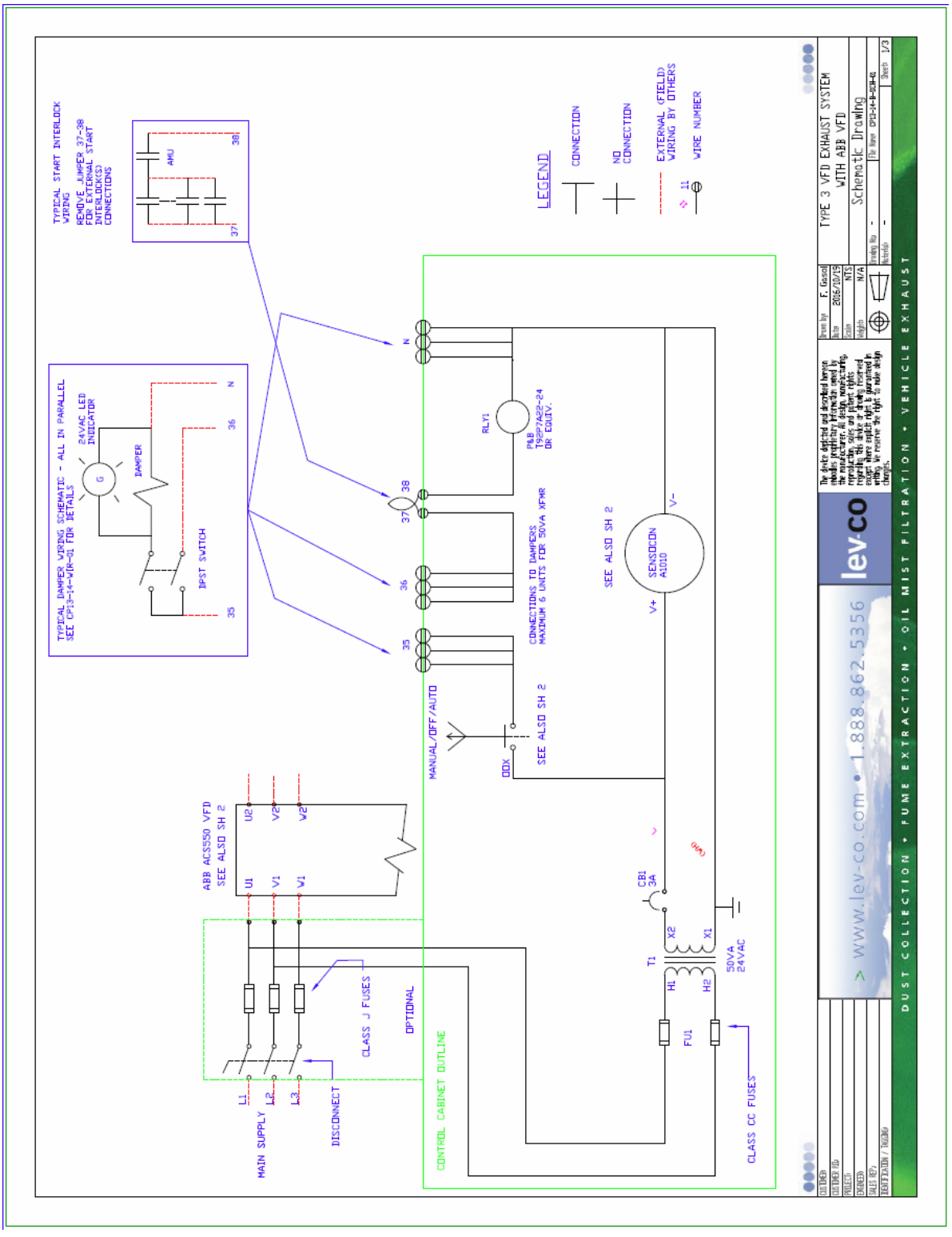


4.2.3 Run List

CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 10	VFD 10
4-conductor	RED	Control Panel 13	VFD 13
4-conductor	BLACK	Control Panel 14	VFD 14
4-conductor	WHITE	Control Panel 24	VFD 24
STP	RED	Control Panel 5	VFD 5
STP	BLACK	Control Panel 6	VFD 6
STP	SHIELD	No Connection	VFD 1
JUMPER	Any	VFD 6	VFD 11
JUMPER	Any	VFD 11	VFD 12
JUMPER	Any	VFD 12	VFD 22
JUMPER	Any	VFD 13	VFD 15
JUMPER	Any	VFD 14	VFD 18

4.3 Model 13-14 – Type 3 – Type 2 System with Controlled Electrical Dampers

4.3.1 Schematic Diagram



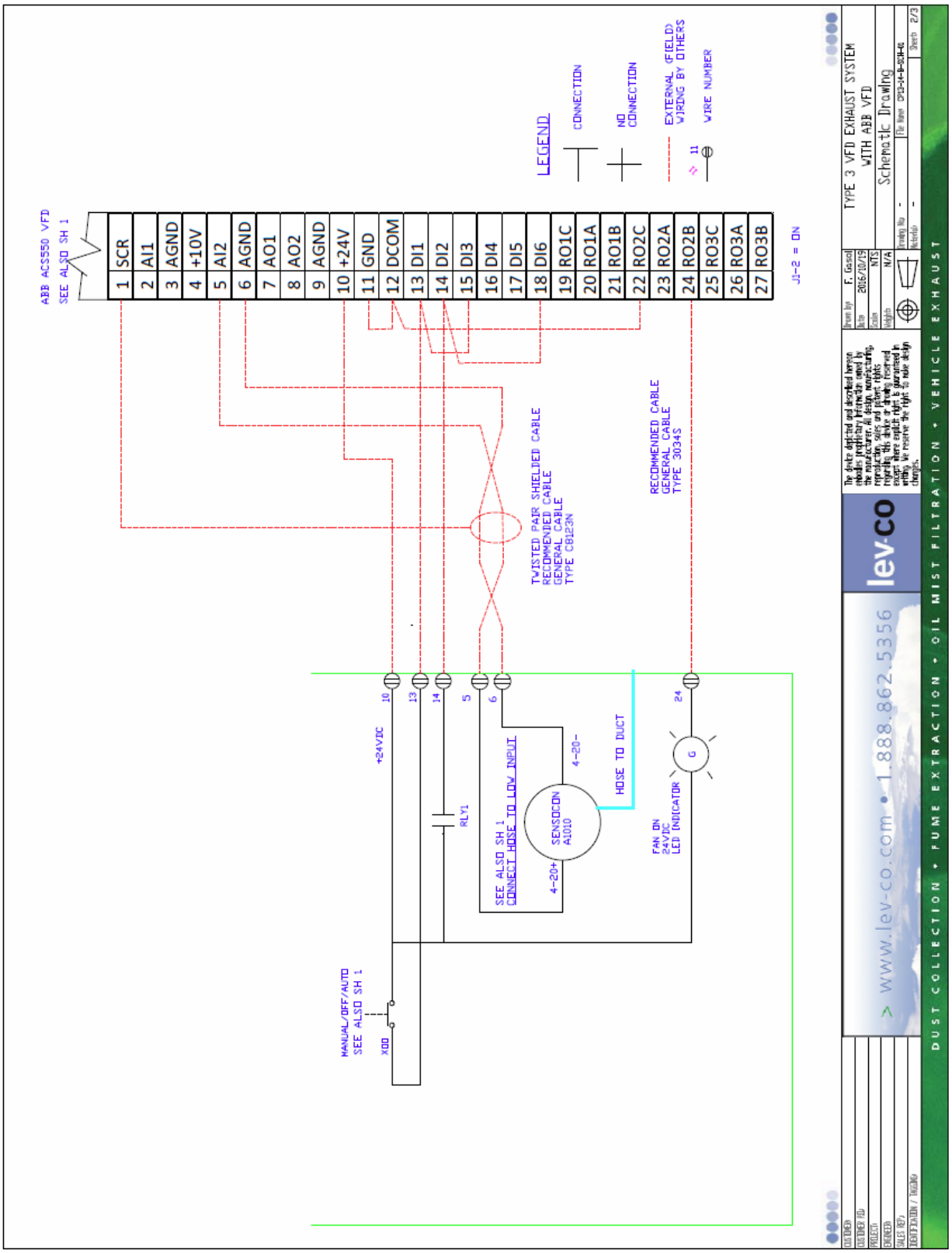

TYPE 3 VFD EXHAUST SYSTEM
WITH ABB VFD
Schematic Drawing
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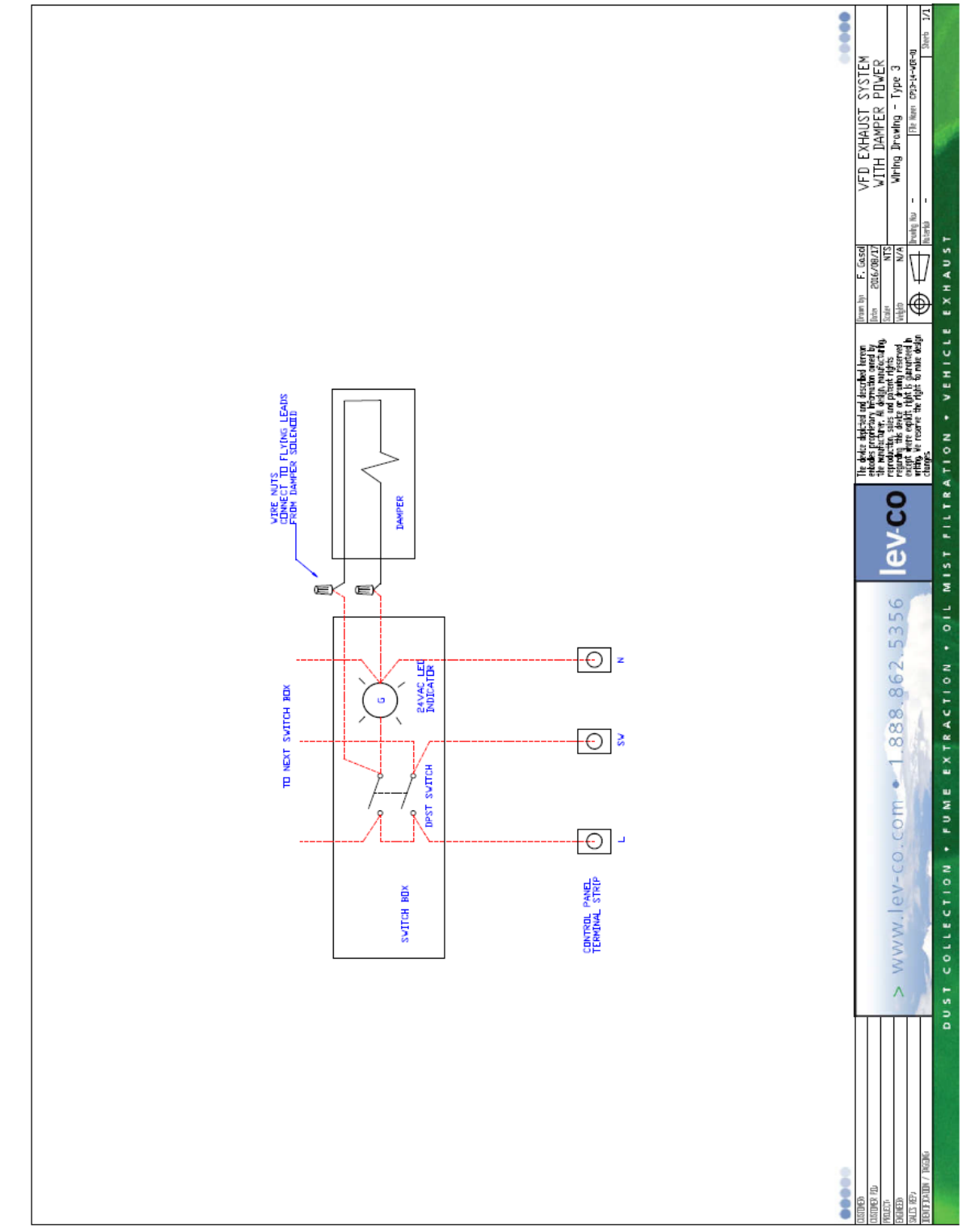
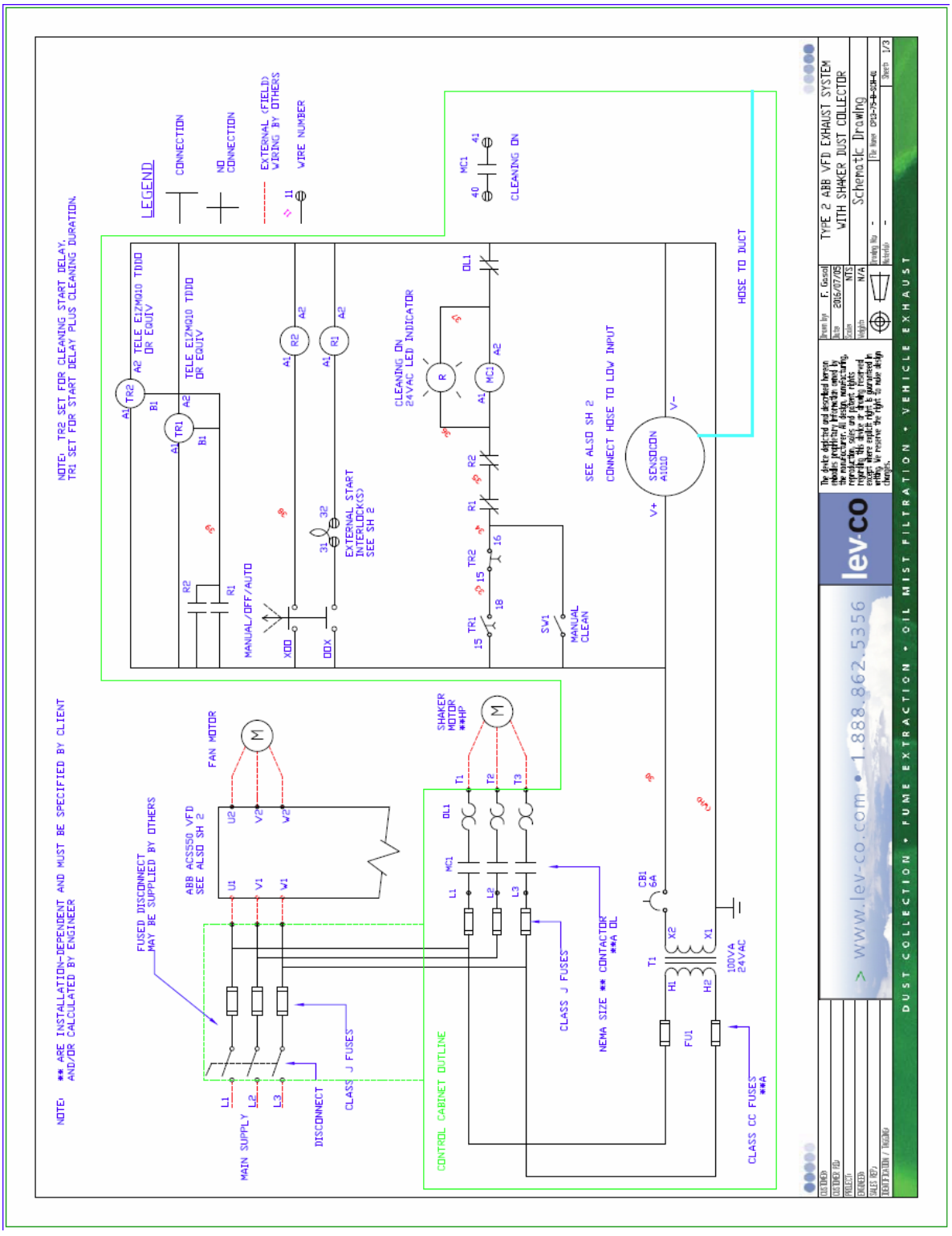
ABB ACS550 VFD
SEE ALSO SH 1
1 SCR
2 AI1
3 AGND
4 +10V
5 AI2
6 AGND
7 AO1
8 AO2
9 AGND
10 +24V
11 GND
12 DCOM
13 DI1
14 DI2
15 DI3
16 DI4
17 DI5
18 DI6
19 RO1C
20 RO1A
21 RO1B
22 RO2C
23 RO2A
24 RO2B
25 RO3C
26 RO3A
27 RO3B
J1-2 = ON
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11 WIRE NUMBER
TWISTED PAIR SHIELDED CABLE
RECOMMENDED GENERAL CABLE
TYPE CB123N
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
+24VDC
10
13
14
5
6
24
RLY1
SEE ALSO SH 1
CONNECT HOSE TO LOW INPUT
4-20+
SENSOCON
A1010
4-20-
HOSE TO DUCT
FAN ON
24VDC
LED INDICATOR
G
MANUAL/OFF/AUTO
SEE ALSO SH 1
X00

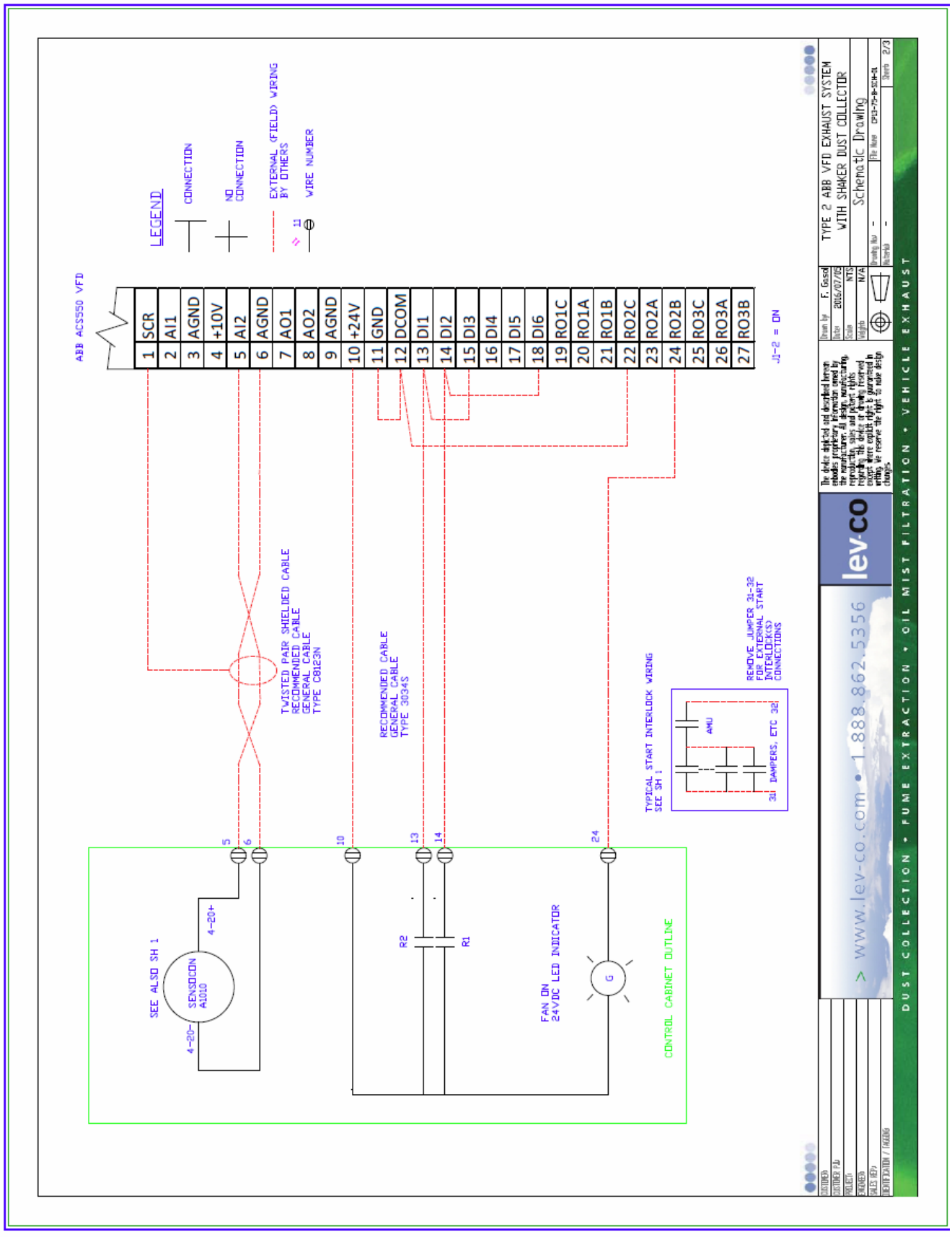
4.3.2 Type 3 Field Wiring



4.4 Model 13-75 – Type 2 System with Shaker Motor Cleaning

4.4.1 Schematic Diagram




TYPE 2 ABB VFD EXHAUST SYSTEM
WITH SHAKER DUST COLLECTOR
Schematic Drawing
ABB ACS550 VFD
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
WIRE NUMBER
1 SCR
2 AI1
3 AGND
4 +10V
5 AI2
6 AGND
7 AO1
8 AO2
9 AGND
10 +24V
11 GND
12 DCOM
13 DI1
14 DI2
15 DI3
16 DI4
17 DI5
18 DI6
19 RO1C
20 RO1A
21 RO1B
22 RO2C
23 RO2A
24 RO2B
25 RO3C
26 RO3A
27 RO3B
J1-2 = ON
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
TYPICAL START INTERLOCK WIRING
SEE SH 1
AMU
31 DAMPERS, ETC 32
REMOVE JUMPER 31-32
FOR EXTERNAL START
INTERLOCK(S)
CONNECTIONS
SEE ALSO SH 1
SENSOCON
A1010
4-20+
4-20-
R2
R1
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
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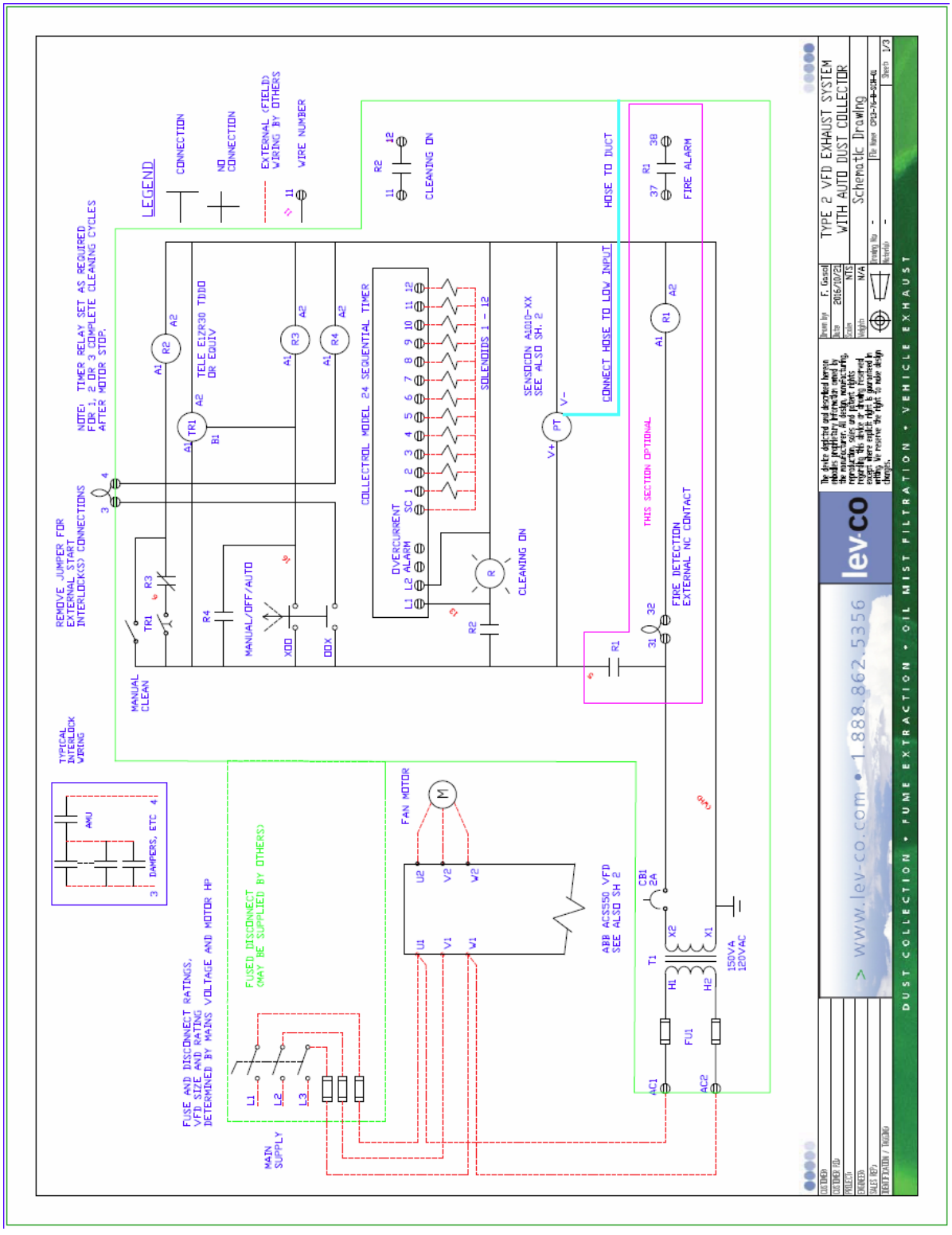
4.5 Models 13-76 – Type 2 System with Collectrol Solenoids Cleaning

4.5.1 Schematic Diagram



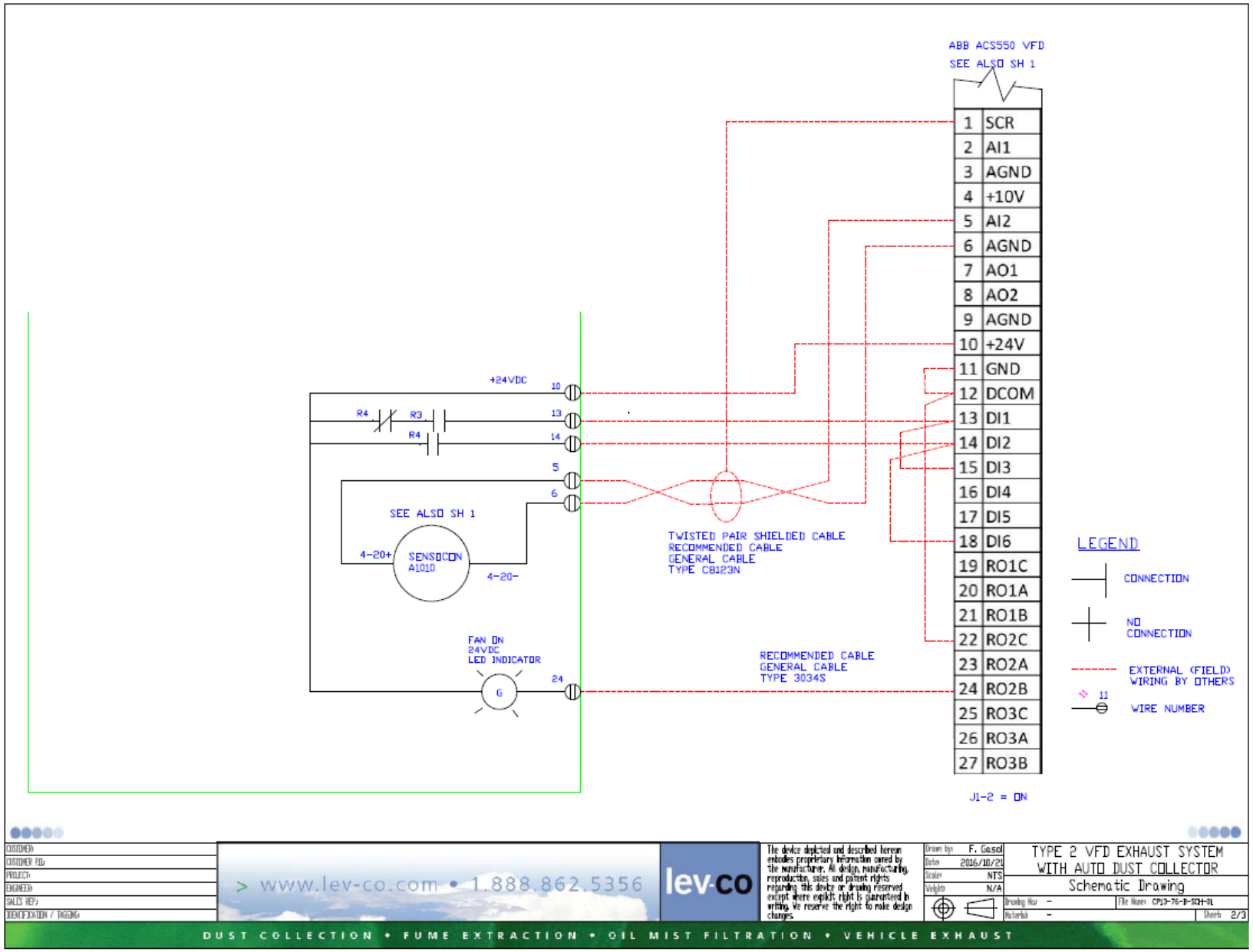


ABB ACS550 VFD
SEE ALSO SH 1
1 SCR
2 AI1
3 AGND
4 +10V
5 AI2
6 AGND
7 AO1
8 AO2
9 AGND
10 +24V
11 GND
12 DCOM
13 DI1
14 DI2
15 DI3
16 DI4
17 DI5
18 DI6
19 RO1C
20 RO1A
21 RO1B
22 RO2C
23 RO2A
24 RO2B
25 RO3C
26 RO3A
27 RO3B
J1-2 = ON
+24VDC
10
R4
R3
13
R4
14
5
6
SEE ALSO SH 1
4-20+
SENSOCON
A1010
4-20-
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
FAN ON
24VDC
LED INDICATOR
G
24
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP:
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Drawn by: F. Gasol
Date: 2016/10/21
Scale: NTS
Weight: N/A
TYPE 2 VFD EXHAUST SYSTEM
WITH AUTO DUST COLLECTOR
Schematic Drawing
Drawing No: -
File Name: CP13-76-B-SCH-BL
Material: -
Sheet: 2/3
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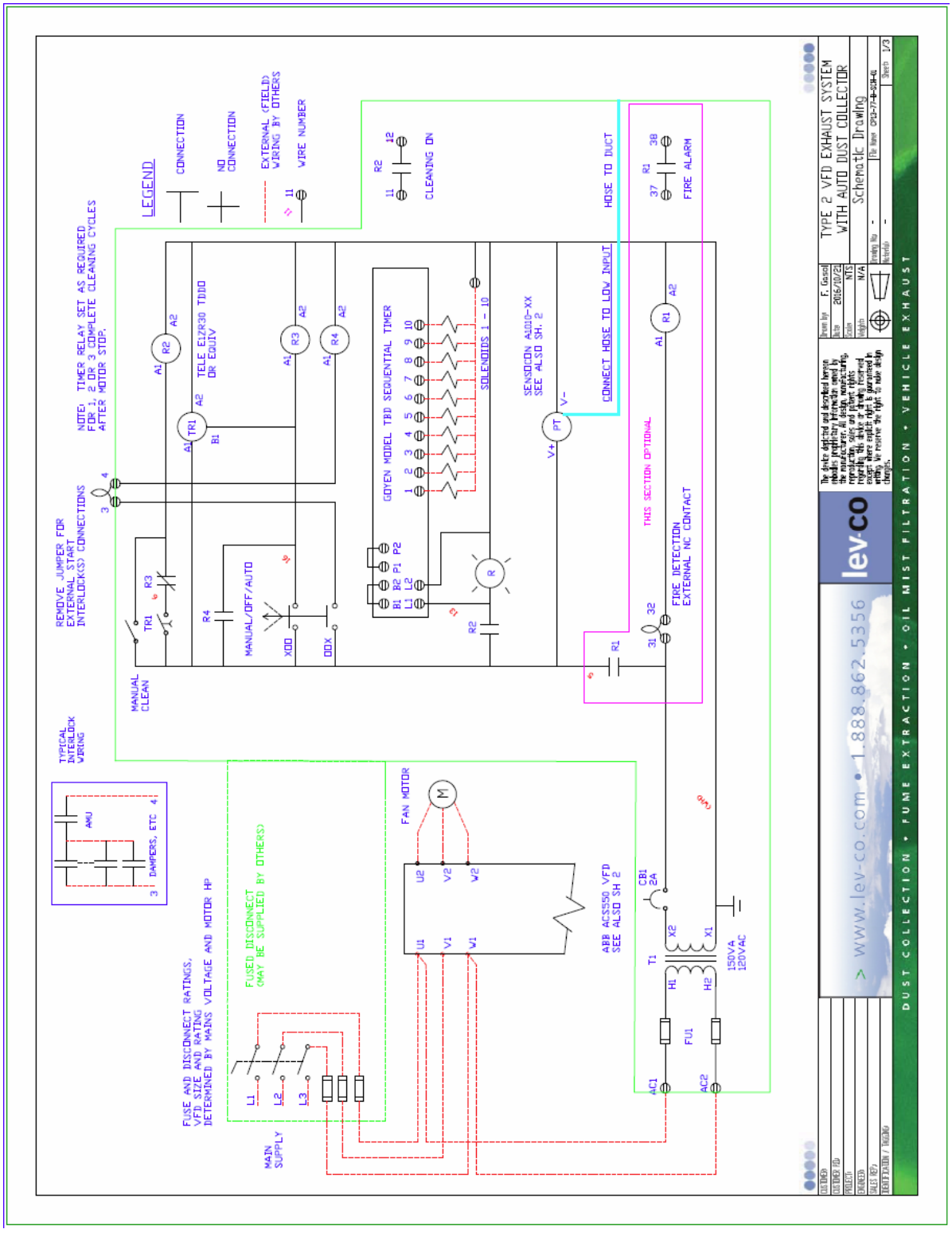
4.6 v Model 13-77 – Type 2 System with Goyen Solenoids Cleaning

4.6.1 Schematic Diagram



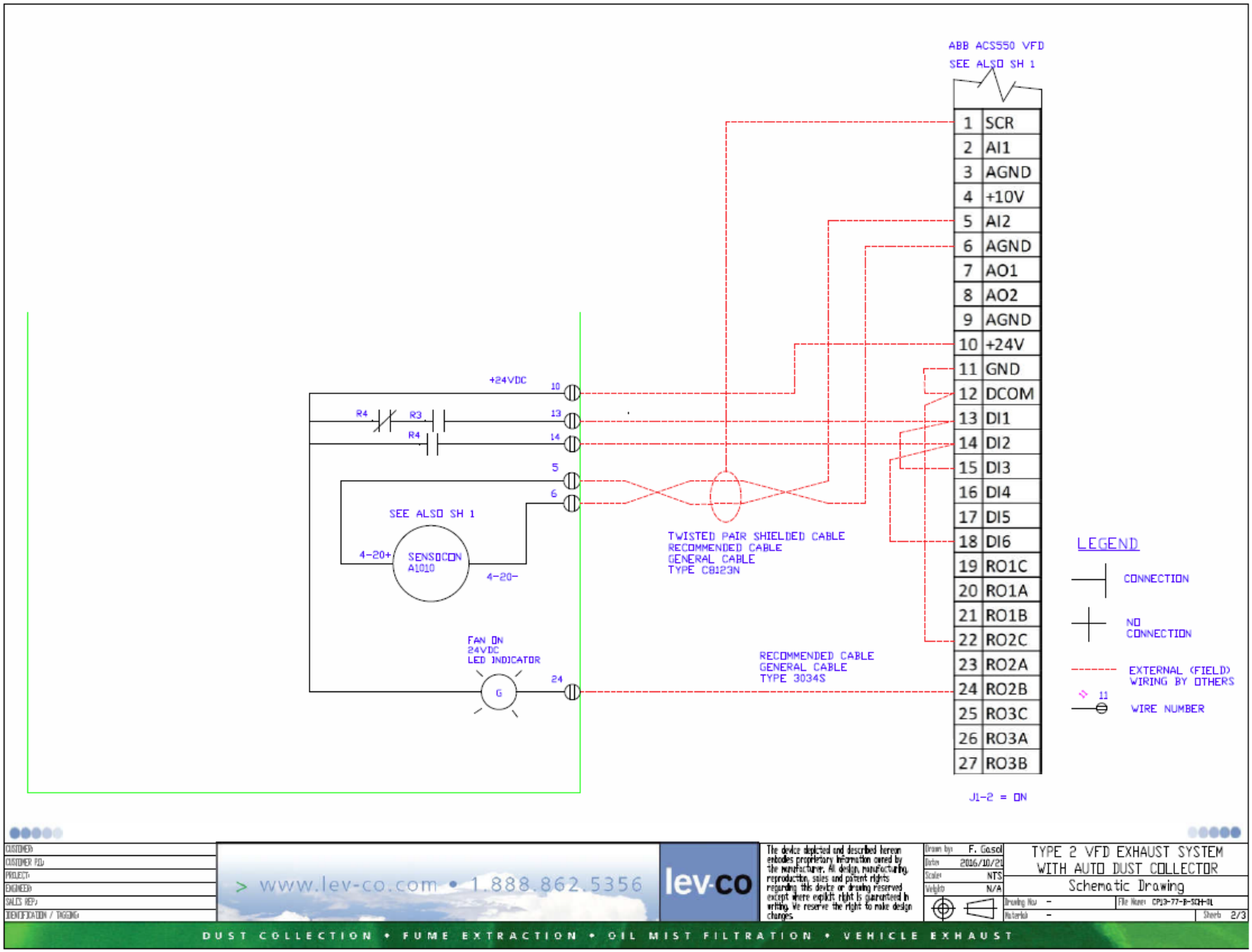


ABB ACS550 VFD
SEE ALSO SH 1
1 SCR
2 AI1
3 AGND
4 +10V
5 AI2
6 AGND
7 AO1
8 AO2
9 AGND
10 +24V
11 GND
12 DCOM
13 DI1
14 DI2
15 DI3
16 DI4
17 DI5
18 DI6
19 RO1C
20 RO1A
21 RO1B
22 RO2C
23 RO2A
24 RO2B
25 RO3C
26 RO3A
27 RO3B
J1-2 = ON
+24VDC
10
13
14
5
6
R4
R3
R4
SEE ALSO SH 1
4-20+
SENSOCON
A1010
4-20-
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
FAN ON
24VDC
LED INDICATOR
G
24
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
IDENTIFICATION / TAGGING:
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Drawn by: F. Gasol
Date: 2016/10/21
Scale: NTS
Weight: N/A
TYPE 2 VFD EXHAUST SYSTEM
WITH AUTO DUST COLLECTOR
Schematic Drawing
Drawing No: -
File Name: CP13-77-B-SCH-01
Material: -
Sheets 2/3
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